Combined Proceedings
Central, Eastern, and Western Regional Meetings
1982

Association of College Professors of Textiles and Clothing, Inc.
ACPTC Combined Regional Meeting Proceedings

1982

Association of College Professors of Textiles and Clothing, Inc.
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Central Region
ACPTC-CR OFFICERS AND COMMITTEE CHAIRPERSONS

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  Purdue University
Imogene Ford, Secretary
  University of Tennessee
Nelma Fetterman, Treasurer
  University of Alberta
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  Ruth Marshall, Iowa State University
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  Esther Meacham, Ohio State University

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Newsletter Editor
  Gloria Williams, Univ. of Minnesota
Historian
  Patricia Horridge, University of Texas

CONFERENCE COMMITTEES

Program
  Betty Wass, University of Wisconsin
Local Arrangements
  Margaret Grindereng, Univ. of Minnesota
Registration
  Sara Kadolph, Iowa State University
Proceedings
  Sandra Hutton, University of Nebraska
Hospitality
  Helen Lunde, North Dakota State Univ.
Evaluation
  Holly Bastow-Shoop, Emporia State Univ.
Research
  Carolyn Callis, University of Texas
Publicity
  Sherri Johnson, University of Minnesota
Resource Exhibit
  Dorothy Behling, Bowling Green St. Univ.
Fiber Arts Exhibit
  Ardis Rewerts, University of Texas
Roundtables
  Holly Schrank, Purdue University
Thursday, October 28th

8:00 - 9:00 am  Meeting of Conference Chairpersons
9:00 - 10:30 am  Meeting of 1982 Council
9:30 - 12:30 pm  Tour of Minneapolis Institute of Arts & Guthrie Theatre
9:30 - 12:30 pm  Tour of Faribault Mills
10:00 - 10:45 am  Tour of Albrecht's Furs
10:00 - 10:45 am  Tour of Rainbow Maternity Wear

1:45 - 2:45 pm  General Session I
   Presiding: Mary Littrell, ACPTC-CR President, Iowa State University
   Address: "Interdisciplinary Creative Problem-Solving"
            Gerald Allen, College of Art and Design and President of
            Criteria..., Minneapolis

2:45 - 3:00 pm  Beverage Break

3:00 - 4:15 pm  Symposium "Planning and Decision Making and the
   Decision Process"
   Moderator: Jacquelyn DeJonge, University of Tennessee
   Participants: "Use of the Computer in Textile Design"
                 Patricia Mansfield, University of Wisconsin
                 "Developing and Implementing Design Specifications in
                 Apparel and Interiors"
                 Duncan Case, University of Tennessee
                 "Economic Design Decisions in the Apparel Industry"
                 Jerry Lavin, Gordon and Ferguson Clothing Manufacturers,
                 Minneapolis

5:45 - 6:15 pm  General Session II
   Presiding: Ardis Rewerts, University of Texas-Austin
   Welcome: Joanne Eicher, University of Minnesota
   Address: Gallery Talk
            Mary Stieglitz, Head, Design Department, University of
            Minnesota

6:15 - 7:15 pm  Cocktail Supper, University of Minnesota

7:15 - 8:30 pm  Juried Fiber Arts Exhibit
   Coordinator: Ardis Rewerts, University of Texas, Austin
Tours of McNeal Hall
Coordinator: Marilyn DeLong, University of Minnesota

Juried Educational Resource Exhibit
Coordinator: Dorothy Behling, Bowling Green State University

Participants: "Flat Pattern Lab Manual"
Donna Albrecht, University of Wisconsin-Stout
"How Teenage Males Can Apply Line, Design, Color to Clothing Choices"
Joy Bostrom, University of North Dakota
"Course Material for Production Aspects of Textile Products"
Sara Butler, Miami University
"Dressing for Energy Conservation"
Sara Butler & Sally Francis, Miami University
"Apparel Manufacturing"
Betty Cagna, Lexington, Missouri
"Staywarm with Clothing Computer Program"
"Format for Conducting a Class Research Project"
Sally K. Francis, Miami University
"Fabric Stain Removal Computer Program"
JoAnn Hilliker, University of Kentucky
"Teaching Textile Science Basic Introductory Course"
Jane W. Hooper & Dorothea June Grossbart, Wayne State University
"Computerized Data Base of Clothing Periodical Literature"
Sandra S. Hutton, University of Nebraska, Lincoln
"Team Teaching Using T.V. in a Two-Campus Situation"
Rita McKenna Kean, University of Nebraska, Lincoln & Bette Tweten, University of Nebraska, Omaha
"Computer Program for Fashion Merchandising Class"
Grace I. Kunz, Iowa State University
"Trade Journals for Clothing and Textiles"
Holly Schrank, Purdue University
"Clothing for Special Needs"
Joyce Smith & Norma Deyo, Ohio State University

Friday, October 29

8:15 - 9:15 am General Session III
Presiding: Imogene Ford, ACPTC-CR Secretary, University of Tennessee
Address: "Contemporary Technology of Apparel Manufacturing: Its Effect on the Designer"
Kathryn Johnson, Director of Design, Vassarette, Division of Munsingwear

9:15 - 10:30 am Presidential Remarks and Business Meeting

10:30 - 10:45 am Beverage Break

10:45 - 12:15 pm Special Interest Groups I
Presiding: Barbara Reagan, Kansas State University
Participants:

"Instrumental Color Evaluation for Research and Design"
Richard Harold, Manager, Applications Engineering, Hunter Associates Laboratory

"Recent Trends in Textile Finishing"
Robert E. Averell, Adjunct Professor of Textiles, Kansas State University, and Group Leader, Staple Technical Service, Celanese Fibers Marketing Company

"Dyeing and Printing Basics for Educators and Designers"
Barbara M. Reagan, Kansas State University

B. Visual Display in Merchandising
Sam Druy, University of Minnesota

Address:
"Communicating a Theme to the Public"
Karen Bohnhoff, Divisional Vice President of Fashion & Development, Dayton's

12:30 - 1:45 pm
Roundtable Special Interest Luncheon, Minneapolis Athletic Club

Presiding:
Holly Schrank, Purdue University

2:00 - 3:30 pm
Research Reporting Session I

A. Textile Science
Presiding, Margaret T. Ordonez, Kansas State University

2:00 - 2:20 pm
"Precision Analysis and Evaluation of Research Methodology Used in Window Energy Studies"
Maureen M. Grasso, University of Texas, Austin, & Jacquelyn Orlando DeJonge, University of Tennessee, Knoxville

2:20 - 2:40 pm
"Liquid Ammonia Treatment of High Wet Modulus Rayon Fabrics"
Lenore Cheek, Louisiana State University, & Christine M. Ladisch, Purdue University

2:40 - 3:00 pm
"Hydrophilic Finishes: Effect on Polyester Fabric,"
Helen A. Lunde, Coila Janecek, & Vicki Bogart, North Dakota State University

3:00 - 3:20 pm
"Direct Dye Penetration Behavior of Selected High Wet Modulus Rayon Fibers"
Vivian Davis, Rosalie King, University of Washington, & Lenore Cheek, Louisiana State University

B. Economic/Consumer
Presiding: Hilda Mayer Buckley, University of Illinois, Urbana-Champaign

2:00 - 2:20 pm
"Communicating the Problems of Workers in the Textile Industry: The Case of J.P. Stevens and the ACTWU,"
Sara Douglas, University of Illinois, Urbana-Champaign, Invited paper by ACPTC-CR Fellowship Recipient

2:20 - 2:40 pm
"Retailer's Views and Purchasing Patterns of Apparel Imports"
Kitty G. Dickerson, University of Missouri, Columbia
2:40 - 3:00 pm  "A Comparison of the Ability of Family Life Cycle and Family Composition Models to Predict Family Clothing Expenditures,"
Janet Wagner & Elizabeth McCullough, Kansas State University

3:00 - 3:20 pm  "Male and Female Style Preference and Perceived Fashion Risk",
Jacqueline A. Lubner-Rupert & Geitel Winakor, Iowa State University

C. Pesticides/Historic/Consumer
Presiding: Jacquelyn Orlando DeJonge, University of Tennessee, Knoxville

2:00 - 2:20 pm  "Clothing Wear and Care Practices of Field Consultants Exposed to Insecticides,"
K. Rinn McLellan, Margaret S. Hranitzky, Mary O. Day, & Nancy K. Keith, Louisiana State University

2:20 - 2:40 pm  "User Evaluation of Functionally Designed Protective Clothing for Agricultural Workers"
Nancy K. Murray, Idaho State University & Jacquelyn Orlando DeJonge, University of Tennessee, Knoxville

2:40 - 3:00 pm  "The Origin and Development of the Victorian 'Crazy' Quilt"
Virginia Gunn, University of Akron

3:00 - 3:20 pm  "Consumer Satisfaction: Attitudes Among Retirees"
Dawn Throndike Pysarchik & Marilyn Nagy, Michigan State University

3:30 - 3:45 pm  Beverage Break

3:45 - 5:15 pm  Special Interest Groups II

A. Textile Conservation: Focus on Exhibition
Presiding: Virginia Gunn, University of Akron
Participants:
"Exhibition Planning: Object Selection to Opening Night"
Lotus Stack, Minneapolis Institute of Arts
"Exhibiting Large Textiles"
Margaret Ordonez, Kansas State University
"Preparing a Traveling Exhibition"
Nelda Christ, Indiana University

B. Relevance of Cultural Studies in Textiles & Clothing
Presiding: Ann Slocum, Michigan State University
Participants:
"Using Ethnic Clothing and Textiles to Stimulate Interest in Global Awareness—Outside the College Classroom"
Rae Reilly, Iowa State University
"The Relevance of Cultural Studies to Retailing/Merchandising Students"
Betty Wass, University of Wisconsin
"Teaching Techniques"
Holly Schrank, Purdue University
"Application in Developing Countries of Cultural Information About Dress"
Mary Littrell, Iowa State University
Visit to Hmong Retail Shop in Minneapolis

C. The Role of Clothing Construction in the Curriculum of the '80's.

Presiding: Ruth Marshall, Iowa State University

Participants: "Textiles and Clothing Curriculum: Current Trends and Future Outlook"
Nancy Rudd, Ohio State University
"Clothing Construction: Issues and Alternatives"
Marilyn DeLong, University of Minnesota
"Sequencing Clothing Construction Experience"
Ruth Marshall, Iowa State University
"Clothing Construction in Extension Programming"
Sherri Johnson, University of Minnesota

Saturday, October 30

8:00 - 9:00am Meeting of NCR-65 Representatives
8:00 - 9:00am ASTM Meeting, Coila Janacek, presiding
8:00 - 9:00am Meeting on Membership Criteria, Pat Horridge, presiding

9:00 - 10:30am Research Reporting Session II

A. Pesticide Research
Presiding, Jacquelyn Orlando DeJonge, University of Tennessee

9:00 - 9:12 am "Overview of Pesticide Research"
Jacquelyn Orlando DeJonge, University of Tennessee, Knoxville

9:12 - 9:24 am "Completeness of Methyl Parathion Residue Removal After Multiple Launderings of Contaminated Fabric"
Carol Easley, Joan Laughlin, & Roger E. Gold, University of Nebraska, Lincoln

9:24 - 9:36 am "Effects of Methyl Parathion Concentration on Residue Removal Through Laundering Contaminated Denim"
Joan Laughlin, Carol Easley, & Roger E. Gold, University of Nebraska, Lincoln

9:36 - 9:48 am "Pesticide-Residue Removal as Affected by Laundering Variables"
Charles J. Kim, Janice F. Stone, & Charles E. Sizer, Iowa State University

9:48 - 10:00 am "Effects of Storage and Weathering on Pesticide Contaminated Fabrics"
Elizabeth Easter & Jacquelyn Orlando DeJonge, University of Tennessee, Knoxville

10:00 - 10:30 am Discussant: Phillip Harein, Extension Entomologist, University of Minnesota

B. Economic/Consumer/Historic/Educational
Presiding, Margaret T. Ordonez, Kansas State University

9:00 - 9:30 am "Analysis of Specified Attributes for Men and Selected Demographic Variables"
Lucille M. Terry, Bowling Green State University
9:20 - 9:40 am  "A Comparison of Managers' and Consumers' Perceived Image of Discount Stores: A Multi-Attribute Attitude Model"
   Marianne Young Mahoney & Brenda Sternquist Witter, Michigan State University

9:40 - 10:00 am  "Clothing for Warmth: A Victorian Perspective"
   Josette H. Rabun & Mary Frances Drake, University of Tennessee, Knoxville

10:00 - 10:20 am  "Energy Efficient Clothing: Effect of Method of Dissemination on Knowledge, Attitudes and Behavior"
   Sally Francis & Sara Butler, Miami University

C. Aesthetic/Social-Psychological
   Presiding, Hilda Mayer Buckley, University of Illinois, Urbana-Champaign

9:00 - 9:20 am  "Pattern as a Design Aspect: Multidimensional Scaling Analyses Using Visual Perception of Its Properties"
   Joyce M. Camacho & Joan Laughlin, University of Nebraska, Lincoln

   Elizabeth D. Lowe, University of Illinois, Urbana-Champaign

9:40 - 10:00 am  "Factors Affecting the Selection of Clothes on Daily Basis"
   Yoon-Hee Kwon, Northern Illinois University

10:00 - 10:20 am  "Effects of Appropriate and Inappropriate Attire on Attributions of Personal Dispositions"
   Jane E. Workman, North Texas State University, & Franklin G. Miller, Purdue University

10:30 - 11:00 am  Brunch

11:00 - 2:00 pm  Symposium "Design for Impact: Challenge, Response, Dialogue"
   Presiding: Wanda Sieben, University of Minnesota

   Challenges: Michael Baizerman, Center for Youth Development & Research, University of Minnesota
               Richard Sauer, Director, Agriculture Experiment Station, University of Minnesota
               Keith McFarland, Dean, College of Home Economics, University of Minnesota

   Respondents: Kitty Dickerson, University of Missouri
                Marjorie Norton, Virginia Polytechnic & State University
                Gloria Williams, University of Minnesota

   Dialogue: Exchange among Presenters & audience

3:00 - 5:00 pm  Post-Conference Meeting of 1983 Council

Sunday, October 31

9:00 - 12:00 noon Post-Conference Meeting of 1983 Council, continued
INTERDISCIPLINARY CREATIVE PROBLEM SOLVING:
WHY INTERDISCIPLINARY?

Gerald E. Allen
Chairman of Visual Studies
Minneapolis College of Art and Design

Creativity is to cause and produce versus just having ideas—to see ordinary things in a different way. Creative persons seek problems as opportunities, produce many ideas, are flexible in a deliberate search for points of view, are original, and have drive.

What an idea looks like:

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All of us are smarter than anyone of us—the problem is how to use all of us. In the fifteenth century, Renaissance man was appropriate to that world and knowledge. Today the Renaissance person is a team. That is what can evolve from our design training (not our media)—a new interdisciplinary communicator, "a new profession as yet without a name."

In the future more designers may be applying the fundamentals of their training instead of the crafts of their media. Through the rigors of a design education, young persons learn techniques and skills that they will use in providing the services of their profession. In that statement lies both the potential and the limitation for designers' future growth.

In school, the students' time and energy is focused on the developmental skills and techniques as they apply to the profession whether it be visual communications, or product, industrial, architectural, or interior design. Through this emphasis, the eager student is tailored to meet a specialized job description. After a number of years in practice, the student becomes the professional who routinely applies the learned skills into getting the job done within the budget and deadline. This flow from school to job to professional is not necessarily poor or wrong; however, it need not be the only avenue open to individuals with a design education.

What other avenues are open for a career with this training? What is so special about a design education? To answer the first question, think about how many times you have heard design professionals lamenting that others don't recognize the importance of their work and that they wish the client would realize how much more assistance they could provide. These feelings are predictable. Clients, like the rest of us, operate out of a very narrow definition of what a particular discipline
can do. On the other hand, designers, through their training and experiences, have insight as to how their services could be applied to many other areas. So, in answer to the first question (What avenues are open?), a sense of it already exists but precise implementation of these expanded services lacks definition. The clarification of this lies within the needs of contemporary society.

Within the last two decades our problems, whether they be social, political, ecological, etc., are not as simple are previously perceived. Contemporary society has discovered a complexed, interdependent nature to all human endeavor. The problems of pollution are tied not only to technology but also to unemployment, social services, inflation, biochemistry, and numerous other components. Thus, the Renaissance man concept of the fifteenth century is now replaced with the principle of synergy or a Renaissance team for the twenty-first century. This type of team consists of a group of people representing a broad spectrum of disciplines focusing their specialized abilities on current problems and finding appropriate solutions. In fact, one has to believe the concept that all of us are smarter than any one of us. Each discipline has developed its own specialized rules, goals, and languages, and in only a few cases are those problems of cross communication overcome.

At the same time, if you look around, the necessity of an interdisciplinary process is evolving. For example, most of the new sciences are hyphenated, such as social-biology, social-anthropology, biochemistry, genic-engineering, etc. Also, in business one of the major efforts lies in the area of technology transfer. In other words, the trend is in motion, but what it lacks is the communication person to work between the disciplines. What is needed are persons who can understand diverse goals and needs, have a process of organizing data, and present it in such a fashion that it is concise and consumable. They must be able to find a connection between seemingly unrelated problems and creative opportunities. At the same time, they must work well under pressure, criticism, and deadlines. This is an emerging job description for a new profession without a name.

This leads to the second question--What is so unique about a design education? At this point think of the designer's education not in terms of techniques, such as materials, composition, operations, form, and function but instead the underlying methods that support these skills.

Learning by criticism. This single experience for young students is initially devastating. Previous to design school, the creative act would have been enough to evoke praise. In school, however, everything they do is scrutinized by "a jury" and "critics," in an effort to push students beyond the first solution satisfaction into a process of questioning, refining, and evolving ideas. In terms of problem-solving characteristics, creative persons must be able to receive criticism in a positive way, whereas most people either wilt after the first wave of criticism or assume a defensive posture. The students who stay in school eventually learn to take criticism in stride, in fact they learn to use it as an ally to develop and enhance their solutions. Using criticism in this manner is definitely a rare characteristic in our society at large.
Problem solving. Young students often come to a design education with the attitude of being or wanting to become a free spirit with no limitations. The process of having to learn how to tackle a problem and see it through initially is seen as unnecessary "stuff" that stifles their native creativity. However, as their design process abilities grow they learn to seek out the "real problems" as the fuel for their imaginations. Rather than trying to avoid the difficulties, they learn to transform them into opportunities. Hence, students become acutely aware of problems and believe there is always a solution. A problem-solving process is a concept that everyone, in all endeavors, should be taught, but they are not.

Working within context. Everyone works within a context—although most people are not aware of what the contextual forces are. The tendency usually is to focus all one's energies on a particular problem until a solution is hammered out. The designer, however, is trained to research the context for the solution.

For example, when an architect designs a house, he or she must understand the regional climate, community, codes, topology, utilities, etc., while also being concerned about the floor texture, pattern of light on the wall, and lifestyle of the user. As Charles Eames put it, "The designer is always responsible to the next larger as well as the next smaller thing within their [sic] solution."

These are the characteristics of a futurist—to think and act holistic in respect to a series of choices and actions that might be taken. These are essential skills for effective decision-making at any level.

Working with abstract wishes. Designers learn early in their education that their solutions often are shaped with vaguely described goals, needs, and wishes. They learn to take theoretical desires and turn them into physical solutions. Clients, no matter how similar the projects, are always different. They may range from a church group to a corporate vice-president, from a community action committee to a private developer. Each reflects selective points of views, such as inspiration, public relations, ecology, and sales. The designer has to search into the depth of what clients know and do, as well as what they want, to produce an effective and useful design.

Visual thinking. The previous skill required researching abstract needs, and then translating the data. The form of this translation is the most common of languages for human beings—the visual image. Visual thinking is a much needed right-brain skill for a left-brain society. This step in the design is the most fundamental to the design profession. With this tool, the programmed needs are taken out of the theoretical and brought into a physical form that designers, clients, users, bankers, etc. can discuss.

Working as a team. Unlike the freer counterpart—the artist, the designer soon learns that cooperation with many types of people is necessary for the implementation of a design. In school, it was enough to please the instructor. In practice, the designer is confronted with varied client demands, production costs, consultants, restrictions, and numerous other conditions. Each of these conditions is represented by people. Therefore, successful designers develop the skill of orchestration. For the designer, it becomes second nature to work as a team member.
Working to deadlines. Along with the skill of working with a team is meeting constant deadlines. Even though all designers wish they had a little more time, they learn to work under pressure and complete the task. In fact, some designers learn this skill so well that they can't get started until it is almost too late, just to get their juices flowing. The ability to meet a critical timetable is highly prized by the marketplace.

In summary, students through a time honored process of long hours with little sleep, and constant criticism that leads to poor eating habits and weakened health finally lose their will to resist and open up to learning the fundamentals of all designers. When one thinks about fundamentals rather than media skills, one can begin to understand the uniqueness and potential of this professional training. If more students and designers became aware of these abilities, a few might be able to break from the professional boundaries and give direction and assistance to the emerging interdisciplinary problem solvers by becoming one.

THE DESIGN CONTINUUM

Mary Stieglitz-Witte
Professor and Head, Department of Design and Director, Goldstein Gallery
University of Minnesota

Design, the expressive word you have chosen as your conference theme, is problem-solving of the best kind. My title "design continuum" can be literally translated as "planned whole." It is that concept I'll discuss in relation to the ongoing question, "why things look as they do," and in consideration of the ACPTC exhibition opening this evening.

Every designed object is a result of the interrelationship (and hopefully resolution) of an enormous number of factors. The traditional pyramid of factors, expressed pictorially as an equilateral triangle, acknowledges the connection among three basic factors. The three usually expressed are the concept (design idea), technique, and materials. In fact, the number of factors is much greater...and includes communicative and symbolic value, psychological input and impact, economic and social factors, and additional environmental components. Satisfactory design solutions take as many of the factors as possible into consideration. The solution, then is the result of the factors, and not of the properties of the object alone.

Considering the multiple factors influencing design helps us to answer the question of why things look as they do. State capitol buildings, including ours in Minnesota, function (inwardly) as enclosed space for government business, and (outwardly) as visual symbols. Appreciation of the historical roots of the decoration of the facade provide some explanation of both the choices and the prioritizing of
the various factors. Determining the overriding factors is an important step to both designer and perceiver. The following examples illustrate different priorities, yet all present solutions to design as problem solving.

My slides include--an antique silver service, late nineteenth-century garments, ethnic (Latvian) mittens, a nineteenth-century maternity dress, nineteenth- and twentieth-century children's clothing, a fashion collection, lingerie, applied design (undergraduate exhibition), fiber design (graduate exhibition), and examples from the current ACPTC exhibition.

"Breakfast jacket" by Virginia Koerr, silk-screened silk, 17" x 25"

The images themselves illustrate well the consideration of many factors--the prioritizing, the planning/patterning/balancing, and the resolution into a visual object that results in a design continuum.
CONTEMPORARY TECHNOLOGY OF APPAREL MANUFACTURING:
ITS EFFECT ON THE DESIGNER

Kathryn M. Johnson
Director of Design
Vassarette Division of Munsingwear

Every day, a designer's creativity interfaces with the contemporary technology of the manufacturing plants. The 1982 Bobbin Show, recently held in Atlanta, relayed the message to the apparel industry that our future lies with microprocessor controls. Our problems are the same as the problems in Detroit; we need cost efficient equipment.

In recent years, when an apparel company talked about its computer transactions, it referred mostly to financial or managerial functions, not manufacturing functions. That is no longer true. For instance, Vassarette owns three Carasco machines. The Carasco system is a computerized marking and grading system that generates a tremendous number of patterns and markers in a very short period of time. With the addition of these computers, we have a greater awareness of fabric waste as each marker prints out our fabric efficiency percentage. We are experiencing fewer, but more productive personnel, and improved grading and marker quality.

The designer works hand in hand with the grader. As we design and construct our experimental patterns, we constantly think of the grading process. In the past, with manual grading, we could have a very irregular grade. For instance, as we appliqued fine lace around the bodice of a slip, we used to be able to add a little extra to the back for size 34 and use the next lace repeat for size 36 and on and on, as we progressed to a size 42. Today, the tendency is to simplify the design to aid the computer. At times the designer is asked to engineer patterns to achieve better material utilization without adversely affecting the style, fit, or appearance of the garment. Examples are--shifting a sleeve seam slightly, bringing shoulder seams forward, or clipping pattern corners within the seam allowance. A minor change such as this can be made on the computer screen, and every marker using that pattern in the library stored in the computer system can be quickly and automatically updated.

Vassarette also uses a Gerber Cutter, which is a computer driven automatic cutter. Some might assume computerized markers are more accurate, therefore, improving cutting quality. This is not necessarily true. Cutters are human and they make mistakes, so computer-automated cutting can be of great importance. The entire manufacturing process is affected by accurate cutting. More automated sewing equipment can be employed if the cutting is uniform and precise. The elimination of inadequate cutting can reduce the cost of sewing room labor by as much as 6 percent. Quality, the most important aspect of our trade, holds the future for apparel manufacturers. Increased sales will be enjoyed by companies that provide better, more consistent quality on time. Computerization leads the way to better quality and future growth.

Automization, however, can mean standardization, and standardization does not mean fashion. The designer can easily adjust basic styling and patterns for modern technology and mass production, and
therefore reduce costs. But, the design plan asks for new fashion additions. To catch a trend, the designer moves quickly into design, pattern, and costing routines as there is little time for engineering, market tests, or even re-costings. Few items are made and the prices are higher. There are few, if any, second cuttings. The price of fashion is high but for obvious reasons.

Let's look for a moment at fabric technology. Yarn companies are constantly developing new fibers that they advertise heavily to the trade and the consumer. For instance, one fiber company recently developed a new multi-filament nylon yarn it promoted as a sleepwear fabric. Soon retail buyers were asking to see garments made of this fiber. As designers we must be aware of all new fabrics. Because Vassarette is vertical, that is, we make our own tricot fabrics, we must develop new fabrics using new yarns. Let's look for a moment at a series of slides showing the development and production of Vassarette's own robe fabric that we call Velvelour.

- Huge beems of yarn are shipped to our plants.
- Row after row of tricot knitting machines.
- There are 5,276 knitting needles at work at one time on one machine.
- The machines knit 800 rows per minute. A constant check for flaws is made by a defect detector. At the first sign of an error, the machine stops.
- We formulate our own dyes for lab dips.
- When the color is approved, we dye the fabric in 800 lb. batches.
- After dyeing and drying, the fabric is brushed and then sheared.
  Several passes through the brusher gives the fabric a deep velvety hand.
- The finished fabric is ready to cut.
- This fabric is 114" wide and the tables are 23 yards long.
- A manual cutting process.
- Pattern pieces are cut 96 layers high.
- The pieces are bundled for 12 garments and sent to the sewing room.
- Each worker is specialized.
  One girl sews belts or collars  
  Another zippers, another buttons.
  Others assemble trims, apply laces, attach pockets.
- Finally price tags and hang tags are speared to the garments.
- The garments are steamed, bagged, and hung to be shipped.

Now that Vassarette has the technology and the consumer acceptance of this product, we are compelled to use it. Every season, the fabric must be used and this is a very dull experience for the designer. It is important that every fall I gear my staff up in some way—through color, trims, concept, silhouette or something other than fabric excitement—because every year we will do 70 percent of our Fall robe line in our own Velvelour fabric. The fabric is soft, pretty, durable and perfect for today's consumer; it is monotony that can bog down the designer, not a dislike for the goods. Our cuttings on a basic Velvelour robe can go into thousands of dozens. Therefore, it is necessary for us to automate as many of the sewing operations as possible.

When the manufacturing period for warm robes is over, machines must then be used for our Spring line. The designer must be aware of the plant's capabilities. It is very important that machinery does
not lie idle. For example, I may design a new group employing our scallop machines and then be told those machines are tied up through week 23. Therefore, I might redesign the group using the idle shell-stitch machine.

Let's look for a minute at a group of slides that show a machine that ties bows. The ribbon is fed into a machine, tied, and clipped very quickly. We own the bow maker and we use bows! This reminds me of a funny story: About nine years ago, my predecessor retired. She was a lovely lady who firmly believed lingerie did not look finished unless there was at least one bow attached to it. After she retired, I brought my first line as head designer to our sales meeting. I'll never forget our sales manager's appraisal of that line. He said... "Gentlemen, the line is salable, the colors are good, the laces are beautiful, and that bow salesman is younger than we thought!"

Slides:
- My bow-making friend is fascinating.
- It's like watching a robot. It automatically pulls down a length of ribbon, two pinchers move forward, and flip the ribbon. The knot is formed, and you have 30 bows every minute.
- Straps--some are ordinary, but some are trimmed. Let's watch straps made automatically--no operator. Fabric is sewed to interlining and lace in one operation. They are cut to length and assembled.

The designer is affected by every new idea implemented in the manufacturing plant. One of the most recent surprises occurred when we designed such a tiny bikini there was no place to sew in the label or to spear the price ticket--back to the drawing board! About two years ago I was on my semi-annual tour of our plants, and decided to make a quick detour to Memphis, Tennessee where our warehouse is located. (We fondly refer to our warehouse as "the best little warehouse in Memphis.") At any rate, I wanted to see our newly acquired hanging, steaming, and bagging operation. I was amazed to see that sleepwear previously folded and boxed was now hanging and being shipped in cartons. This method enables our merchandise to go immediately to store racks, instead of waiting in stockrooms to be unpacked. What none of us had anticipated was that hanging merchandise has a tendency to fall off hangers in shipping. We now incorporate hanger loops into all our garments.

I have one more series of slides that show a technology peculiar to the intimate apparel business. It is molding fabric for seamless bra cups. This is by far the biggest technical breakthrough for our industry in recent years. Bra designers are engineers. I have heard them compared to suspension bridge designers! Please understand my responsibilities stop with lingerie, but I have a counterpart in our foundations area who engineers and designs bras and girdles.

Slides:
- The development is done in the design studio. Actual patterns for a cut-and-sew garment are made. The cup is fitted and refitted and the perfect cup is sent to the molder, where a plaster mold is made of the original shape. Numerous checks are made of each size.
- When it is approved, it is sent to the foundry.
- It is stored at the molder until needed. Sometimes the molded bras are lined--separate molds are made for linings and pads.
- Hundreds of cups are molded and cut into pairs and finally sent to cut.
Every year I travel to Europe to visit the Igedo Fair in Dusseldorf, Germany. This international lingerie fair brings together new styling and technology from all over the world. Recently we saw nonmetal hooks and eyes, fine laces that are produced on computer-driven raschel machines, and natural fiber fabrics that can be molded. I visited a lingerie manufacturing plant in Germany that had a completely computerized warehouse facility. We were told that no human knows where the goods are stored.

Many times I have asked myself, how far can this go? Our industry is still people oriented. The new computers still depend largely on people for results. We are hopeful the 1980s will bring a renewed emphasis on improving the utilization and performance of workers operating this technology. There are those who feel automation will force us back to basics, but I cannot believe the consumer will let that happen. The fashion business will continue in all its craziness. It will always be unpredictable and controversial; but always exciting.

OBJECTIVE INSTRUMENTAL SHADE SORTING*

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For years, the textile manufacturer and garment producer alike, have found it difficult to shade sort materials consistently. The variability of visual judgments from day to day, plus the increasing consumer awareness of shade variations, have made this problem more prominent than ever before. Instrumentation for color measurement has been available for a number of years, but high instrumental precision, repeatable specimen measurement techniques, and a rapid data handling system, all needed for shade sorting, have been lacking.

A system in wide use today comprises an automatic tristimulus colorimeter with an integral microprocessor. Software programs offer the user industry proven shade sorting using the "555-169" concept with Hunter L,a,b or CIE 1976 L* a*b* (CIELAB) color scales and rectangular coordinate sorting or CIELAB metric hue angle sorting. Using any of these systems, a three-digit shade number, based on the allowable tolerances, is assigned to each of the various shades detected. Materials assigned to like shade numbers can be inventoried according to shade and shipped to apparel manufacturers where they may be pieced together without noticeable shade differences. Thus, consistent shade numbers can be assigned day after day, resulting in lowered manufacturing costs, reduced customer complaints, and improved product quality.

Instrumental shade sorting in the laboratory or "on-line" is designed to provide an accurate identification of goods that may be

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Pieced together in a finished garment without noticeable shade differences. To implement a meaningful shade sorting program, one must have an understanding of the various appearance variables that can affect the way a garment will appear to the consumer.

Some of the variables that can affect the appearance of textile specimens are--

Chromatic variables
1. Color - being the most important, is established by the spectral reflectance of light at different wavelengths.
2. Spectral composition of illuminant. Materials dyed with chemically different dyes that match under one illuminant but appear quite different under other illuminants, are said to be metameric and must not be pieced together.

Geometric variables
1. Texture or weave, which involves surface structure characteristics. 
2. Luster, the reflection of more light in some directions than in others, i.e., it involves the ratio of specular reflectance to diffuse reflectance.
3. Directionality, the change in appearance with orientation, i.e., corduroy ribs, "brushed" goods, highly lustrous fibers.

Shade sorting normally involves only the first of these five variables. In practice, the other four do not normally interfere, but the instrumental shade sorter must be aware of their potential for interference with his process.

Some variables, such as texture and luster, must be controlled early in the manufacturing process where steps can be taken to insure uniformity. Color control and avoidance of metameric matches is also important to insure that the basic color will fall within the pre-determined limits set for that specific color. Once these variables are under control, color shade grouping can be undertaken.

There are several requirements for successful instrumental shade grouping. Items such as specimen preparation, specimen selection, operator technique, moisture content, etc., all play an important part; however, the prime requirement is a reliable color measuring instrument. In choosing an instrument, there are several factors to be considered:

1. Information desired - data output - what type of information is required to do the job properly?
2. Repeatability - precision.
3. Agreement with others - accuracy.
4. Specimen requirements - convenience of sample presentation.
5. Ease of maintenance - reliability.
6. Speed.
7. Operation skill - simplicity of operation.
8. Operating environment - ruggedness.
9. Benefit - price - will you realize cost saving!!!

The most important factors mentioned are instrumental precision and accuracy. To define these terms:

1. The precision of an instrument - repeatability and reproducibility.
a. Repeatability - the deviation from mean experienced when measuring a single specimen on a single instrument.
b. Reproducibility - The deviation from mean experienced between instruments of a given type.

2. Accuracy - The deviation from an accepted reference level.

The manufacturer's specifications should be checked carefully to ascertain that the instrumental precision is sufficient for repeatable discrimination of small color differences. There are many sources of measurement differences due to instrumental variables and specimen handling techniques (Hunter, 1969).

Sources of Measurement Differences

1. Differences between instruments:
   a. Spectral - Nonconformance to CIE Illuminant and Standard Observer.
   b. Geometric - Differences in geometry, 45°/0°, diffuse/0°, field angles (cones), etc.
   c. Photometric - Linearity of detectors and operational amplifiers.

2. Differences in specimen presentation.
   a. Thickness and backing--Ideally, when the material is placed against the measurement port, there should be no light show-through. Good analytical practice dictates at least several thicknesses of material where practical, with a firm backup, such as an uncalibrated white tile or a firm backing of nearly the same color.
   b. Orientation--If there are noticeable orientation differences, such as corduroy ribs or directional considerations, the specimens should be presented in the same direction for each measurement.
   c. Specimen Port Cover Glass--If cover glass is used over the measurement port to prevent pillowing, it should be kept clean, and the amount of pressure against it should be kept constant. Proper instrument re-standardization should be performed to compensate for the effect of the glass.
   d. Pressure--Variations in pressure will cause measurement differences; always maintain constant pressure.
   e. Tension--Tension applied to the materials should be kept constant; different tensions will cause different readings.
   f. Pile Lay--If there is a distinct pile lay, repeatable measurements can be achieved by brushing in the direction of the natural lay, and presenting the specimen always in the same orientation.

By following these few simple rules, successful instrumental measurements can be achieved. Eliminate the variables in specimen presentation and measurement, and the differences detected will be due to actual color variations and NOT operator technique. Never stop looking at your specimens, simply use the information as a guide, and it will provide you with a much more reliable system.
Requirements for a Reliable Shade Sorting System

1. Dependability--The system must be DEPENDABLE. Excessive "down time" will severely hamper your program.

2. Precision--Is the equipment able to repeat itself on the same piece of goods?

3. Simplicity of operation--Is extensive training required for operating personnel?

4. Speed--Is the equipment able to provide an answer in less time than your present visual system?

5. Economy--Is the system within the reach of the corporate budget? Will it provide cost reductions and improvement in product quality?

Unfortunately, visual systems are dependent on human judgment, which can vary from day to day, with the time of day, and from operator to operator. Therefore, they lack almost all of the requirements listed. In fact, visual judgments can often be in error (Hunter, 1975). The shade groups are defined by ellipses drawn on the chart (plot of Hunter "a" vs. "b"). Specimen No. 10 was visually judged to be within Shade Group 35 when, in reality, it belonged in another group. Similarly, Specimen No. 9 was rejected as being outside Shade Group 35 when it should have been counted as within the group.

Today's demanding apparel industry is imposing tighter tolerances on shade groups. Therefore, the need for a more reliable system is becoming a necessity. A number of shade sorting systems have been available over the years, but they have lacked one or more of the requirements listed previously for a reliable system. Early in 1961, Professor Frederick T. Simon (now with Clemson University; Clemson, SC) introduced (in the German publication Die Farbe) a three-number rating "cube" system, based upon his chromaticity charts, which bears a striking resemblance to shade sorting systems being introduced today (Simon, 1961). Yet, in 1961, he said, "We look to future instrumentation to provide greater precision and more automation of the control mechanics to permit closer tolerances and better uniformity." Thus, a good rating system was available, but the instrumentation to back it up was lacking.

A system similar to Simon's rating cubes is available today; but instead of using CIE chromaticity coordinates, the L,a,b (a more visually uniform) opponent-colors scales are employed. The L,a,b values represent a three-axes opponent-colors scale system, based on the theory that color is perceived by black-white (L), red-green (a) and yellow-blue (b) sensations. The opponent-colors theory is based on evidence that, in the human visual system, there is an intermediate signal-switching stage between the light receptors in the retina and the optic nerve, taking color signals to the brain. In this switching stage, red responses are compared with green to generate a red-to-green color dimension. The green (or red and green together, depending on the theory used) response is compared in a similar manner with the blue to generate a yellow-to-blue color dimension. These two dimensions are widely, although not always, associated with the symbols "a" and "b," respectively. The necessary third dimension, "L" for lightness, is a nonlinear function such as the square or cube root of "Y," which is percent reflectance.
The scientific validity of the opponent-colors system is strongly supported by experimental evidence (DeValois, 1970). For example, Russell L. de Valois, of the Primate Vision Laboratory at the University of California at Berkeley, attached electrodes to individual optic nerve fibers of monkeys and identified L, a and b correlating signals, rather than X, Y and Z correlating signals. The wide acceptance and use of the system by practicing color technologists supports its validity. The Hunter L,a,b values are related to the CIE tristimulus values (for CIE Illuminant C) by:

\[
L = 10 \sqrt{\frac{Y}{Y}} \\
a = 17.5 (X% - Y) or 17.5 \left[ \frac{(X/0.98041) - Y}{Y} \right] / \sqrt{Y} \\
b = 7.0 (Y - 2Z) or 7.0 \left[ Y - \left( \frac{Z}{1.18103} \right) \right] / \sqrt{Y}
\]

In three-dimensional space, this system would appear as in the artist's sketch in Figure 1.

Why are Hunter or similar type L,a,b scales ideally suited for color sorting?

1. They represent a more visually uniform color space.
2. They provide scale values in more visually meaningful terms.
3. They are available by direct instrumental readout.
4. Easily understood rectangular chromatic coordinates can be set up.
5. The CIE 1976 L*\(a^*b^*\) scale has proven to be good for dark colors (McLaren, 1976) and is also available by direct instrument readout. It is commonly abbreviated CIELAB. It is the current trend in color measurement:

"To promote uniformity of practice, use CIELAB."

Translating the L,a,b opponent-color scales into a rating system, a three-number model can be set up similar to Simon's rating "cubes" (Figure 2). As in many products, two sets of tolerances may be specified. One, with fairly broad limits, will define the allowable differences from "standard" or target values; while the other, with more stringent tolerances, will establish the boundaries of a "shade group" so that all pieces assigned to a single group may be sewn together without objectionable mismatches, even though the entire group may be substantially different from the standard.

When consistent standard values and tolerances are used and metameric matches are avoided, a shade sorting system can be used to identify material from several different production lots, which may be used together for maximum efficiency and cost savings. In this system, the standard and all pieces of the same shade are assigned the number "5" on each of the three color axes, L, a and b. Therefore, the central or standard shade is identified as "555." The number of tolerance increments away from the standard on each axis is counted and added algebraically to the "5" of the central shade, thus giving a "shade number" that will indicate its relationship to the standard in number of steps higher or lower on each of the three axes, L, a and b. On a
single axis, these tolerance steps may be shown, as in Figure 3. Thus, a piece of goods having a shade number of 915 is four steps lighter (a higher L value), is four steps greener in the "a" dimension, and is within the central shade in the "b" dimension. All pieces of goods having the same shade number (915) would be compatible with like numbers, could be sewn together, and could therefore be shipped as first quality goods. Furthermore, since the same tolerances were applied, the match within the groups would be of equal quality (i.e., all 111 pieces would match one another just as well as do the 999's, the 555's, or the 436's). The recommended practice is to make individual shade ranges so that the shade numbers (whose identifications differ by only one number) may, in most cases, still be sewn together.

Another system, using similar "sorting boxes," is the Metric Hue Angle shade sorting system. The primary difference in the mathematics of this system and previous systems is in the application of the CIE 1976 L*a*b* color space and the rotation of the horizontal axis to fit on the iso-hue line (which approximates the dominant wavelength). This results in differences measured in scales of psychometric lightness, chroma, and hue (McLaren, 1976; Commission, 1978). This permits tighter limits for hue, which is the most critical factor in shade sorting. Field trials indicate that it is possible to use fewer sets of color tolerances for a broader range of colors (Blackburn, 1977).

Obviously, one set of tolerances will not work for all industries involved in color sorting. Differences in the material substrates, customer acceptance levels and grades of material being produced necessitate different tolerances for particular situations. It has been found in sorting by the metric hue angle that, in most cases, the same tolerance limits can be used on a range of colors within a particular situation (Blackburn, 1977). This is not to say that one set of tolerances will work for all shades; however, one set will work for a group of shades within a given range (i.e., most pastel shades may have one set while dark shades may require other sets).

There are actually several uses of color sorting that are beneficial to a textile manufacturer. The first is to provide meaningful sort groups for shipments to apparel manufacturers. In this way, the garment producer may coordinate items from many locations or sources and assure acceptable visual matching of the various items.

A second use of a color sorting system is for quality control of finished production or at various stages of production. Shade-to-standard may be checked, side-center-side shading may be checked, and end-to-end consistency may be determined.

A third major use of a color sorting system is as an aid to dye-house and finishing for control of shade delivery. By examining the data from a run, an experienced dyer can make adjustments to successive runs for closer conformance to standard.

There are several advantages in using an instrumental color sorting system that help in communications between a cloth dyeing and finishing operation and a garment manufacturer.

The first advantage is that definable tolerance limits may be set on the shipment of goods. These tolerances should be mutually agreeable to both parties. A basis for the determination of tolerance limits generally is review of individual specimens and comparison of
visual judgments of color acceptability with color data determined from instrumental evaluation of the specimens. By use of these agreed-upon tolerances, decisions can be based on quantitative data.

The development and usage of an instrumental shade sorting system allows a common language between cloth manufacturer and garment cutter. This is important in communicating not only about offshade goods but also provides adequate descriptions of acceptable goods when compared to the standard. This helps bridge the communications gap between technical facilities, merchandising areas, and garment producers.

The ability to shade sort instrumentally both in the laboratory and on a running textile inspection machine, is available from several instrument manufacturers. HunterLab offers the D25-9 microprocessor colorimeter with software programs for shade sorting using the "555" concept and Hunter L,a,b or CIELAB color scales and rectangular coordinate sorting or CIELAB metric hue angle sorting. The laboratory system is comprised of an optical sensor to view the specimens and a microprocessor controlled signal processor to rapidly convert the raw data into usable sorting information that is recorded on paper tape by a thermal printer.

An optical sensor with circumferential illumination is recommended for most textile applications. The sensor uses a unique circumferential illumination system that directs 240 beams of light (encompassing a 360° area) onto the specimen at 45°. The diffuse reflected light is picked up at 0° by a special optical fiber beam splitter to further randomize the reflected light and equally divide it for distribution to the four CIE filters and then onto the silicon cell detectors. The sensor was designed to minimize the effects of textile directionality and to provide accurate, repeatable (Coates, 1972) information to the signal processor.

Preprogrammed with the necessary information, the system can provide an accurate shade number for a particular piece of goods in less than two seconds. The processor has the ability to store the data gathered on each lot and on command, retrieve the information and sort the lots into usable shade groups. A paper tape from the processor provides a hard copy of the data and can be placed with each lot for grouping and sorting for eventual cutting and sewing into a finished garment.

Continuous color monitoring and/or sorting on a running textile inspection machine is possible using the D25-9 Textile Shade Monitor (TSM). It features a special temperature controlled optical sensor mounted on a traversing mechanism to facilitate the examination of all areas of the fabric. Nondestructive, side-center-side, end-to-end, and piece-to-piece shading can be determined rapidly and conveniently. The signal processor is the same as that used with the laboratory system, except that the microprocessor has been programmed to handle the increased work load of the system. Equipped with a remote alarm bell or light, the TSM can provide an audible or visual warning signal to the operator that the particular section of goods being monitored has deviated from the specified tolerance on any of the scales. A strip chart recorder with its paper drive synchronized to the cloth drive mechanism can be installed to provide a permanent record of the shade variations correlated with position on the cloth.
In addition, the D25-9 TSM can perform the "555" type shade sorting using the "rectangular coordinate" or "Metric Hue Angle" sorting programs. As discussed earlier, using either of these systems, a three-digit shade number based on the allowable tolerances is assigned to the various shades detected within a roll or from roll to roll. At the end of a run, pieces assigned to like shade numbers can be inventoried according to shade and later sewn together in a finished garment without noticeable shade differences. Thus, consistent color shade groups can be determined either in the laboratory or directly on-line, to improve your overall product quality, reduce production costs, and reduce customer complaints.

Acknowledgements: The author would like to express his sincere thanks to those who offered comments or suggestions that were so helpful in completing this paper: Richard S. Hunter and S. Upton Jenkins, Hunter Associates Laboratory, Inc., Reston, VA.

References:

Billmeyer, Jr., F. W. Applied Optics, April 1969, 8, 775.

For additional information, contact Richard W. Harold, Applications Engineering Manager, Hunter Associates Laboratory, Inc., 11495 Sunset Hills Road, Reston, VA 22090.
Figure 1

Figure 2. Example of 555 Shade Sort System Using a Blue Denim Standard with Shade Range Tolerances of $L \pm 0.3$, $A \pm 0.2$, $B \pm 0.3$
Technological changes usually are the result of economic or competitive incentives. In the last few years this has been particularly true for finishing of textile fabrics where significant changes have occurred. Major incentives behind these changes include:

- the rising cost of energy
- consumer demands for quality and performance
- government regulations

I intend to focus today on several trends occurring in the finishing of textile fabrics and share with you what is happening and why it is occurring. However, before we get too involved in technological changes in finishing, I thought it might be appropriate to spend a few minutes reviewing some textile finishing concepts.

Many people take the finishing of textile fabrics for granted. We speak of most textile operations as separate entities, such as spinning, texturizing, weaving, knitting. However, finishing is always mentioned in the same breath with dyeing. We refer to finishing as only the final part of the dyeing process.

One gets so involved with dyestuffs, strike rates, shade matching, reactive sites, reduction agents, acids, etc., that finishing is often ignored. Yet finishing is one of the most important operations in the entire textile process. It is the final step in the manufacturing of a fabric. All the care and quality that has gone into the manufacturing of fiber, yarn, and fabric can be ruined by improper finishing. Conversely, many pieces of marginal, or in some cases unacceptable, fabric have been salvaged by the skill of an expert finisher.

Fabrics are finished to give them desired performance characteristics and tactile aesthetics. Finishing for performance includes heatsetting, durable press, water repellency, soil release, flame retardancy, anti-static, and wickability. Finishing for aesthetics involves napping, shearing, suedeing, embossing, calendering, pleating, stiffening, and softening.

Most of these techniques combine the use of chemicals and heat with mechanical action such as pressure, abrasion, or cutting. Chemicals can be classed as softeners, hand builders, lubricants, durable press resins, water repellents, flame retardants, mildewproofers and bactericides, shrinkproofers, antistats, soil retardants, soil release agents, mothproofers, antislip agents, delustrants, and gas fading inhibitors.

Most of these chemicals are applied from a water solution or emulsion of one-half to 15 percent active ingredients. Selection of a chemical, or combination of chemicals, is dictated by fabric characteristics desired. Fabrics are dipped in the solution, excess is squeezed out and fabrics are dried. Usually from 20 to 60 percent moisture needs removing in the drying process. A typical 50/50 polyester/cotton finishing range running with 60 percent wet pick up from the finish pad will use over 5 billion BTU's of energy per hour broken down as follows:
<table>
<thead>
<tr>
<th>Process</th>
<th>Percentage</th>
<th>BTU/Hr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical motors</td>
<td>12%</td>
<td>648,000</td>
</tr>
<tr>
<td>Evaporating water</td>
<td>48%</td>
<td>2,493,000</td>
</tr>
<tr>
<td>Heating cloth</td>
<td>10%</td>
<td>504,000</td>
</tr>
<tr>
<td>Heating air</td>
<td>28%</td>
<td>1,426,000</td>
</tr>
<tr>
<td>Radiation</td>
<td>2%</td>
<td>93,000</td>
</tr>
</tbody>
</table>

From this data it is obvious that any technique that reduces the amount of water to be evaporated will result in a substantial energy savings.

**Energy Costs**

This brings us to the first trend in finishing I plan to discuss today. In the trade it is referred to as Low Add-On Finishing, which is a term used to describe various finishing systems and techniques that have reduced wet pick up in the range of 5 to 40 percent. This includes:

- foam application
- kiss roll applications
- vacuum extracting
- transfer methods
- air ejecting
- spray applications

Each of the low add-on systems is designed to achieve energy savings although the approaches vary considerably. One of the more popular is foam application where air and water rather than water by itself is used to carry the finish. This reduces wet pick up to less than 25 percent.

The use of foamed finishes requires machinery designed specifically for their application such as knife coaters, reverse roll coaters, horizontal nip pads, and slot applicators.

Auxiliary equipment required for these applicators includes blenders to create the foam and metering pumps to deliver the foam to the applicator. In these systems, the fabric surface is coated with a layer of foam that instantly collapses, depositing the chemicals on the fabric surface. Subsequent heating or curing diffuses the chemicals into the fabric for final fixation.

Another popular low add-on technique is kiss roll application, which is essentially a contact transfer of finish from a metal roll to the fabric. What is unique in this process is the use of moisture gauges before and after the kiss roll to control the finish add-on to the precise level desired.

With vacuum extracting, the fabric passes over a slotted tube that vacuums off moisture. Most systems employ two vacuum slots. The first reduces moisture to a uniform level across the fabric prior to the fabric entering the finish bath. The second slot removes excess finish and recycles it back into the finish bath.

All the techniques that offer lower add-ons reduce finishing costs but they vary widely in benefits and disadvantages. Each mill must decide what is best for its use. For example, kiss rolls work best on flat fabrics whereas foam applicators are suited for corduroys and seersuckers. Vacuum slots are suited for porous fabrics.

Benefits consumers will see include lessened impact of energy costs, lower chemical usage, and selective use of chemicals.
Mill data shows these techniques are softening the impact of rising energy costs. Further cost reductions are being achieved by reducing the amount, or improving the effectiveness of chemicals being used. Equivalent fabric performance is being obtained with lower add-ons indicating more efficient application. Some of these methods permit two-sided finishing, that is, putting a different chemical on each side of the fabric, reducing total add-on, and maximizing fabric performance. An example of this is corduroy finishing where a softener is foamed onto the pile and a resin is foamed onto the back for body and stability.

Consumer Needs

The rising cost of energy is spurring another new direction in finishing as consumers are desiring the warmth of surface-finished fabrics in apparel and home furnishings. Surface finishing includes the following:

- napping, which uses wires to cut fibers and raise a pile on the surface;
- shearing, a cutting process generally used after napping to cut the pile to a uniform height;
- suedeing, which abrades the fabric surface with sandpaper to create a velvety appearance.

Arnel® fabrics made from triacetate fiber have long been favored for surface finishing because they are easy to nap and suede and have good aesthetics.

Demands for surface-finished polyester fabrics have required development of improved wire for nappers and better shearing blades to withstand stresses of cutting the stronger polyester fibers. Chemical suppliers have developed lubricants that facilitate uniform cutting of polyester fibers. Several man-made fiber producers are attempting to develop polyester fiber variants that are easier to surface finish.

Polyester flannels and blanket-sleeper fabrics are now in wide use in the children's sleepwear market. In sweatshirts, polyester is replacing acrylic because of its cost-performance advantages. In home furnishings, the use of polyester/cotton flannel sheets for greater warmth is growing rapidly. Likewise, surface finished Arnel fabrics are finding greater acceptance in home furnishings.

Consumer demand for performance has prompted yet another new finishing direction for polyester fabrics. Many of you in the audience have had the sad experience of stains ruining a garment. Your complaints have been heard. Today's fabric finisher has the choice of several chemicals that will impart soil-release characteristics to polyester fabrics. These products are applied as finishes and during heatsetting are durably attached to the fiber surface. Normal laundering will then remove these stains from the fabric. These finishes are most effective on 100% polyester fabrics. Many domestic polyester fabrics are now treated with soil-release finishes. Work is underway to develop similar products for high polyester content blends, that is, 80/20 and 65/35 polyester/cotton.

Government Intervention

Earlier, I mentioned government regulations as another of the factors influencing trends in finishing. The textile industry's experience with government regulations has not been totally positive.
A particular example is in the area of flame-retardant finishing of children's sleepwear to meet FR regulations. In the early '70s, industry leaders agreed the proposed regulations were excessive. These regulations required the use of expensive chemical finishing to meet all the test criteria. Subsequent research showed that some of the chemicals hurriedly adopted to meet FR regulations were hazardous products. Manufacturers were forced to suspend production and recall products resulting in substantial cost to the industry.

Fortunately, the government agencies responded by making the FR regulations more realistic without decreasing the level of protection. Today, 100% polyester finished without the use of any flame-retardant chemicals meets all requirements for FR sleepwear. Hindsight is always best but one wonders if this industry upset would have occurred if more realistic government regulations had been established in the early '70s.

A similar situation may be developing today. The CPSC has banned the use of urea formaldehyde insulation in homes because of release of formaldehyde from this product. Textile finishers have been using resins based on formaldehyde chemistry for over 25 years to impart permanent-press properties to the cellulosic portion of polyester/cotton fabrics. During these years steady progress has been made on reducing free formaldehyde levels on fabrics to where levels today are one-fourth what they were 10 years ago. Formaldehyde released from fabrics is two orders of magnitude less than urea formaldehyde foams. What is feared now is the establishment of an unrealistic standard on formaldehyde release from textiles. Research is underway on products and processes that further reduce or could even eliminate formaldehyde release from treated fabrics and on developing fabrics that do not need resin finishing. These alternatives may increase fabric costs and reduce performance levels such that touch-up ironing may be necessary on some fabrics. Industry support groups are encouraging government regulators to carefully weigh the cost versus benefits of regulations on the use of formaldehyde, and to avoid the mistakes made in the early '70s with unrealistic regulations.

I do hope you have found this perspective on recent trends in fabric finishing informative. I've tried to briefly mention the major areas where important changes in technology are occurring. The common link in all these developments is meeting market requirements. Incentives for change have included:
- keeping prices down by controlling increasing energy costs;
- meeting market demands for warmth and launderability;
- responding to government safety regulations.

Technological innovations in finishing will continue since one of the ways our industry can remain competitive in today's worldwide market is to be first to meet the needs of our customers. You can expect to see continued development of more efficient finishing processes that produce fabrics and garments meeting market demands for quality and performance.
Color and design are dynamic merchandising tools that have a significant influence on customer purchases. By enhancing the aesthetic properties of textiles, we appeal to the potential customer's most direct senses--sight and touch (1). The aesthetic appeal of a textile is influenced by fiber, yarn, and fabric properties as well as by methods of dyeing, printing, and finishing. For most textiles, dyeing and/or printing represent important steps in the manufacturing sequence. By understanding the technical aspects of coloring textiles, designers as well as chemists working in the textile industry can maximize the potential of the art form, select dyes and dyeing methods suitable for a specific end use, and interface more effectively with technical personnel involved in the different phases of textile manufacturing.

The objectives of my presentation are (1) to review the basic principles involved in dyeing and printing textiles and (2) to assist you in developing courses in this area. To facilitate the last objective, the information presented herein is organized in topic form that can be expanded on to develop a comprehensive, in-depth course on textile dyeing and printing. I also would like to share with you laboratory equipment, techniques, and references that may be of benefit to you in your teaching, research, or creative endeavors.

History of Dyes and Dyeing

Inspired by the desire to embellish body and environment, Palaeolithic man began using pigments to apply designs and color to his body, cave walls, corpses, and animal skins. Hence, pigment coloring preceded dyeing. During the Neolithic period, the climate became warmer, man began to grow plants, and spinning and weaving were invented. Neolithic man also began to extract coloring materials from plants, insects, shell fish, and other naturally occurring substances. Dyeing was a widely practiced art in early civilizations of China, India, and Egypt (2). Except for a few vat dyes (i.e., indigo) and mineral pigments, most natural dyestuffs were applied in conjunction with a mordanting agent that formed an insoluble complex with the dye molecule, thereby improving fastness properties (3).

Until discovery of the first synthetic dyestuff, mauve, by William Perkin in 1856, all dyes were obtained from natural sources. Brilliant chemists, such as Griess and Martius, Grabe and Liberman, and Bottiger, also made significant contributions to the field of dye chemistry. Equally important was Kekule's (1865) theory of benzene, which served as the building block for most synthetic, organic dyestuffs. Interestingly, the acceptance of Kekule's theory by the Germans and Swiss resulted in a shift in the center of the dye industry from England and France to Switzerland and Germany. And today, these countries remain the leaders in dye manufacturing.

With each new development in synthetic dye chemistry, natural dyes lost a greater share of the market, and by 1900 they had virtually disappeared. Even indigo, the king of dyestuffs, was no longer obtained...
from natural sources. Approximately 100 years after Perkin discovered the first synthetic dye, ICI developed the last application class of dyes we know today (i.e., reactive dyes). Hence, all major usage classes of dyes were developed within a 100-year period. Concomitant with dye development, the textile industry has developed new fibers, processes, and equipment that have added to the complexity of textile dyeing and printing (4). Early books on dyes and dyeing that will fascinate both historians and scientists include those by Rosetti (The Plictho, 1548), Bancroft (Experimental Researches Concerning the Philosophy of Permanent Color, 1790), Ellis (The Country Dyer's Assistant, 1798), and Bemis (The Dyer's Companion, 1806).

Dye Classification Systems, Nomenclature, References and Calculations Used in Dyeing

The two major types of colorants are dyes and pigments. Unlike pigments, dyes are soluble in the application medium, have affinity for the substrate, and exhibit a certain degree of permanency. Pigments, on the other hand, are mechanically held to the fiber surface by a binder or are added to the spinning dope before man-made fibers are extruded from spinnerets.

Textile colorants (dyes and pigments) may be classified according to source, chemical class, or usage class. An understanding of these methods of classification, especially the latter two, is essential for ordering dyes and reading technical literature. The source class simply divides dyes into four main groups based on origin (i.e., vegetable, animal, mineral, or synthetic). Chemical classes of dyes are based on the chemical structure of the dye molecule. A specific chemical class is often found in more than one application or usage class. For example, azo dyes, which represent the most important chemical class of dyes based on occurrence, have an azo (-N=N-) group in their structure and are the basis for many acid, basic, direct, disperse, mordant, pigment, and reactive dyes. The inherent properties of the dyestuff such as substantivity for specific fiber types, suitable application procedures, fastness properties, etc. are influenced by functional groups attached to the parent structure. Usage classes subdivide dyes according to method of application. The names of these classes refer to either application procedure, general chemical properties, or method of dye/fiber association.

Methods of labeling specific dyestuffs include (1) chemical names that are often cumbersome and seldom used for practical purposes, except for very simple dyestuffs or intermediates, (2) C. I. Generic Names based on a classification developed by Colour Index (5), which includes the initials C. I. followed by the usage class, spectral hue, and sequential number (i.e., C. I. Acid Red 1), and (3) commercial names assigned to the dye by various dye manufacturers. In general, a specific dyestuff usually has only one chemical name, one C. I. General Name, but several commercial names if it is manufactured or sold by more than one dye company. Both C. I. generic names and commercial names are used in technical literature and reference works such as Colour Index.

No dye laboratory is complete without Colour Index, which is the leading work in the field of colorant classification and is the most valuable reference for manufacturers and users of dyestuffs (6). In Volumes 1-3 of Colour Index, colorants are grouped according to their
recognized usage category, the dye or pigments themselves being arranged in spectral hue order based on C. I. Generic Name. Important information included in these volumes are chemical class, C. I. constitution number, hue, suitable dyeing procedures, appropriate substrates, and fastness properties.

In Volume 4 of Colour Index, colorants are arranged according to their chemical constitutions by means of a five-digit C. I. Chemical Constitution Number. Dyestuffs with similar chemical structures are grouped together (i.e., azoic dyes have C. I. Chemical Constitution Numbers from 37000 to 39999). Information given in Volume 4 includes structural formula, methods of preparation, chemical and physical properties, references, and patent numbers, if available. The C. I. Generic Name Index and the Commercial Name Index in Volume 5 of Colour Index are helpful when ordering dyestuffs or determining the C. I. Generic Names that correspond to specific commercial names or vice versa.

The AATCC Buyer's Guide for the Textile Wet Processing Industry (7) contains similar indexes as well as valuable information on other chemicals used in textile wet processing (dyebath auxiliaries, finishes, scouring agents, bleaches, etc.).

Dye companies, fiber producers, and related textile companies also publish equally informative and beneficial technical literature on dyes and methods of application, ranging from booklets to complete books such as BASF's text on dyeing and finishing acrylic fibers (8). Company shade card books include samples of fabric dyed at different concentration as well as other pertinent information such as dyeing procedures, suitable substrates, fastness properties, reflectance spectra, and instrumental color values.

Dyes are sold as powders or liquids that must be measured out or weighed and diluted with water or another suitable solvent to prepare the requisite dyebath. In general, it is easier and more practical to work with a stock dye solution (a dilute solution having a known concentration) rather than repeatedly weighing out the needed quantity of dyestuff, especially when dyeing small quantities of goods. Stock dye solutions are usually prepared on a weight/volume basis because they are so dilute. For example, a 0.4% stock dye solution would be prepared by dissolving 4 g of dye in 1000 ml of distilled water.

Laboratory solutions of chemicals and auxiliary products other than dilute stock dye solutions (greater than 1% conc.) should be prepared on a weight/weight basis (9). For example, a 1% H₂SO₄ solution would be prepared by dissolving 1 g of H₂SO₄ in 99 g of distilled water.

In the dyeing industry, quantities of liquor, dyestuffs, and auxiliaries are usually based on the weight of the goods being dyed or processed. This is often abbreviated % owf (on weight of fabric). Thus, a 2% owf dyeing designates that 2 g or dye are needed per 100 g of textile (100 g x .02 = 2 g). The volume of the liquor required (liquor-to-goods ratio) also is expressed as a multiple of the weight of the goods being dyed. Common liquor-to-goods ratios range from 10:1 in newer, more energy efficient dye equipment to 50:1 or higher in conventional dyeing machines. A 50:1 liquor-to-goods ratio is well suited for laboratory dyeings. To calculate the total volume of the dyebath, simply multiply the fabric weight by the value on the left side of the
designation for liquor-to-goods ratio. Thus, for a 50:1 liquor-to-goods ratio, the total volume of liquor needed for a 5 g sample would be 250 ml (5 g X 50 = 250 ml).

When using a stock solution, an additional calculation is needed to determine the volume of stock solution needed for a given weight of textile. It simply requires multiplying the fabric weight (g) by the percent owf of the dye or assist and dividing by the percent concentration of the stock solutions:

\[
\frac{\text{sample weight, g} \times \% \text{ owf of dye or assist}}{\% \text{ concentration of stock solution}} = \text{Volume (ml) of stock solution}
\]

For example, if a 5 g sample of cotton is to be dyed to a 2% depth using 40% owf salt and a 50:1 liquor-to-goods ratio, the dyebath would contain:

<table>
<thead>
<tr>
<th>Component</th>
<th>Calculation</th>
<th>Volume (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2% owf dye (0.4% stock)</td>
<td>(\frac{5 \text{ g} \times 2%}{0.4%}) =</td>
<td>25 ml</td>
</tr>
<tr>
<td>40% owf salt (10% stock)</td>
<td>(\frac{5 \text{ g} \times 40%}{10%}) =</td>
<td>20 ml</td>
</tr>
<tr>
<td>Distilled water</td>
<td>(250 - (25 + 20)) =</td>
<td>205 ml</td>
</tr>
<tr>
<td>Total volume for 50:1 liquor</td>
<td>(5 \text{ g} \times 50) =</td>
<td>250 ml</td>
</tr>
</tbody>
</table>

Chemical Constitution of Dyes and Its Influence on Color, Dyeing Theories, and Methods of Dye/Fiber Association

Dyestuffs are colored because they have the ability to selectively absorb certain wavelengths of light. Important aspects of molecular structure that have potential for imparting color to a substance are unsaturation, conjugation, resonance, and certain functional groups such as chromophores and auxochromes, which also increase solubility and substantivity. These chemical principles, as discussed by Trotman (10) and other authors (11-22) are germane to understanding the relationship between dye structure and color; how dyes are modified to increase depth, brilliance, and affinity for specific fiber types; and methods of dye/fiber association.

The economic, aesthetic, and practical aspects of dyeing are governed by complex theories in physical chemistry that are important but beyond the scope of this presentation. In general, however, the three stages in the dyeing process are (1) dye migration from the solution to the surface of the fiber, (2) dye diffusion into the interior of the fiber, and (3) anchoring of the dye to the fiber. Dyebath concentration, temperature, pH, auxiliary chemicals (electrolytes, wetting agents, reducing agents, etc.) as well as the chemical and physical structure of the dye and fiber determine whether or not a specific dye-stuff can be used to economically dye various fiber types, and its subsequent fastness properties. Each of these factors have a critical influence on the three stages of dyeing and should be carefully considered. Thus, dyeing theories have important implications for the textile producer, designer, engineer, and chemist when determining production costs,
selecting suitable dyes for specific fiber types or end uses, determining appropriate application procedures, and predicting fastness properties. Texts on the physical chemistry of dyeing vary in difficulty, but often require the reader to have a working knowledge of basic chemical principles. If students have a limited background in the physical sciences, a more practical approach to the subject can be taken, as is typified by FPI's dyehouse manual (23).

Methods by which dyes can associate with a fiber include chemical forces (i.e., Van der Waals forces, hydrogen bonding, ionic bonding, and covalent bonding) and mechanical entrapment. For a particular dye, several of these forces may be responsible for its substantivity. In a practical sense, method of dye/fiber association influences dyeing conditions, substantivity, levelness, and fastness properties.

Application, Use, and Properties of Dyes and Auxiliaries

Each usage class has general application procedures and properties specific to that class; however, procedures and colorfastness vary considerably within the class, depending on the physical and chemical properties of the dye and fiber. Direct dyes, for example, are applied to cellulosic textiles at or near the boil with suitable quantities of salt that promote exhaustion by reducing the negative charge on the fiber surface. More specifically, however, direct dyes are divided into three groups, based on dyeing behavior and migration properties, and each requires different application procedures. As is the case with most dye classes, it is usually not advisable to mix dyes from different groups because they often require different dyeing conditions and exhaust at different rates, resulting in uneven dyeing and difficulties in shade control.

Sulfur and vat dyes are usually reduced to convert the dyestuff to its water soluble form, applied to the textile, and then oxidized back to their insoluble form. They vary in substantivity and ease of reduction, which have a significant influence on dyeing conditions (i.e., alkalinity of reducing bath, salt, temperature).

Azoic dyes are applied to cotton and other suitable fiber types by coupling together inside the fiber a naphthol derivative (C. I. Azoic Coupling Component) and a primary aromatic amine (C. I. Azoic Diazo Component). These components vary in their substantivity and coupling rate which, in turn, influence dyeing conditions.

Acid and basic dyes ionically bond with fibers containing nitrogenous groups (i.e., wool, silk, and nylon) or acidic groups (i.e., acrylics and modified polyester and rayon). Acid dyes are subdivided into three groups, based on leveling properties, pH of the dyebath, and function of the electrolyte, that is, level-dyeing (pH 3.5, salt retards exhaustion), milling (pH approx. 5.5–3.5), and super-milling (pH approx. 7.0–5.5, salt promotes exhaustion). Basic dyes also are applied from an acid bath and vary in application conditions.

As the name implies, reactive dyes form a covalent bond with the fiber (i.e., cellulosics, proteins, and polyamides), but vary in terms of reactive group, suitability for various fiber types, fiber substantivity, exhaustion rate, and application and reaction conditions (i.e., salt needed for exhaustion and alkalinity and temperature needed for dye/fiber coupling).
Mordant dyes, which are often referred to as chrome dyes because of the importance of chromium as a mordanting agent, are applied to wool, silk, nylon, and cellulosic fibers by either a pre-mordanting, or on-mordant (one bath), or after-mordanting procedure. The dye molecule complexes with the metallic chromium atom through ionic and coordinate bonds (covalent bond in which the shared electron pair come from one atom called the donor), which reduce water solubility and increase the size of the dye molecule, thereby increasing fastness properties. The type of mordanting agent used and method of application greatly influence the final hue and shade reproducibility.

Disperse dyes are applied to polyester, acetate, triacetate, nylon, acrylic, and other synthetic fibers by one of several methods (i.e., dyeing at the boil with or without a carrier, high temperature/pressure dyeing, and thermosol dyeing), depending on the fiber type, the size of the dye molecule, and the amount of energy to exhaust or fix the dye.

In addition to the application requisites of specific dyestuffs, chemical auxiliaries vary in properties, function, and use. These products are added to control dyeing rate, improve evenness, increase depth of shade, or improve fastness properties. Shade card books; technical literature from dye companies, chemical specialty companies, and fiber producers; and buyer’s guides can assist in the proper selection and use of dyes and auxiliary chemicals. It is important to know the function and recommended use of such products to achieve desired results. Many auxiliary products, for example, are recommended for use on specific fibers or dyes. Cationic wetting agents, for example, may be used when applying basic dyes, but they will cause acid dyes to precipitate out in the dyebath.

**Fabric Preparation for Dyeing**

Whether it be a fiber, yarn, or fabric, most textiles substrates are subjected to one or more pretreatments prior to dyeing. For woven textiles, the sequence of preparation may include:

1. **Singeing**—goods are brushed and then passed across a gas burner to remove the raised fibers.

2. **Heat setting**—textiles containing thermoplastic fibers are subjected to dry heat or saturated steam that sets the fibers or fabrics and imparts dimensional stability (also may be done after dyeing).

3. **Desizing**—application of desizing agents such as enzymes that hydrolyze starch sizes into soluble sugars.

4. **Scouring**—goods are saturated with chemicals to assist in the removal of sizing agents and other contaminants.

5. **Bleaching**—hydrogen peroxide or other appropriate bleaching chemicals are applied to increase fabric whiteness.

6. **Mercerization**—cellulosic-containing fabrics are treated with an 18–25% NaOH solution under tension to increase dye affinity and luster.

The sequence of operation varies depending on the fiber type and method of dyeing.

It is estimated that 70 percent of all fabric defects can be attributed to inadequate preparation of the goods (24). Thus, correct fabric preparation procedures will maximize dyeing efficiency and quality. In most situations, however, university faculty have little control over textile pretreatment procedures, except if the goods were
manufactured according to the user's specifications. Many of the fabrics
used in our laboratories are purchased from Testfabrics Inc., and they
strive to maintain high standards of quality.

Dyeing and Printing Methods and Machinery

The major industrial dyeing methods can be divided into (1) con­
tinuous processes in which the dyeing, scouring, and finishing equipment
are arranged in tandem, and (2) batch processes in which smaller yardages
are dyed in a suitable dyeing machine and then transferred to other
machinery for finishing. In continuous dyeing, the dye liquor is
usually pad-applied to the textile. Laboratory-size padders can be
used to simulate pad-dyeing for teaching and research purposes, but
equipment for dry heat or steam fixation also may be required for
certain dye types.

Equipment used for discontinuous dyeing includes types in which
(1) the goods circulate through a stationary dyebath (i.e., winches and
jigs), and (2) the goods remain stationary and the dye circulates
(i.e., kiers for stock, package, and beam dyeing). Laboratory versions
of these dyeing machines are available; however, beaker dyeing or
dyeing in a Launder-Ometer is less expensive and yields good results.
The standard laboratory procedure developed by AATCC for dyeing polyester
recommends using a Launder-Ometer because it is relatively simple to use
and is found in most textile laboratories (25).

The major printing methods are roller printing, screen printing,
and heat transfer printing (26-28). Small flat-bed screens can be made
or purchased for laboratory use. Small roller-printing machines also
are available. In addition to the printing equipment, a curing unit
also may be needed because most print paste formulations require some
method of fixation (steam or dry heat) to facilitate dye movement into
the fiber or polymerization of the binder when applying pigment prints.

Print Paste Formulations

The major components in a pigment printing paste are (1) pigment,
(2) binder and catalyst, (3) thickening agent, (4) diluent, and (5)
other additives such as emulsifiers, hand modifiers (softeners or
plasticizers), antifoaming agents, and antimigrants. Unlike dyes,
pigments are applied in conjunction with a binder that is incorporated
into the printing paste and after drying or curing with heat, physically
entrap the pigment and holds it onto the surface of the fabric. In
pigment printing, the characteristics of the binder determine the fastness
properties of the print, except for lightfastness, which is determined
by the pigment. Binders vary in stiffness or hand and fastness to dry­
cleaning, aqueous solvents, and crocking. Typical binding agents used
industrially include urea or melamine formaldehyde condensates, acrylic
esters, butadiene, and vinyl acetate. A suitable catalyst is added to
the printing paste to speed polymerization of the resin during fixation.
Most pigment/binder systems are applicable to most fiber types and are
not fiber specific as are dye printing pastes. The major method for
printing polyester/cotton blends, for example, was pigment printing until
disperse/reactive printing systems were developed.

Thickeners function by increasing the viscosity of the print paste
to hold the colorant particles in place until the printing and fixation
process is completed. Available thickeners include (1) natural sub­
stances such as gums (gum Arabic, Guar gum and locust bean gum),
modified starches, sodium alginates that are widely used in pigment printing, and cellulose esters, and (2) synthetic thickeners such as polyacrylates and cellulose derivates.

Other components commonly used in pigment printing pastes include water or other suitable solvents depending on whether it is an all-aqueous system favored by screen printers or an oil-in-water emulsion system favored by roller printers, emulsifying agents to keep the inner phase containing the colorant and one liquid suspended or dispersed in the outer phase, hand modifiers that reduce the stiffness of the print, antifoaming agents to reduce the amount of foaming, and antimigrants to hold the dye or pigment in place during drying and fixation. The choice of specific components used in the printing formulation depends on the type of printing machinery, the item being printed, and the desired fastness properties.

The steps in pigment printing are simple and include: preparation of the print paste, printing the fabric, drying, and curing the resin with heat (i.e., 160°C for 1-3 minutes). Unlike dye printing systems, pigment prints usually are not washed after curing.

Printing with water-soluble dyes is more complicated because additional auxiliary chemicals, rather than binders, are incorporated into the printing paste, which, during dry heat or steam fixation, promote dye reaction or fixation. For example, vat dye printing pastes contain an alkali (sodium carbonate) and a reducing agent (sodium sulphoxylate formaldehyde) that reduce the dye to its leuco form during steaming. Likewise, reactive dye printing pastes usually contain an alkali that causes the dye to react with the fiber during steaming. In the application of azoic dyes, a stabilized mixture of the two components (coupling component and diazo component) can be printed on the fabric or the coupling component can be padded on, followed by printing with a diazo component formulation. During subsequent steaming, the two components react.

Both the printing formulation (thickener and other chemicals) and method of fixation are influenced by the dye class, substrate, and printing machinery. The carboxylic anion (-COO\(^{-}\)) on xanthum gum, for example, makes this thickener unsuitable for use with cationic dyes. Suitable methods for promoting the fixation or development of dyes on printed fabrics include dry heat treatments, wet development in an appropriate chemical bath, or steaming with either saturated or superheated steam (180-220°C) in atmospheric or pressure steamers. Superheated steaming reduces fixation time, but it is not suitable for all fiber types (i.e., nylon and acrylics).

After dye fixation, the printed goods must be thoroughly after-washed to remove the thickener and dyestuff loosely attached to the fiber surface. Wash-efficiency is influenced by the amount of unfixed dye, ease of removal of unfixed dye, and tendency of dye to stain the unprinted areas of the fabric.

**Colorimetry, Color Specification Systems, Color Matching, and Shade Sorting**

In the past, color evaluation was done primarily by visual assessment. For example, values for specifying the precise hue and intensity of a color were determined by using a color atlas such as the ICI Color Atlas (29) or the Munsell Book of Color (30). Likewise, the concentration
and evenness of a dye on a given substrate, the degree in which the
dyed fabric matched a given standard, and the amount of color change
during processing and consumer use also were evaluated visually. Be-
cause of speed, reproducibility, and cost efficiency, visual color
evaluation is being replaced or supplemented by instrumental methods.
It is important for our students to understand the principles behind
instrumental color evaluation, obtain hands-on experience with colori-
meters and spectrophotometers, and gain an appreciation of how these
principles and instruments can aid the designer and researcher.

By manually or instrumentally recording and plotting transmittance
and absorbance spectra for liquids or reflectance and absorbance spectra
for fabrics, students can readily understand how the absorbing properties
of a dye (i.e., amount of light absorbed and wavelength of maximum
absorbance) will change, depending on the concentration and hue. From
the absorbance spectra, the concentration of the dye in solution can be
calculated by referring to a set of standards of known concentration.
Similarly, the concentration of a dye in a fabric can be calculated
from reflectance values by using the Kubelka-Munk equation
\[ \frac{K}{S} = \frac{(1-R)^2}{2R} \]

The basis for instrumental color evaluation is the CIE tristimul
values, X, Y, Z. These can be computed by multiplying reflectance values
by the appropriate constants for a standard light source and standard
observer or by using a suitable colorimeter or spectrophotometer. Be-
cause differences in X, Y, Z values for different hues do not correspond
to how the eye perceives color differences, the tristimulus values are
converted to uniform color solid coordinates such as Hunter L,a,b values.
These values can be used to specify a hue, compute color difference, and
sort fabrics from different dye lots into shade groups (31-34).

Colorfastness Properties and Evaluation

It is important to consider the colorfastness properties of a dye
when evaluating its suitability for a specific end use. Dyes that have
poor colorfastness to chlorine, for example, should not be used in
bathing suit fabrics. Likewise, only those dyes that have good color-
fastness to light and atmospheric contaminants should be used to dye
and print carpeting. Information on the colorfastness properties of
dyes is readily found in Colour Index, shade card books, and other dye
company literature as mentioned earlier. To understand the rating
scales used in these references, an appreciation of standard test methods
for conducting colorfastness tests and using rating scales is essential.

Most consumer and producer type colorfastness tests used for quality
control and research purposes are published in the AATCC Technical Manual
(35). Most colorfastness tests published in this manual specify the
use of the AATCC Gray Scale for Color Change, the AATCC Gray Scale for
Staining, or the AATCC Chromatic Transference Scale for evaluating test
results; however, test specimens also can be evaluated instrumentally.

I hope this overview of textile dyeing and printing basics has
been helpful, and I have given you a better appreciation for dyestuffs,
dyeing procedures, and the complexity of the dyeing process.
References:


Our marketing program has a clean, consistent objective: to support Dayton's position as the dominant, pacesetting fashion store. This means focusing on a primary audience--defined as the 25-40 age group. The video tape I will show you clearly explains why 25-40 is our target market. It means understanding and projecting Dayton's unique "character." It means supporting targeted merchandise areas, and strengthening our value concept in daily newspaper ads. Let me show you some examples:

- This Gloria Vanderbilt ad is geared to the updated traditional customer. Dayton's primary audience is defined by attitude more than age.
- This cosmetics ad reflects Dayton's "character"--sophisticated... contemporary...distinctive.
- This men's ad is an example of support for a key merchandise area.

These ads all ran on page 2A--the dominant page for advertising in our markets. This prime position was locked-in for Dayton's last year--in 14 newspapers, in all seven of our markets. This was a giant step in achieving dominance through standardization.

Another big step was improvement of our systems--using computers for schedules, budget controls and projections that allowed transmission of data to four states at the touch of a keyboard. With a computer printout, store managers can quickly check all pertinent facts such as ad copy and prices, and make sure the merchandise is in stock to support the advertising. Day after day, newspaper ads make a dominant statement, and boost sales on the advertised items.

But a dominant statement can be compounded with a multimedia approach. Our "marketplace" strategy, for example, includes newspaper ads, full color catalog, shopping bag, point of purchase signing, and an apron for salespeople.

"Boundary Waters" is a theme that has been successfully translated to a multimedia marketing thrust and a private label program. This label has been supported by newspaper and magazine ads, in-store and point of purchase signing, and a shopping bag.

Another area where a multimedia strategy is very important is electronics, and I'd like to spend a little time discussing our overall approach to the marketing of consumer electronics. This marketing plan is one we use for any product or lifestyle category we designate for strategic growth.

First of all, in identifying the opportunity, we look at industry growth and consumer interest. Growth of the electronic industry can be defined as explosive. From a 1979 base of $38 billion, the consumer electronics industry is projected to grow to $200 billion in 1995--an annual growth rate of 11 percent. The rapid growth of the electronics industry relates directly to strong consumer interest and lifestyle preferences of our target customers. Their focus is on self and self-gratification. Home is their center of gravity--a place to relax, a place that is attractive and pleasing, and a place to spend
more time. They are investment-oriented, interested in quality and value. They feel they are unique and different. The wide array of exciting, innovative electronics merchandise responds directly to their wants and desires.

Having identified the market opportunity, our objective is to make Dayton's the dominant retailer of quality electronics in our markets. This means (1) dominance through assortments, (2) dominance through pricing, (3) dominance through presentation, and (4) dominance through promotion.

Let's look at these four elements. First, to guarantee dominance through assortments, we decided to include all of these merchandise categories in our electronics world--more merchandise categories than any single competitor. We decided to carry broader assortments than our competitors in selected merchandise categories--and in these audio and video classifications, Dayton's has a broader assortment than any primary competitor. It was decided at the outset that our prices would be competitive. Our pricing posture was based on two tenets: (1) our regular prices would be on a par with our primary competitors, and (2) our sales prices would be among the lowest in the market. This pricing policy was designed to boost sales and build customer confidence.

To achieve dominance in presentation, the design plan incorporated these design elements:
- dominant grey to highlight the merchandise
- neon to energize the world
- resource identification to exploit brand identity
- crisp category statements to highlight dominant product assortments

The final element of our strategy was the promotional package. Advertising dominance was to be achieved with a consistent ad format, a strong value focus, and a strong assortment focus. The format selected was built on a grid system designed to reinforce the technology of the products and "hold together" unrelated items. This format is used for all promotional events: one day sales, four day sales, resource sales.

Perhaps our most powerful advertising vehicle is the eight-page tabloid, distributed quarterly. It is the most dominant advertising vehicle for electronics in our markets, and clearly communicates the depth of our assortments. Our multimedia promotional package also includes magazine ads to reinforce our leadership position; full-sheet posters in our stores; and television commercials to support our strong print campaign.

Another way we achieve dominance is with special events and editorial publicity. To increase store traffic and sales, we emphasize merchandise-related special events. A good example would be the "GQ" men's event featuring personal appearances by leading men's designers and vendors, plus a variety of activities for male customers that generate sales and media coverage.

"Accessories Week" is another example of a merchandise-oriented event that results in publicity and sales and reinforces Dayton's dominance in fashion leadership.

Community involvement also is an important part of Dayton's "Brand Character." We have worked with many cultural organizations and institutions in a way that is mutually beneficial, whether it's a Picasso tie-in, the St. Paul Chamber Orchestra, or the De Stijl Exhibit at Walker Art Center.
We are now at the center of a community-wide celebration—"Scandinavia Today"—an event that brought national attention to the upper Midwest this fall when five heads of state kicked off a year-long focus on Scandinavia. Sweden's Royal Family will open Dayton's Christmas event this November.

Meanwhile, Dayton's has been receiving a great deal of customer interest in its "High-Tech Marketing"—the use of touch-terminal computers to generate sales. The Bridal Registry touch-terminal computer enables us to take advantage of a growth opportunity—the growing wedding business. Nationally, 2.4 million marriages a year generate more than $12 billion in sales. In our five-state area, 43,000 weddings a year are projected—with an average expenditure of $1,200 per wedding, and an additional $5,400 for the new household. Bridal registry computers were installed in Dayton's metro stores and Rochester early in 1981. Customers now find it quick and easy to "touch up" the name of a bride or groom and get a printout of the couple's preference list. Purchase records are updated daily, and names are compiled for follow-up business. About 12,000 customers currently are registered and the touch computers are being used by an average of 1,300 customers per day—soon to be 2,000 or more, with the addition of our regional markets this spring.

The new baby boom has created another opportunity for our computer marketing program to capture a growing market. As reported nationally and locally, many couples who postponed parenthood are now starting a family, so Dayton's is starting its own "stork club"—a computerized baby gift registry. Our buyers have taken this baby registry information to New York to obtain vendor support and we expect to have the computerized baby registry in operation by November.

Here's another way we have put the touch-terminal computer to work for us—an "instant credit" machine in our downtown Minneapolis store. Here again, customers find the touch computer easy to use and a time-saving way to open a Dayton's account.

In closing, I'd like to tell you about an exciting community event we helped sponsor and then show you how Dayton's and Grey Advertising translated this event into a commercial for "Jubilee"—Dayton's biggest storewide sale since 1922. The community event, a kick-off for "Business Salutes the Arts Week," was the World's Largest Marching Band. Three-thousand musicians marched through downtown Minneapolis, onto all three television networks, and into the Guinness Book of World Records!
In 1893, William Morris suggested the purpose of a museum was to inspire and educate the public about art. Museums today face not only these challenges of inspiration and education, but are required in addition to practice good stewardship by conserving artifacts for future generations.

Recently the designer Ralph Lauren raised a hornet's nest of controversy among quilt lovers. They felt his decision to cut up antique quilts to incorporate them into garments was not the best way to display or preserve them (despite the handwritten tag attached to each garment identifying the pattern of the design and categorizing it as an heirloom to be conserved).

Most textile conservators feel a primary rule of their trade is that historic costumes should not be worn by live models. Thus, they will probably disagree with the philosophy of Shannon Rogers and Jerry Silverman who own one of the largest private costume collections in America. These costumes will soon be housed at Kent State's new School of Fashion Design and Merchandising. This fall, at a gala fashion show in Cleveland, one-of-a-kind "museum quality" costumes from their collection were modeled under the lights of a runway in an elegant event held to raise money for the new school.

Clearly there are differences of opinion about what constitutes responsibility in the use and exhibition of historic textiles and costumes. Our task today, then, is to address some of the complex questions and problems that must be dealt with if we are to exhibit textiles effectively while at the same time conserving them for future research and use. It is my pleasure to introduce two experts in the field who will share some of their experience and knowledge related to textile exhibition. We will first hear from Lotus Stack who is curator of textiles at the Minneapolis Institute of Art, where she has been instrumental in developing methods for cleaning tapestries and handling large, flat textile exhibits. Then we will hear from Margaret Ordonez who is curator of the textile and costume collection at Kansas State University, where she also teaches and has set up a conservation program that has received national attention.
EXHIBITION PLANNING: OBJECT SELECTION TO OPENING NIGHT

Lotus Stack, Curator, Textile Department
The Minneapolis Institute of Arts

Planning an exhibition that depends almost exclusively on your own collections or those available in your community usually starts with a general concept that is further defined by object availability.

At a relatively early stage of planning, make a preliminary object list that includes basic label copy for each object. Information such as period and country of origin; maker if known; method of construction and materials employed; source, be it donor, purchase fund, or loan; identifying or accession number; and size of object should be indicated. At this point, all notations are very simple. An individual listing for a William Morris print might read:

England, XIX Century ca. 1870
William Morris
Printed on Cotton
Gift of Mrs. Duncan Fitzroy
80.35.7
24" x 48"

Keep information placement consistent, that is, the first line always relates to the time and place of manufacture, measurements always are given with height first and the width second, etc. It is often helpful to make up this list in two formats. Make one on cards that can easily be rearranged as the need arises and make a second copy by laying out the cards in numerical order and xeroxing them. With the object list in hand and the limitations of the galley space in mind, basic sub-groupings of the objects can be made by technique, historical period, artistic style, or any other arrangement that seems appropriate to the theme.

Now for the first time, carefully look at the textiles themselves. Consider the condition of each piece, indicating if it can be exhibited and procedures necessary for mounting as well as a time/cost estimate. Think of visual harmony between the various textiles, suitable backing materials, gallery colors, display cases, etc.

Having defined the essence of the exhibition, take a second look and see what sort of didactic and supplementary objects can be added to give added dimension to the exhibit, so the public will view the objects as more than pretty pieces of cloth. Paintings, prints, and photographs showing the use of the displayed textiles or sculpture and decorative arts of the period or culture that exemplify similar stylistic patterns are often useful.

After gathering this information, a budget can be developed. The most obvious costs are those related to object preparation and installation, such as conservator's time for mounting, construction of special mounting frames or display cases, and purchase of mounting and display background fabrics as well as paint and other alterations the gallery may require. Other costs to consider are printing costs for such items as labels (silkscreened, printed, press-on, typed or plexiglass), gallery handouts (including initial photographic and type-set costs,
paper and printing) and gallery graphics (signage including large type,
didactic material, photo blowups, etc.).

Related costs that should be considered include an opening reception.
Consider costs of invitations, stamps, labor costs for table set-up and
closet check, tablecloths and decorations (florist charges), food costs
(will it be catered?), overtime for security guards, clean-up costs,
etc. Don't forget educational components such as films, special lectures,
classes, or a videotape component, publicity photos and news releases,
printing, and mailing costs. All of these are budget items that should
be considered as real costs, even if you are doing the actual work.
They should be included in any exhibition proposal or grant request.
If you have to work from fixed funding, each area must be considered
individually to decide what kind of reasonable compromises can be made.

Much planning is required before actual installation of an exhibition.
The most logical method, especially for individuals working consistently
with the same gallery space, is to build a basic room model to scale.
This can be reused as needed and each new exhibition will require only
scale representations of the specific objects to be displayed. These
can be moved about in the planning stage until the desired result is
obtained. Besides the obvious ease of trying various layouts in a
quick and easy manner, this system saves the collection objects from
needless deteriorating activity. However, when one must use various
galleries for each new exhibit, a graph paper layout may be more practical.
When there are many small objects involved in an exhibition and there is
very little time allotted for actual installation, set up a section of
an exhibition panel to represent a portion of the gallery wall where
theoretical layout may be tested with a few of the objects to be displayed.
This small section trial run can be a great psychological aid and comfort
when dealing with new aspects of exhibition installation.

Thematic development, object selection, budget planning, and
installation design are all critical to a good exhibition, but one also
should remember to document all exhibitions, which includes installation
photos and slides. These records are useful for developing new ideas
and avoiding unproductive expenditure of energy in future efforts.

EXHIBITING TEXTILES VERTICALLY

Margaret T. Ordonez and Alfred A. Ordonez
Kansas State University

Virginia Gunn, University of Akron

Museums and churches have exhibited large textiles in a vertical
position for centuries, and now large and often heavy textiles are
decorating public buildings at an increasing rate. Exhibitors are
using a wide variety of methods to support hangings with no research
on which to base decisions concerning the safety of support systems.
The test of time has been the best indicator of strain. The problem of
evaluating stresses on vertically hung textiles is complicated further
by the lack of a standardized test method to measure strain.

This research tested a method to measure strain created when textiles
are exhibited vertically. Different methods of hanging, various backings,
and a number of stitching arrangements to attach the backing were
evaluated. The basis for the test involved using bias-cut gingham fabric
to replace a historic or valuable textile in various support systems
weighted with a heavy rod to accelerate the effect of gravity. The
orientation of the warp and filling yarns, originally lying at a 90
degree angle, changes according to the amount of strain exerted on the
yarns at any one place. A measure of the displacement of the yarns
or the change of the angle at various sites is an indication of the
strain at those places. The bias-cut gingham acts as a gauge to measure
the stress that an historic textile would experience in a similar support
system.

To date, an elimination study has identified some of the safest
methods of hanging textiles, best support fabrics, best arrangements of
stitches that attach the textile to a backing, and least stressful
stitches. The next part of the study scheduled for spring 1983 will
compare the least harmful choices from the elimination study. More
complete statistical analysis will include tests for interaction of the
factors being evaluated. From the numerical data and visual evaluation
of the bias-cut gingham samples, exhibitors will have more concrete
information to add to what the test of time has shown in making wise
decisions about vertical exhibition of textiles.

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Periodicals

History News. Monthly publication of the American Association for
State and Local History, 1400 Eighth Ave. South, Nashville, TN 37203.

Floyd, C. Exhibit designers talk about their work. History News,

Gershman, E. and Pendry, J. Women at work: How Stamford's exhibit
traces the professional development of women. History News,
August 1980, 35(8), 12-14.

Pizer, L. How not to cooperate. History News, October 1980, 35(10),
7-10.

Technical leaflets from History News

Baker, C. L. Planning exhibits: From concept to opening. Technical
for State and Local History.


Bowditch, G. Preparing your exhibits: Case arrangement and design.


Display of Costume. ICOM Technical File No. 1.

Journal of the American Institute for Conservation of Historic and Artistic Works (AIC) and quarterly Newsletter. AIC, 1511 K Street, NW, Suite 725, Washington, DC 20005.


Museums. Quarterly publication from UNESCO. Unipub, Box 433 Murray Hill Station, New York, NY 10016.


Popular and trade magazines, especially those dealing with fine art, decorative art, or antiques occasionally publish articles related to textile display. As always, however, the reader should use caution in using information designed for a nontechnical audience without verification from other sources.

See for example:


Books

Bogle, Michael. Textile Conservation Center Notes, 1979. Merrimack Valley Textile Museum, 800 Massachusetts Avenue, North Andover, MA 01845. ($15.00 plus $1.50 postage.)
See especially Sec. 12 "Museum Lighting for Textiles," N. Stolow.  
Sec. 15 - "The Mounting of Textiles for Storage and Display,"  
K. Clark.  
Sec. 9 - "Packing and Shipping Data for Textiles," N. Kajitani,  
Adviser.

Creigh, D. W. A Primer for Local Historical Societies. Nashville:  
American Association for State and Local History, 1976.

Finch, K. and Putnam, G. Caring for Textiles. New York: Watson-  
Guptill Publications, 1977, (see Chapter 2 - "Display and Protection").

Harris, K. J. Costume Display Techniques. Nashville: American  
Association for State and Local History, 1977. ($4.00 members,  
$5.75 nonmembers.)

Institution, 1972. (Currently out-of-print.)  
-See Chapter 8 - "Storage and Display," A. Buck and J. E. Leene.

Mailand, H. F. Considerations for the Care of Textiles and Costumes: A  
-(See sections on Mounting and Exhibition, 14-19.)

for State and Local History, 1976. ($6.00 members, $8.00  
nonmembers.)

Institution, 1972. (Currently out-of-print.)

The Smithsonian Institution has a number of slide sets for sale or  
loan. Write for a brochure entitled Audiovisual Programs for Museums -  
Conservation, Education and Folklife.

Address: Audiovisual Loan Program  
Office of Museum Programs  
Arts and Industries Building, #2235  
Smithsonian Institution  
Washington, DC 20560  Phone: (202) 357-3101

Smithsonian slide sets include the following related specifically to  
exhibits:

"Mounting Flat Textiles for Exhibition" (MTS-3)
Smithsonian Institution: Office of Museum Programs, 1976.  
107 slides & script - loan $17.00.

"Protecting Objects on Exhibition" (POS-10)
135 slides - loan $17.00.

The script accompanying the slide set is yours to keep. (Extra  
copies can be ordered separately for $1.00 each.) It contains a  
bibliography related to the subject matter.

The Smithsonian Institution, National Museum of American History,  
offers a number of leaflets on various aspects of exhibition. These are  
available on request.
Margaret Fikioris of the Winterthur Museum in Winterthur, Delaware 19735, has also compiled information on mounting techniques for textiles and bibliographies on many areas involving conservation of museum collections.

Exhibit Catalogues

Evolution of Fashion 1835-1895. Catalogue for exhibition held at the National Museum of Modern Art, Kyoto, Japan, April 5–June 1, 1980 in cooperation with the Metropolitan Museum of Art, New York City ($19.00).


Periodicals such as Antiques, Americana, Art & Antiques, and Fiber Arts list current exhibitions and usually announce whether or not a catalogue accompanies the exhibit.

The Newsletter of the Costume Society of America is informative.


Using Ethnic Clothing and Textiles to Stimulate Interest in Global Awareness—Outside the College Classroom

Rae Messer Reilly
Iowa State University

Most of us can probably remember the textile item or situation that first stimulated our interest in clothes and textiles from other countries. From that first experience we might be able to trace a series of other experiences—travel, study, special friendships with people from other countries, heightened awareness of specific parts of the world, and interest in news events concerning those places. This global awareness is what we've been trying to stimulate through programs in which I have been involved.

At Iowa State University there are various programs available to help increase global awareness. In these programs we have capitalized on people's curiosity about art and items used for daily living to introduce people to what we hope will result in a lifelong interest in world affairs.

We count on ethnic clothing, for instance, to stimulate discussion. Questions might concern the wearer, the occasion, the maker, the cost, the design, and changes that happen with time. Clothing related to rites
of passage can lead to discussions about the family and values. In the process of this discussion participants discover there are not only some differences, but also many similarities between that culture and our own.

For many years the Office of International Educational Services has used this approach to foster cross-cultural awareness. Its International Resource Center has collected artifacts donated by American travelers and foreign nationals. These clothes, foods, home furnishings, toys, music, folk tales, and art, along with printed material, have become culture kits. These kits allow children and adults to handle, examine, and wear items from other cultures.

Donations are an effective way to collect artifacts. One drawback, however, is some loss of control over the development of the kit. The next two programs have been developed differently, but at high cost and with more personnel.

The first is the African Cultural Heritage program originated in the mid-1970s by Michigan State University. The objectives were to help Blacks develop pride in their cultural background, help non-Blacks understand and appreciate the African and Afro-American culture, and attract new clientele to the 4-H program. It consists of 10 learning modules containing subject-matter content, planning guides, activities, and slide and tape sets. Modules include an overview of Africa, foods, personal appearance, various types of textile processes, embroidery, and beadmaking. In Iowa we added another objective: to help participants understand their own culture better by studying another culture. We developed a module on cross-cultural awareness suggesting ways to look at a different culture.

The other program is "Iowa in Global Perspective: A Program in Cross-Cultural Understanding" developed by Iowa State University in 1980 and 1981. It was funded by a grant of almost $140,000 from the U.S. Department of Education's "Citizen Education for Cultural Understanding Program." Its broad goal is "to increase the people of Iowa's awareness, knowledge, understanding, and appreciation of the cultural, economic, and political relationships between Iowans and citizens of other nations in the world." Several of us in Extension Service were on its steering committee.

Cultural awareness kits were developed for Nigeria, Japan, Mexico, Saudi Arabia, and Brazil. Each kit includes information and activities concerning cultural, economic, and political aspects of the country. A limited number of artifacts including clothing are included.

Extension Service's role in using these global awareness materials has included (1) using the materials within our own programming for adult and 4-H audiences and (2) publicizing the availability of the resources to schools and other kinds of organizations. Schools and 4-H groups have been the primary users. Additional users include county care facilities, nursing homes, camps, the Iowa Braille and Sight Saving School, and libraries.

The following examples of programming efforts show the diversity of uses. The African Cultural Heritage module on appliquéd banners of Benin was used to help 4-H members learn more about design. Members saw slides showing the appliquéd banners that portray stories or proverbs through symbols. Then they studied symbols in an abstract way. They
started with a symbol for Iowa, such as corn, hogs, the oak tree, and created an abstract form of the symbol. The members appliquéd their symbols onto their own portable banner—a backpack.

One county had an international event for adults to help foreign nationals living in the county become acquainted with Extension Service and with other women in the community.

Another county with several strong ethnic groups is planning a county Cultural Awareness Day. Each 4-H club has selected one country to study using one of the cultural awareness kits. During Cultural Awareness Day the clubs will share some aspect of what they have learned. The 4-H members, their families, and the general public will be invited to join in the activities, displays, and refreshments. Several local ethnic groups also will participate.

Responses from users of cultural awareness resources are enthusiastic. Users report that the most useful parts of the kits are the slides, artifacts, and cultural and global awareness activities. The more in-depth materials such as curriculum units and information showing links between the country and us are seen as only slightly less useful. The major uses of the kits are displays, discussions, learning centers, and group presentations.

We have learned a lot through experience. Many of the following suggestions were reinforced by Janet Drum, Project Enrichment Coordinator of the Stanley Foundation, Muscatine, Iowa, a foundation involved in global awareness education for many years. Suggestions include:

- Look for funding.
- Be realistic about your perceptions of people using the resources. They probably won’t have a background in global awareness education and won’t have much time to plan their use of the resources.
- Assume that most users will want one- or two-day lesson plans and some will want aids for developing good one- to two-hour programs.
- Because of time constraints, the materials will probably be used by one teacher or leader rather than by an interdisciplinary team.
- But, make the development of the resources an interdisciplinary project.

We received invaluable assistance from faculty members from our sociology, anthropology, political science, and art and design departments; staff members from the Office of International Educational Services; and many foreign nationals. They helped us achieve a balanced picture of the culture, showing both a traditional and modern view. They helped us avoid overgeneralizing.

- Give an accurate picture of current clothing practices. Indicate under what circumstances they are worn today and by whom.
- Plan for active involvement—games, discussions, things to make and do.
- Pay attention to practical matters, such as packing, labeling, taking inventory, scheduling, and replacing printed materials and artifacts.
- Assume that users won’t have the time to search out reference books. Include reference materials in the kit.
- Be patient. Interest in global awareness grows slowly. Start with people who have international interests. Let word of their successes encourage others to try using the resources. And let their enthusiasm encourage you to do more in global awareness education.
I am assuming those of us teaching in this area all emphasize one learns a great deal about many aspects of a culture--its beliefs, attitudes, values, religion, politics, and economics--through thoroughly studying about the traditional clothing of that culture.

The cultural studies course in my department is called Comparative Studies in World Costume. Because two-thirds of the students taking the course are retailing majors, I compiled facts, figures, and quotations to convince these students cultural studies are relevant to them.

First, the incidence of foreign trade and investment opportunities is evidence the world is becoming increasingly interdependent.

- One out of every six of America's manufacturing jobs depends on international trade. (Some reports say one out of eight.)
- The thirteen largest American banks now derive almost 50 percent of their total earnings from overseas credits.
- Approximately 35,000 American business people live abroad, about 6,000 American companies have overseas operations, and 20,000 concerns export products or services to foreign markets.
- It is estimated that each $1 billion of exported manufactured goods creates at least 30,000 jobs in the United States (Strength..., 1979).

These statistics were reported in 1979, and, if there is change since then, it is in the direction of greater international involvement. One of our most interesting Retailing Club programs last year was a regional department store toy buyer who told about experiences trying to have toys made to specification in the Far East. I point out to students it is highly likely if they are in business, they're going to be involved in international trade in some way in the future.

I try to discuss current examples such as the Reagan administration's textile-apparel export program. The United States has well-established programs in Europe; therefore, this administration is putting more emphasis on the Near and Far East and Latin America. Planned for the future are--

- an apparel exhibition in Dubai in November 1982;
- a selling mission of fabric producers to Australia, Singapore, and Hong Kong in March 1983;
- a combined selling mission/exhibition to the Near East;
- a selling mission to the Japanese apparel market for the second time (Women's Wear, August 1982).

The administration's export program has implications for manufacturers. From the retailer's perspective, a recent quote by the chairman of a New York retail consulting firm, admonishes retailers:

Department store buyers in the next decade, are going to have to be product managers, as well as buyers. They're going to have to go to Europe in groups to develop items exclusive to them (Women's Wear, February 1982).

I qualify that quote by predicting our buyers will be going less to Europe and more to third-world countries. The U.S. International
Trade Commission in June 1981, undertook a study to evaluate changes that have taken place in world trade in textiles and apparel with particular emphasis on certain countries experiencing significant growth in their exports of textiles and apparel, or that may have potential for significant expansion (USITC Publication, 1982). Countries to be studied were selected on the basis of actual export levels or export growth during the period from 1976-1980. These countries were Brazil, China, Columbia, India, Macau, Malaysia, Mexico, Pakistan, Philippines, Singapore, Sri Lanka, and Thailand. Most students are convinced they are not very familiar with these countries viewed as important trading partners.

The next topic I turn to concerns who has been successful in dealing in international business in the past. A survey conducted in late 1977 by the U.S. government queried 267 American firms reported to be doing business abroad (Inman, p. 247). Marketing was the primary nature of their businesses and they were located in all parts of the world. Among information resulting from the survey was the criteria these companies used for sending persons overseas. The companies indicated their considerations to be (1) technical ability, (2) ability to adapt to a new environment, (3) previous overseas experience, and (4) language competency.

Point two is the one I emphasize with students. Gaining knowledge of other cultures is certainly one way to assist in adapting to such cultures. If North American executives who go to work abroad are better acquainted with the cultures they are to live in, I believe we would not have the situation reported in 1972: one-third of executives working abroad returned home before completing their assignments (Commerce Today, 1972), because "All too often the businessman overseas assumes that the entire world operates according to the values and principles of his own culture." (Inman, p. 264.)

If you would like specific examples of mistakes made by companies trying to do business abroad, read International Business Blunders by Ricks, Fu, and Arpan (1974). The authors recount many actual blunders that involved clothing and appearance, especially as it was used in advertising. They say, "Most advertising blunders occur because of a failure to fully understand the foreign culture and its social norms."

Another statement concerning the needs of a person with an overseas assignment comes from the President of the American Graduate School of International Management. According to him, the person who attempts to meet the many complexities of an overseas assignment needs—

1. A depth of knowledge of one's field of expertise. (The person who is abroad) will be under the constant scrutiny of the customers and competition in the host nation. He (or she) will have to prove expertise again and again.

2. Knowledge of the politics, culture, religion, and economics of the region where the executive is assigned... Even when going to some closely related environment... It's far too easy to be lulled into a sense of security if someone is speaking English to you. The plain facts are that even in Britain and Canada the people have different values than those of people in the United States. That must be understood (Voris, 1978).
Statistics about preparation of high school and college students for understanding other cultures are dismal. American high school students studying a foreign language dropped from 24 percent in 1965 to 15 percent in 1979; 95 percent of American teachers do not take any course in either international affairs or foreign culture during their careers. More than one-fifth of the nation's high schools offer no foreign languages, and where languages are offered, most students quit after one or two years, before any proficiency is attained (Carlson, 1980). With these figures in mind, I checked on the foreign language background of my students in cultural studies. Thirty-four out of 36 students had studied foreign languages! I therefore assigned a term project that involved studying one developing country of the student's choice and foreign language background. Although almost all their language studies involved European languages, many African, South American, and Asian countries speak European languages along with indigenous languages because of the colonial experience. My students are being encouraged to do their projects on countries where European languages they have studied are spoken extensively.

Finally, I will share some materials from the Fulbright Commission about understanding other cultures. The Fulbright Commission sends orientation materials to all Fulbright scholars, and among the materials is one document that lists 107 questions to try to answer in learning about another culture. Some of the questions are dear to my heart as a textiles and clothing specialist. Questions included are:

1. Which textiles, colors, or decorations are identified with specific social or occupational groups and not considered appropriate for others?
2. Are there some types of clothing considered taboo for one or the other sex?
3. What are appropriate manners for entering a house? Do you remove your shoes or any other items of clothing before entering?

I have told my students the Fulbright Commission, under the auspices of the U.S. Government, believes these questions are important.

References:

The department store: Dinosaur or dynamo? Women's Wear Daily, February 8, 1982.
Strength through wisdom: A critique of U.S. capability. A report to the President from the President's Commission on Foreign Language and International Studies, November 1979, 125.
My purpose is to share with you several teaching strategies I have used to convey socio-cultural concepts. The activities are experiential and the instructor supervises "from the wings" so students are actively involved in carrying out each strategy and experience the content more fully than they might if taking lecture notes.

"The Museum Assignment" was introduced in an article appearing in the March 1978 *Journal of Home Economics* (Schrank, 1978). The assignment is a dynamic and effective means of enhancing student learning and received overwhelmingly positive feedback from students who recognized and valued what they had learned.

The museum assignment takes the form of a pencil and paper "take-out" quiz that requires a student to observe museum displays, read interpretative labels, and answer questions about each display, demonstrating the ability to relate information observed to course concepts. The types of questions used can include those that require simple listing based on observation. However, the assignment ought to require students to think about what they see, draw conclusions, and defend those conclusions.

Should you choose to use this teaching technique, allow enough time to write the questions and check them in the museum setting. Before I used the assignment each term I did a "dry-run" revisit to assure myself the museum had not modified exhibits and to update the questions.

"The Success Game" is a teaching technique I found in a teacher's manual for a sociology test (Baldridge, n.d.) and adapted to use as an experiential introduction to a course on sociological aspects of clothing.

The purposes of the success game are to experience the range of wealth and poverty within the context of United States culture, to experience and analyze feelings and behavior associated with intra-cultural differences, and to launch classroom study of socioeconomic concepts applied to clothing.
In brief, students are given envelopes containing certain amounts of money and, dependent on the amount, specific instructions for using it. The game is set up so the greater the amount of money, the greater the opportunity for using it. There are four rounds to the game providing players enough opportunity to gain relative wealth or go bankrupt.

As the game is played, players begin to exhibit behavior that can be observed and recorded to use in follow-up discussions. For example, I have observed students (1) withdraw from others, (2) deliberately violate the rules of the game, (3) borrow money from other players, (4) loan money to other players, (5) request changes in the rules, (6) complain loudly about the rules or their own or another player's luck, and (7) develop kindred sub-groups for mutual support.

The final and most important stage of the Success Game exercise is the discussion of feelings and behaviors exhibited by the players. It is very important that players have the opportunity to recognize their behavior, express their feelings, and analyze the principles inherent in the system that determined their fates.

"The Aesthetic Opinionnaire" is a third technique I have used; it illustrates that opinions about aesthetics change over time, may differ across cultures or geographic regions, and are influenced by how familiar viewers are with an aesthetic stimulus. I show a series of slides to students and ask them to rate each slide on a scale of 1 (beautiful) to 10 (not beautiful). I tell them nothing except that I am seeking their personal opinions and will aggregate the results for the class. The slides used are preselected and arranged in pairs. Each of the pairs includes a less familiar aesthetic stimulus and a more familiar one. Mean scores are calculated by the instructor for each slide and can be shared with students in several ways: for example, how they rated each of the familiar/unfamiliar pairs, and ratings compiled from past classes and classes at other universities.

In general, I have found the same conclusions about the meaning of results can be drawn semester after semester. First, distinctly different ratings are given to stimulus slides representing people from other cultures and other eras. Second, recognizable people are rated more favorably by students than are people not recognized. Third, stimulus slides representing distinctly different aesthetic values are usually rated strongly negative. Not only are the means more negative, but the number of extreme (as opposed to moderate) ratings is greater.

This strategy is a useful teaching technique that stimulates classroom discussion and provides students opportunity to express personal aesthetic values in a nonthreatening way. It is useful for students to compare their own opinions to those of others so they have some means of evaluating their own level of aesthetic tolerance. Through such comparison, students become aware of aesthetic differences of opinion and become more accepting of these differences.

I hope these brief examples of teaching strategies for socio-cultural concepts will stimulate you to try some new things in your own classrooms and provide opportunities to apply class concepts to everyday life experiences. Effective teaching often requires getting yourself out of view and away from the lecture podium. Experiential learning can be fun, challenging, and very rewarding for your students and it is an effective means of conveying socio-cultural concepts.
APPLICATION OF TEXTILES AND CLOTHING INFORMATION
IN DEVELOPING COUNTRIES

Mary Littrell
Iowa State University

During the past several years I have become aware of heightened interest in international work, whether it is an assignment in teaching or an opportunity to conduct research or participate in a rural development project. Certain questions seem to surface in discussions:
1. What kinds of international experiences might textiles and clothing professors expect in the 1980s?
2. How do we prepare for these opportunities?

First, what kinds of international experiences might textiles and clothing professors expect in the 1980s? As I prepared to address this question, I reflected first on the individuals interested in international experiences and second on the emerging attitudes of host countries abroad toward their involvement with Americans. Ultimately the types of experiences open to textiles and clothing professors will evolve from a meld of the interests and needs of Americans and the needs and attitudes of host countries.

First to the textiles and clothing professors interested in international work. Who are they? What are their interests and needs?

Some are teachers responsible for courses that include information about dress in other societies. Many have traveled abroad as tourists. However, they are aware their travels have allowed for very cursory observations of textile production and use in a society. They also are aware that until recently much of the literature on which they had to depend was based on less than solid fieldwork with producers and users of dress and textiles in other societies. Accordingly, some teachers question their abilities to accurately relay in the classroom the meaning of dress in other societies.

Other individuals are researchers interested in conducting research on dress and textiles in other societies. They are concerned whether the topics they select are in fact important aspects of dress as viewed by the insiders in the society. They also are concerned whether their research methods will lead to valid findings.
Still others have participated in development projects in third-world countries. Home economists have often been involved in small-scale projects and have witnessed meaningful change take place at the local level in the lives of families. Because of these observations of change, the home economist persists in wanting to refine methods for delivery of home economics related assistance.

Now to the other side of the coin, the host countries. What are some of their attitudes about teachers, researchers, and developers from abroad?

**Opportunities for teaching.** In the 1980s, teachers will be needed who are generalists, knowledgeable in all areas of textiles and clothing, adaptable in teaching style, aware of appropriate technology, and willing to spend time learning about rural families and their clothing needs.

**Opportunities to conduct research.** Many foreign university faculty members have received graduate training in art history, anthropology, economics, and home economics and are now conducting research on dress and textiles in their own countries. These faculty members may question why we as outsiders believe we should conduct research on dress in their countries. They may question the future benefit of our research to the host country and ask for research impact statements.

As I pull together information about textiles and clothing professors interested in international involvement and the attitudes and needs of host countries, it appears the types of international experiences clothing and textiles professors might expect in the 1980s include the following:

- For those who wish to study traditional textiles and dress, participation in and observation of daily life in rural areas will be in order. This likely will mean living in conditions very different from those with which we are accustomed. Language training may be crucial to go beyond surface-level understanding of the meaning of dress in a society.
- Researchers will not be allowed the luxury of conducting research with few checks on methods and findings. At the same time, joint research with international colleagues may result in more valid research and in findings of greater use to the host institution or country.
- Teaching and development experiences abroad may call for a holistic view of textiles and clothing and of textiles and clothing with other areas of home economics.

For those of us who consider the foregoing examples as challenging opportunities, we arrive at the second question. How do we prepare for international opportunities? The goal of early training experiences is that they provide opportunities for individuals to build skills important in international work, to assess competencies in adapting to a foreign cultural environment, and to identify areas and levels of textiles and clothing subject matter appropriate to international work.

As I have interacted with home economists building skills for international work, I have learned many of them are part of a network of individuals active in three professional organizations. Where possible they participate in a university Title XII Strengthening Grant. The individuals are serious about their preparation for international work and are willing to spend time beyond their regular assignments to take university courses to broaden their global awareness.
A handout (available from the author) identifies some resources for beginning training for international work in textiles and clothing. The list includes professional organizations; opportunities for research, field work, and language training; a source for up-to-date country information; and a short list of references.

What are individuals who have used resources such as those on the handout gaining from their early training experiences? The experiences have provided opportunities for individuals to:

- **Build skills important in international work.**
  
  Examples: Becoming part of a university network of faculty involved in international work. Learning terminology and acronyms important to function in development projects, acronyms such as RFP's, PID's, etc.

- **Assess competency in adapting to a foreign cultural environment.**
  
  Examples: Developing roles for oneself—
  - as a woman or man in a society where individuals of that sex may not normally do the kinds of things you want to do.
  - in dealing with members of the opposite sex, particularly in sexual matters.
  - as the honored guest.
  - in dealing with the many requests for money or assistance.

- **Identify areas and levels of textiles and clothing subject matter appropriate to international work.**

In summary, invitations for participation in international teaching, research, and development activities will be extended to those individuals with a track record of training and introductory experiences in international work. We have a responsibility to take our training seriously as textiles and clothing professors become increasingly globally interdependent.

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**HMONG DRESS: A PRELIMINARY LOOK AT TEXTILES AS AN INDEX OF CROSS-CULTURAL CHANGE**

Catherine A. Cerny  
University of Minnesota

The Hmong, as Asian people, have undergone major cultural changes within the last 50 years, initially, as participants in the Indochinese wars and, more recently, as a displaced society. As the Hmong refugee is acculturated into American society, customs are no longer practiced; traditions are lost. However, the residence of the Hmong throughout the United States provides opportunity for textiles and clothing students to study cross-cultural clothing patterns. Within the context of cultural change, one must question what is happening with regard to Hmong textile handwork once made to adorn traditional dress, now primarily worked and sold to American neighbors as wall hangings and checkbook covers.
Historically, the Hmong (Meo or Miao) people as residents of China date back more than 2,000 years. Migration of a portion of the population southward into Indochina occurred within the last 150 years. Yet, despite their wide dispersal as an ethnic minority in the mountainous areas of southern China, Vietnam, Laos, and Thailand and as refugees in the West, the Hmong consider themselves one people (Geddes, 1976).

Prior to the turmoil of the war, the mountain communities were relatively isolated from one another. The extended family formed the economic unit and thereby structured the activities of the village. Each familial unit was placed within the larger social network; the individual was a member both of a subtribe and of a clan. Variations in language and cultural patterns distinguish the Blue, White, Black, Red, and Flowery subtribes. The names, originally used by the Chinese, correspond to specific features of Hmong dress. These distinctions are seen in the traditional festival dress of the Blue and White Hmong who have settled in the United States. The skirt of the Blue Hmong incorporates an indigo-dyed batik design, while the skirt of the White Hmong is white.

The patrilineal clan structure, which cuts across subtribal distinctions, regulated relations between village units. Since marriage was exogamous, interchange between Hmong clans occurred regularly throughout the year as opportunities for the youth to meet. The finely embroidered dress of young women was a source of attraction for young men. The more skilled embroideress acquired greater prestige and was seen as a more desirable wife. Further research is needed to identify whether design and technique varied according to a woman's lineage and whether such variation placed her in a social context thus facilitating intratribal communication.

Within American Hmong communities, traditional dress is still worn on specific occasions. However, not all women have the skill to do the intricate work nor are the young girls learning the techniques. The decorated items that comprise the dress: headwear, collar, belt, and skirt, thus must be exchanged between families to outfit the individual.

The interrelations of clan and lineage have contributed to the solidarity of the Hmong in their relocation outside Laos. Textile marketing plays a role in strengthening the kinship relationships between the American Hmong and the refugee in Thailand. Handwork sent to American relatives, is sold; the profits are returned to the family in the refugee camp. Entrepreneurs have expanded upon this interchange of goods and money: the American Hmong, knowing which items and designs are most profitable, send specifications to the "offshore" relatives.

In the recent past, possibly in the refugee camps, the Hmong women adapted traditional geometric designs worked in cross-stitch embroidery, appliqué, reverse appliqué, and batik techniques to western consumer items, including pillow covers, wallets, belts, and Christmas ornaments. Whereas some techniques as batik are specific to a subtribe, the sharing of technology and design is evidenced among the Hmong in Thailand and the United States. Western materials and colors have further broadened the range of design. Despite the decline in the number of female artists, the male embroiderer has become more visible, adopting the satin stitch in rendering scenes of traditional Hmong life with references to his past as farmer, hunter, and soldier.
For the American Hmong family, the selling of handwork has served as a source of income while individuals learn English and develop job skills. Initially refugee sponsors, English instructors, and church organizations, sympathetic to the plight of the families and cognizant of the uniqueness of the handwork, represented groups of Hmong needleworkers in selling the work through their homes and at street fairs and church bazaars. This practice is being replaced by consignment stores, such as Hmong Handwork in St. Paul, managed by non-Hmong. The buying preferences of the consumer have contributed to changes in color, design, size, and function of the textile. Such civic organizations as the Junior League are training the Hmong needleworker in basic marketing procedures.

Within the last three years, the marketing of Hmong handwork in the Twin Cities has become more focused. Professionals in business and design contribute their expertise. For example, Ellen Errede, owner of Textile Arts Alliance, has been instrumental in obtaining commissions for Hmong artists. Traditional designs, colors, and techniques are adapted to fit the aesthetic demands of interior space; art works hang in the Minneapolis Hyatt Regency and in a Havre, Montana, bank. On the other hand, Hmong Enterprises, funded through local grants, has combined the efforts of individuals from the business, civic, and design community with support from Hmong leaders. The small-scale industry will train and provide long-term employment to needleworkers in the production of high prestige garments and furniture trim. Western technology is used as traditional designs are adapted to consumer needs.

The changing clothing patterns evidence deeper transformations to the Hmong culture. Given the dynamics of change in which a people seeks both acculturation and dignity, many issues remain to be addressed concerning how this balance is to be achieved and what the role of tradition is in moderating the change. The example of the Hmong, only one culture of many in this situation, provides the opportunity for the textile and clothing researcher to examine the cultural relevance of adornment and textile technology.

Reference:

TEXTILES AND CLOTHING CURRICULUM: CURRENT TRENDS AND FUTURE OUTLOOK

Nancy Ann Rudd
The Ohio State University

My contribution to the panel is to share some of the results of a comprehensive study of textiles and clothing programs across the country. The study, which focused on all aspects of curriculum, will be presented in a brief overview. I also would like to draw your attention to specific issues and trends regarding clothing construction that were evident in the results of the study.

Rationale for the study was based on general concerns facing higher education in the future (enrollment patterns, funding, competition for students, and academic relevance) and several particular concerns and challenges expressed at recent ACPTC meetings (program priorities, career training relevant to industry's needs, relevant research, changing societal needs, and visibility of textiles and clothing programs). Therefore, it was believed that a broad curriculum study was needed to assess the current status and well-being of textiles and clothing as a field of study. The results of such a study could be used to suggest future directions for textiles and clothing programs, to give guidance to curriculum development efforts in the 1980s, and to provide guidelines that can be used by educators to reevaluate their individual programs.

The purposes of the study were (1) to assess the status of current programs of textiles and clothing in four-year institutions of higher education with respect to curriculum offerings and to demographic information such as organizational structure, enrollment, and program emphases, and (2) to assess perceptions of textiles and clothing educators regarding the current "state of the art" and future issues or concerns related to textiles and clothing programs. Two demographic variables were used to determine if differences in response existed: role of respondent (faculty member or administrator) and size of program (large = over 100 students enrolled, small = 100 or fewer students enrolled).

The research design was descriptive; a survey questionnaire was mailed to the population of educators at institutions with programs of study in textiles and clothing or related subject matter. One administrator and three faculty members at each institution were asked to participate. Usable questionnaires were completed by 98 administrators and 205 faculty members, a total of 303 respondents. Descriptive statistics were used in data analysis and included measures of central tendency, variability, and correlation. The assumption was made that the incidence and status of the variables tested were approximately the same for the entire population.

Four research questions guided the study. General consensus existed among educators regarding program emphases and curriculum offerings, strengths and weaknesses of textiles and clothing as a field of study, employment outlets available to graduates, and issues facing the field in the future. Fashion merchandising was the most common program emphasis, found in 75 percent of the schools. Other areas of study included clothing/fashion design (28%), general textiles and
clothing (27%), and textiles (19%). Six curriculum topics emerged as most frequently offered courses, offered as full courses by over one-half of the schools: beginning textiles, beginning clothing construction, tailoring, fashion merchandising, historic costume, and social/psychological/cultural aspects of clothing. Additional topics were ranked according to extent and frequency of coverage. Recent curriculum changes included increases in subject matter, opportunities for field experience, interdisciplinary courses, professional preparation, energy-related concerns, and concerns with special interest groups; decreases occurred in clothing construction subject matter and laboratory courses.

Fashion merchandising was perceived as the most important employment outlet among nine areas considered to be open to graduates of textiles and clothing, but the perceived potential for placement of graduates was different than the actual placement of graduates in each area. Only fashion merchandising was perceived as both the greatest potential career choice and the major employer of graduates. The future was considered to be positive by one-third of the educators; suggestions also were given regarding future concerns, such as attracting non-traditional students, maintaining academic relevance, and other issues.

There are many far-reaching implications of this study, and I am very pleased that a national futures conference will be held to deal with some of the questions regarding the future of textiles and clothing. I will limit my discussion today to implications for clothing construction.

Six subjects emerged as being central to the teaching of textiles and clothing. The question arises as to why two clothing construction courses are included and, especially, why an advanced-level course such as tailoring is in the core?

Of 14 topics most frequently offered as full courses, four were construction-related (beginning construction, tailoring, draping, "other" construction topics). Does this indicate that one-fourth of our curriculum offerings are construction-related? Does this percentage reflect the current career outlets and consumer needs for which we are preparing students?

In view of the overwhelming program emphasis of fashion merchandising in programs of textiles and clothing, is the current extent and focus of clothing construction coursework appropriate? Some fashion merchandising programs across the country exclude construction in the traditional sense and include instead a cost vs. quality analysis of constructed apparel. Even though fashion merchandising is currently most popular, other program options are also strong (design, textiles, etc.) What differences or similarities exist in clothing construction requirements for students in each of these options? Or for smaller programs with a general home economics focus, what construction requirements are appropriate?

Questions were raised as to the viability of clothing construction in our programs of textiles and clothing 20 years ago by Dr. Bethel Caster who urged ACPTC members to "rethink why we teach clothing construction." How much progress has been made in answering her question? Change is occurring in clothing construction programs across the country. Some are focusing on the special needs of the individual,
others on apparel production and technology, others on the construction needed in design. Does the term "clothing construction" in college programs reflect such changes in program focus?

Curriculum revision trends were identified as including broader experiences with application to "real life" situations, increased subject-matter offerings, more interdisciplinary courses, fewer laboratory hours, and less clothing construction. What implications do these trends have for the future inclusion of and restructuring of clothing construction offerings?

With respect to maintaining academic relevance in the future, how can clothing construction teachers and curriculum developers best achieve a current awareness of social and industrial trends? How can we foster close working relationships with industry to continually revise teaching strategies and learning experiences? How can we best ensure that our clothing construction component has practical application to individual needs and career opportunities?

These are but a few questions to be considered in our discussion of clothing construction in the curriculum of the 1980s. No doubt the data have suggested many other questions, and we hope you will verbalize them in our discussion period. As a final note, I would be happy to send summary materials of this study to any of you to use in your own curriculum discussions.

References:


Rudd, N. A. Implications for future directions in textiles and clothing. ACPTC Newsletter, No. 5, April 1982.

Many important issues were raised by our last speaker that I would like to address. First I would like to speak of our focus. I believe if clothing construction traditionally has implied only involvement with making clothing for family and/or self, our focus is too narrow. Our focus should be on clothing as a product with all its ramifications—the technology involved in the production of clothing, the costing of clothing and its relation to various price levels, how clothing materials relate to the three-dimensional form of the human body, or even extended to other three-dimensional forms. A student who graduated from our college is now designing boat covers. She has applied her knowledge of dressing three-dimensional bodies to boats.

Times change and so must we. We must address the changing needs of clothing our various populations in the '80s and our curriculum offerings had better reflect this. We have incorporated such topics as clothing for special groups. We have also discovered that if the groups we address are very small, there are limitations to what we can do. For example, we have recognized at once the importance and limitations of clothing the disabled when this group represents only a small percentage of the population.

We no longer can assume all people in the United States have no trouble clothing themselves in the manner they believe necessary or desirable. There is increasing evidence this is not true, at least in Minnesota; the rise of second-hand clothing shops and increasing popularity of alterations services at profitable prices are examples. Several of our students have developed a "going business" in relatively short time in altering and fitting clothing. We need to look closely at the question, "Is this the time to down play the understanding of the makeup of the product?" We may better spend our time developing offerings that insure our students, who want that career path, are very good at it.

Times have changed and so have our students in textiles and clothing. What does our current student want? Who is the student attracted to our programs? We now assume students want a profession—and this is a change. Only in the last 10-15 years has this become an issue for the majority. Prior to this time students didn't expect, care, or demand professional preparation.

Students have changed in other ways. We could say they are coming less prepared or prepared in different ways. It is not an isolated experience that a student with no prior experience in clothing design, construction, or any of the broad areas encompassed in clothing the human body, still expects to enroll and become a designer in four years of college. Harriet Winters is a designer who capitalized on her lack of knowledge of clothing design skills—but this may be an exception we cannot count on for our students.

The increase in trade schools and vocational-technical institutes and their pledge to teach their students to earn a living has affected our offerings. The increase in vocational-technical schools alone has
altered the type of option we can offer. As others with less education take the more routine jobs, our students must become the managers and leaders.

What characteristics do we want in our students? We need to expose students to a variety of problems, those they are capable of solving and those they feel less capable of solving. As they learn to apply themselves to problems, they will learn the avenues that lead to solutions. They need to achieve a level of maturity, an expertise that allows them to sell their abilities and skills. This may require some innovation as they reach out to prospective employers who know nothing of their capabilities. Our goal must not be just training for a skill but educating for the broader view.

There is nothing so powerful as satisfied and vocal students who can communicate to their employers or other significant community leaders the relevancy of education. But how does this come about? A requisite is visibility of our program. We will depend on our ability to broadcast and stay tuned with our subject area, our students and employers and prospective employers of our students. We need to develop our ideas based on the '80s and lead--stay tuned in and then broadcast what we have. In the '70s, the main emphasis in our program was merchandising the product. The area of retail merchandising is no longer expanding today so we may well spend time exploring new areas and new options.

What are the reasons for offering clothing construction courses in the curriculum at all? Let's explore a few. Administratively speaking, it is an expensive proposition--equipment, time, small classes, and usually laboratory time. We could put up a good argument that it is not worth either our time or our students' efforts. Students are burdened with what they can afford in supplies and materials, with shaping these materials to their own bodies. What do they learn about the production of clothing, the problems consumers face, the issue of standard sizing to clothe everyone.

A clothing construction course has been a common entry-level offering. A hands-on experience can be a good beginning because it capitalizes on the concrete. Students may be motivated and continue in the field by having a positive experience at the beginning of their academic careers. But as I have mentioned, students have changed. Many students do not have the necessary expertise to draw on, so what used to be a good entry-level motivator is more often becoming a very frustrating experience for our students.

The focus of the entry-level offering can be broadened to present factors influencing production techniques used for appropriate end results. We must find ways to approach our course offerings, not just with a goal of skill development, but a mechanism by which the application of theory can be understood. I heard of an innovative approach this summer when I was exploring alternatives to entry-level offerings. One school is combining a textile performance laboratory experience with construction. Students encounter first-hand answers to questions such as, what seam strength is good for a specific fabric and apparel type? On-the-spot analysis of the resulting effect of a chosen technique is a very appropriate experience for students.
But lest we all hasten to adopt this offering, consider first the idea that what is appropriate for one area of the country and one school may be misplaced in another. A true innovation in one program area may not be appropriate in another.

A course appropriate for some career paths is not appropriate for all. For example, at the University of Minnesota we long ago abandoned the idea students in the retail merchandising program needed hands-on experience with the product to understand it. This does not mean we are denying the necessity of understanding the makeup of the product. We have replaced this experience with visual analysis of the product, attempting to develop abilities to be critical both of structure and image related to the clothed body. Then this critical ability is applied to cost and the market. Questions are dealt with such as: What differences in visual effects would you expect at various price levels? What production features are appropriate?

If goals are clearly identified in course planning, then appropriate experiences can follow. Here is what we did at Minnesota with flat pattern. First we identified the specific audience. The students are primarily design oriented or are oriented to aspects of apparel production, quality control, consumer education, and development of small businesses.

The experiences our students needed were then identified within the context of their other courses. These included the traditional area of learning pattern manipulation techniques but also included the experiences of (1) kinesthetic aspects of fit, e.g. how clothing feels on the body; (2) the styles and amounts of ease appropriate to a number of body types within a given type of apparel; (3) understanding the relation of various body conformations to standard sizing; (4) which designs and related fabric types are visually appealing within cost limitations.

These identified experiences were incorporated as follows. Instead of an individualized sloper, students chose one of three standard-sized slopers--8, 10, 12. Full-scale patterns were developed in a variety of fabric types. Students were grouped by the standard size they chose. Following pattern development, they tried on their results. Evaluation questions included: What amounts of ease are appropriate to various body types classed within a standard size? Which combinations of fabrics for a given style are appealing to various markets, ages, price levels?

In looking critically at clothing construction and how it relates to the curriculum, let's keep what is appropriate, revise what is not, based on identified criteria. This may require a closer look at new areas and avenues of focus appropriate to the '80s!
An important aspect of any curriculum planning activity, whether in resident instruction or extension, is determining the sequence in which courses or experiences will occur. A subject matter such as clothing construction provides a special challenge to planners because it involves the integration of the cognitive and psychomotor domains—or intellectual and motor skills, if you will.

We, whether in resident instruction or extension, represent programs in which the sequencing of experiences is quite diverse. This diversity in sources is not only good but desirable because of the varying emphasis provided by our programs. While standardization of programs is not necessary or even desirable, I do believe that we as a group of clothing construction educators need to examine the issue of sequencing of experiences. Is there an order in which experiences could be offered to help the learner move through new learnings smoothly? The shifting enrollment patterns, changing emphasis within our programs, and decreasing emphasis on both clothing construction and laboratory courses make this a critical issue for us at this time.

I believe one approach to this issue is development of a hierarchy of clothing construction experiences that would have as its base those intellectual and motor skills basic for subsequent learning. Robert Gagné and Leslie Briggs, instructional design researchers at Florida State University, define a learning hierarchy as an arrangement of objectives presented in such a way they suggest the order in which they are to be learned and the prerequisite relationship among them (Gagné and Briggs, 1974). Further, they define prerequisite skills as those critically required for recall if learning a new skill is to proceed smoothly. Note this is a prerequisite skill, either intellectual or motor skill, not simply information. The prerequisite, too, is not just a skill that is simpler but rather is one that is an integral part of the new learning.

The first step in hierarchy development, as I see it now, is to define the basic concepts that exist for the clothing construction subject-matter area. Can we reduce this vast array of topics we teach to some manageable number that would provide the basis for our offerings? Is there a set of intellectual and motor skills a person uses for executing all processes in clothing construction?

To begin putting these concepts into a hierarchial order, I believe we would need to convert concepts into objectives. What is it learners need to know about or do with these concepts?

There is another aspect to the eventual development of the hierarchy, and that is knowing what contributes to a student's ability to move easily and quickly through new learnings in clothing construction. In other words, what are the prerequisite learnings at each stage that facilitate acquisition of new knowledge? With fewer students in teacher education programs and more in production management, fashion merchandising, and fashion design, the knowledge and skills needed by our...
learners is changing. We need to determine not only how much and what type of clothing construction knowledge and skill they require but also what facilitates their attaining that with ease.

So, what are the prerequisites to the basic construction concepts? I propose to research that topic by administering a battery of tests to students entering clothing construction sequences at several schools to determine what contributes to their moving through the curriculum successfully. For example, does a knowledge of textiles help the learner in basic construction? If so, in what areas?

When all the many parts that contribute to the development of the hierarchy are eventually researched and assembled, we should have something that will provide us as educators with a framework in which to make systematic decisions about curriculum and course development. It could serve as a guide as we examine competencies needed by students in our various program options and determine experiences we need to provide for them and the order in which experiences will be offered.

Ultimately, the hierarchy could help us, too, in determining not only what to teach and the order in which to teach it but also the way to teach it. We are just now beginning to understand relationships that exist among learners, subject matter, and the way materials are presented. The hierarchy would provide the framework in which we could develop research projects to answer questions such as: What are the best ways to teach clothing construction concepts at various levels? What delivery systems are most effective with which clothing construction concepts and which learners? Which learning activities achieve the desired learning outcomes for the concepts or objectives identified at the various levels?

Having the hierarchy would provide the research base we need to proceed with studies we need to do to help us know where we go in the future in the field of clothing construction. I believe such a hierarchy would be of benefit to all who teach in this field, no matter at what level. The concepts would build on each other regardless of where they were taught. While it would serve as a guide, I do not believe it would promote standardization. We in our individual programs would still choose the way we organize learning in terms of courses and the depth of offerings we would provide. We would, however, have a clearer idea of how to structure courses or experiences and prerequisite knowledge to maximize learning.

Reference:

CLOTHING CONSTRUCTION IN EXTENSION PROGRAMMING

Sherri A. Johnson
University of Minnesota

My role on this panel is to discuss clothing construction and how it fits into our Minnesota Agricultural Extension Service. Our audiences or clientele in Extension are very different from many of your students in the campus-based classroom setting. Many of our clientele have a limited background in textiles and clothing subject matter. They have a great deal of interest in areas such as clothing construction but most are not working on a college degree. Many of our clientele are attending a one-time meeting for a short period of time, which limits how much sequencing of clothing construction we can do with some audiences.

Before I address where clothing construction fits into Extension programming today, I would like to comment on the history of clothing construction. In the past, clothing construction played a very important part in Extension Services throughout the United States, since the early 1920s and '30s. One of the very early roles of the Agricultural or Cooperative Extension Service was to teach basic skills to rural people. Making dress forms and recycling clothing were some of the first clothing construction related skills taught by county agents during war times. This was followed by making basic dresses and suits and often was accomplished by a series of individual or small group meetings. For many years clothing construction has been a subject that has attracted many Extension clientele. The focus in many cases has been on making an end product.

Today, just as there is much diversity in textile and clothing programs between schools, there is also diversity between Extension clothing programs from one state to another. In Minnesota, the types of clothing construction programs offered vary each year according to the needs of the people at the "grass roots" level. At present, several factors are critical in determining the types of clothing construction programs taught in the Minnesota Agricultural Extension Service regardless of what courses are taught in our textiles and clothing department. These factors are (1) limited family incomes, (2) high unemployment, (3) more women working outside the home, and (4) high energy costs. Although we are not training our students for professions, we are trying to meet their individual clothing needs.

Recently in one Minnesota county we conducted a program on Speed Tailoring using fusible interfacings. The need for this program was based on the high cost of ready-to-wear blazers and the desire for this item in the working woman's wardrobe. Attendance was overwhelming. If we had offered a program on custom tailoring, I doubt if there would have been the same response. As Extension Specialists we are forced to constantly keep abreast of people's needs and try to meet those needs with educational programs, publications, etc. Other states in our region have excellent clothing construction programs focusing on a wide range of topics such as sewing for profit, recycling, alterations and repair, sewing outerwear, sewing for children, etc.
In terms of sequencing clothing construction programs offered by the Extension Service, 4-H is one audience that can benefit greatly by the sequencing of skills and concepts taught in clothing construction. Our members enroll in a clothing program somewhat similar to how college students enroll in a four-year textiles and clothing program, although the ages of our students are much younger. Our 4-H members may enroll in the clothing project at age 9 and continue in the project to age 19.

When I came to Minnesota in 1975, I was faced with a 4-H Clothing Program that was not specifically geared to progression of learning skills but rather "every member can do his or her own thing." There were four categories in the 4-H Clothing Project at that time: (1) The Clothes You Make, (2) Super Sewing, (3) Sew What's New, and (4) Share Your Sewing. This approach was confusing to members, parents, and leaders as well as many County Agents. Members did not know in which category to enroll. It was difficult for many, I think, because of the lack of sequencing of learning skills. Enrollment declined partly due to members' frustration and confusion.

This past year we printed new clothing project materials in hopes of alleviating our problem. Due to budget constraints, we decided to adapt materials from another state rather than develop our own. In searching across the country, we found that Colorado had done an excellent job of sequencing learning skills in clothing construction especially at the beginning level, which is very critical. Rather than just Beginner, Intermediate, and Advanced, we now have Beginner-Unit I, Beginner-Unit II, Beginner-Unit III, Intermediate, Advanced Explorations in Textiles and Clothing, and Advanced Tailoring. In addition to clothing construction, our materials contain sequencing of concepts in such areas as grooming, wardrobe planning, pattern selection and alterations, clothing buymanship, textile science, clothing care, etc. The materials have been in use for one year and the response has been very positive. We are receiving comments such as "Finally, I can determine what level I should be in," or "We should have had these materials 10 years ago." In Minnesota we presently have over 11,000 young people enrolled in the 4-H Clothing Program. I see many of these people as potential textiles and clothing majors in our department. Many of our 4-H'ers may pursue degrees in textiles and clothing because of their interest in clothing construction.

One critical factor facing Minnesota Agricultural Extension is not necessarily the sequencing of clothing construction programs but the methodology for disseminating information. Our travel and publications budget have been cut severely in the past several years. Again as Extension Specialists we must consider the times as they are in 1982 and think about alternative delivery methods, such as self study packages, cable television, video, newsletters via fabric shops, etc. Many of the Extension Clothing Specialists in the North Central Region will be attending a regional workshop next spring on the use of video in our Extension Programs. One innovative approach for teaching new developments in clothing construction to educators is a program called "Sewing By Satellite" coming soon to many states. This five-hour conference will be beamed via satellite from New York to 28 locations around the country.
In recent years we have tried to de-emphasize the teaching of clothing construction skills. Perhaps in the past our program was too heavy in teaching only skills or "how to's." We have not tried to put clothing construction in perspective with many other areas of textiles and clothing such as our program thrust this year, "Living Resourcefully."

Although my interest is clothing construction, I have had to face the fact that it may not be a need for all our clientele. Several years ago we held a national search for another Extension Clothing Specialist to fill a position that had been previously vacated. I was told by Extension Administration that the position would not have been filled had we requested a clothing construction position.

For clothing construction to survive in Minnesota, we must be unique in the types of programs and methods of delivery we offer. We must offer research-based programs that meet the current needs of people. Not only must our programs be unique, but more importantly in these critical funding times, we must show major impacts of our programs on a yearly basis, such as behavioral changes, attitudinal changes, and economic impact.

In conclusion, I have tried to give you an overview of how clothing construction fits into our Minnesota Agricultural Extension Service. The times ahead are challenging for all of us as Extension Specialists. We encourage resident faculty to realize the needs of people in their states and understand the differences between Extension programs and resident programs. Ultimately, we can work together to strengthen our Extension clothing programs.

PLANNING AND DECISION MAKING IN THE DESIGN PROCESS

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People always have been aware of the need for well-designed articles. From ancient societies to the contemporary scene, though the techniques for producing these articles have changed appreciably the fact remains that design is a planning process—a dynamic, creative, very purposeful planning activity. By definition, designing is "creative planning to meet a specific need." To understand the full meaning of this definition, one must look more closely at several key words. Planning in design means a serious, analytical approach that results in a logical blueprint to action. However, this is not just ordinary planning, but creative planning, "Creative" denotes an original treatment of a problem or task. Ideas may come from many sources, but are adapted, modified, synthesized, or altered to meet a specific need. And that specific need must be a clearly defined problem.
The design process itself has been expressed in many forms; but all have similarities in first defining or stating the problem, then carrying out a phase of analysis and research, structuring the research data into possible solutions, experimenting and evaluating those solutions, and eventually devising a final solution or product. Design is developing—and it has changed. Far from being a well-meaning effort to persuade people to conform to canons of good taste, design has become an influence of power in industry and modern life.

From an engineering design perspective, John Dixson, Industrial Engineer, discusses three mental activities involved in the design process. First is inventiveness, or the ability to get good, useful ideas for solving problems. The inventive mental activity is characterized by its open-endedness, its dependence on perception and breadth of experience, and its tendency to be inhibited by constraints and mental sets. How often do we open our thinking to inventiveness?

Dixson's second mental activity is analysis, or the ability to get meaningful answers to engineering questions within reasonable time and cost. Analysis may involve the construction of a physical or mathematical model, application of principles to the model, and interpretation of the results. Sometimes we may think inventiveness interferes with analytical skill. But they are clearly separate in that the object of inventive effort is many possible answers, whereas the object of analytical effort is one actual answer.

It is in this context that the importance of the third mental activity arises: decision making. Decision making seeks to choose the one best answer by making value and optimization assessments. In this world of change, these three skills become a part of almost every step of the design process. Integrating inventiveness, analysis, and decision making is a critical part of the process. For it must not bog down, and the successful designer must have the capacity to decide and move on.

This afternoon we will be looking at three different examples of planning and decision making that go into the design process. As you listen, recall that design can be defined as "creative planning to meet a specific need," and design also is giving tangible and definite expression to an idea. In all of the planning and decision making involved in the process, we spend money and time in order to move on and make money through our design solutions.
DEVELOPMENT OF A COMPUTER-ASSISTED IMAGE-PROCESSING SYSTEM TO SUPPORT INSTRUCTION AND RESEARCH IN TEXTILE DESIGN

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I will begin by identifying a few examples of how the computer is assisting textile designers in industry. Knowledge of these types of applications and capabilities has influenced the design of the image-processing system currently being implemented by the School of Family Resources and Consumer Sciences, University of Wisconsin-Madison.

In the early 1970s computer-aided design systems were being developed for use in the double-knitting of textiles. These systems eliminated many of the tedious tasks involved in the design process, such as the time-consuming hand-painted mylar graphs requiring one to two weeks of work, and provided a means of converting artistic input almost instantly into double-knit fabric samples. Sci-Tex by the Scientific Technology Ltd. and Fyscan by International Textile Machines Ltd. are examples of such systems. Later developments expanded some systems to include applications for print design—automating steps in preparing engravings used in the printing of textiles and wallpaper.

In general, these systems use a scanning device to translate artwork (multi-colored or monochromatic sketches, photographs, or actual fabric) into computer signals. An interactive computer graphics terminal permits visualization of the multi-colored design on a television screen. An electronic stylus (light pen) and "function box" allow the designer to edit and create designs. These designs can be manipulated in a variety of ways, (changing the position, color palettes or color mapping, scale, repeat networks).

The Milliken Company has developed the Milliken Design Computer and patented the Milltron computer injection-dyeing process. Original designs can be created, manipulated, stored, or produced into a production sample via the computer. The dyeing process consists of many small ink jets with individual on and off sequence controlled by computer programs. One acre of pile carpet can be patterned in a half hour. Only one second is needed to change to a different design provided the same colors are used. The manufacturing cost is approximately one half that of normal tufted patterned carpeting.

The evolution of these types of systems has implications for the training and development of future textile designers. While shaping man's future "material" near environment, designers will not rely solely on slower traditional approaches to design. The computer can be used to extend human capabilities and expand the accustomed "pencil-and-paper" approach. The computer can generate multiple alternatives at an incredible rate and store hundreds of images and colors in a library of visual references, thus providing the designer of the future with more substantive information with which to make a visual design decision.

In developing our computerized image-processing system, there were a number of factors to consider, such as economic and multivariant needs. Specifically, could we obtain a complete image processing system for manipulating, filing, and editing images in color for $15,000 or less?
Block Diagram of Image Processing System

1. Microcomputer
   - Communicates with interactive graphics terminal and remote computer facilities, controls videodisc system and stores digitized images.

2. Serial Interface
   - Provides a link between the videodisc system and the microprocessor, enabling the microprocessor to random access the video system and remote computer facilities.

3. Graphics Terminal
   - Interactive terminal enables user to communicate with the microprocessor and control the entire system.

4. Videodisc System
   - Consists of a laser optical disc and industrial videodisc player controlled by the microprocessor via the graphics terminal.

5. Colored Video Monitor
   - Displays images stored on the videodisc and digitized images.

6. Video Camera
   - Converts images into an analog signal or voltage.

7. Video Image Digitizer
   - Enables computer to store images in memory by converting voltage signals from video camera into digital representations.

8. Light Pen
   - Interactive graphics device for manipulating images displayed on the monitor.

9. Modem
   - Provides, via telephone, communication links to remote computer facilities.

10. Remote Computer Facilities
    - Provides mass storage of textual information until additional memory can be purchased on a more cost effective basis for microcomputers.

NOTE: - - - - - indicates proposed purchases for existing system
The block diagram identifies the various component parts of the system, their relationship to one another, and their purpose within the system. You will note that the dotted lines indicate proposed purchases.

A microprocessor system was chosen that uses the industry standard S-100 Bus architecture. The "S-100 Bus" refers to an industry standard that adopts a 100-pin circuit board and connector design. This allows the flexibility to choose equipment from dozens of different hardware manufacturers to make up a custom-designed system or purchase a complete microcomputer system that would include: CPU board, memory boards, terminal printer interface boards, and disk controller boards. This choice of design also allows use of an inexpensive imaging system (set of four circuit boards) designed to interface to S-100 Bus architecture. The computer system can be expanded with memory and peripherals by plugging in the additional circuit boards. Likewise, the image system can be expanded by adding memory planes to the S-100 Bus.

The heart of the imaging system, which is controlled by the computer, is the collection of memory planes that store the visual image. The image can be derived either from digitizing the video signal from a standard television camera or it can be created by the computer as is the case with more conventional graphics systems. The image displayed on a RGB (red, green, blue) television monitor is organized into 240 horizontal lines, each containing 512 discrete picture elements or pixels. Each pixel, therefore, has an x, y coordinate in the imaging memory and is represented by a number (0-15) that records the light intensity of that point or pixel on the screen. Again, a pixel can have its intensity set either by the digitizing of an image from a television camera or by the computer setting or altering a pixel value. Since the computer can address or read and write individual pixels, it has the capability of storing an image, in digital form, on computer mass-storage devices such as floppy disks or magnetic tape.

Since the cost of an imaging system varies in proportion to the size of the imaging memory, the resolution (number of lines and pixels per line) and pixel depth (number of discrete intensity levels) are directly affected. With this system, each pixel is allocated for binary digits (bits) that allow it to record 16 values of intensity; zero for black, 15 for white or full intensity. Doubling the imaging memory allows one to either double the resolution in the horizontal or vertical direction or double the number of bits per pixel. To increase the pixel depth from four bits to eight bits increases the intensity levels from 16 to 256. Full-color imaging systems have 24 bits per pixel, 8 bits for each of the primary colors—red, green, and blue. Each pixel therefore can record 256 intensity levels for each of the red, green, and blue components.

In a relatively low-cost imaging system such as this one, the ability to represent only 16 values with a four-bit pixel can have its limitations; however, full-color displays can be experimented with by using an inherent and powerful feature of the imaging system—color mapping tables. Via computer control, each of the 16 numbers recording intensity at each pixel can be mapped into one of over 16 million colors. A display, therefore, can be composed of up to 16 different colors selected by the computer program from red, green, and blue color maps.
or palettes. Each color is the result of an additive color system whereby red, green, and blue in amounts varying from 0 to 255 are added together. The end result is the image on the television monitor created by three electron guns (red, green, and blue) illuminating the corresponding phosphor on the front of the screen. For example, 100 red, 50 green, 50 blue yields a rust brown color. Fifty red, 25 green, and 25 blue yields a less intense version of the rust brown.

Since I've discussed the ways digitized visual images can be manipulated by the computer, I also should briefly describe one of the tools used by the designer to interactively alter the image pixels, values, and colors. The light pen is a sensitive photo cell designed to "see" a single pixel or dot of light on the television monitor. Since the television image is being refreshed from the digital image memory at a rate of 30 frames per second, the light pen will send an electronic pulse to the imager circuitry when it is pointed at an individual pixel. In a few microseconds, the computer receives the x-y coordinate of the pixel "seen" by the light pen. Since the computer can address the pixel in the imaging system memory, it can read the pixel value, alter it, and write it back. The result is an interactively altered display.

Therefore, the key to the image-processing system is the computer's capability to address each pixel, read its present location, move it to a new location, map each to a color, and store it in memory.

Future uses of the system include expanding from a single-user to a simultaneous multi-user design laboratory to support additional design areas such as interior design. In addition, a computerized catalogue retrieval system is currently being developed for the Helen Louise Allen Textile Collection. The unique feature of this retrieval system coordinates simultaneous retrieval of textual information and full-colored images of the textiles. The technology of the laser video disc for image storage will be combined with the computer for storage of the textual descriptions and cataloging information, and to control image access of the video disc.

In summary, the Image-Processing System is being designed to support teaching concepts of computer-assisted design and provide students with actual experience in applications they will encounter in the various design professions or museum environments.

References:


An important end product of design research is design specifications. Producing these specifications depends on having a good plan of action. Guidelines for developing this plan of action can not be found solely in traditional research methods. Unlike pure research, design research is guided by the design process, which holistic and cyclical in nature, does not lend itself to either neat categorization of hypotheses or a linear sequence of investigation. If one adds to the planning of design research the additional requirement of interdisciplinarity, an already difficult problem has been made more so.

Such was the challenge recently faced by a team of researchers at the University of Tennessee. They were seeking to study passive solar and wood burning households in an effort to develop integrated design specifications for clothing, interiors, and houseshell.* Rather than develop independent solutions for these three components of clothing, interiors, and houseshell (as is traditionally done in the design professions), the interdisciplinary or integration approach of the project required that these specifications take into consideration the interactive effect of clothing and interior furnishings with houseshell design and interior space planning in achieving thermal comfort. This paper will reflect on the experiences of planning and managing this interdisciplinary design research project and seek to provide some insights and guidelines that may be of value to others.

Process and Planning
Specifications development in the design research process.
Planning design research begins with consideration of the design process. Design research uses an objectified design process (as opposed to a purely intuitive approach sometimes employed in design). This objectified design process is divided up into identifiable steps or stages with relatively specific end goals at each level. The particular design process used in the UT Integrated Design Research project was developed by Christopher Jones (1970), and adapted by J. Orlando DeJonge (Orlando, 1979). This design process is illustrated in Figure 1.
Steps in developing design specification in the design research process can be summarized as defining problem structure, determining critical factors, and assessment. The first task, defining problem structure, asks the question "what needs to be designed?" In our integrated design study we examined five general questions:

- What components are typically found in a passive solar system and what seems to work best?
- What tasks are required to operate the system and how do these fit into the normal household routine?
- What spatial arrangements are best for operating a passive solar system?
- How are furnishing arrangements affected by both operation and functioning of the system?
- What is the effect of living with passive solar on space/time/activity use of the house aside from operation of the system?
Determining "critical factors" is the second task. Critical factors are those aspects of the design problem likely to pose special problems. They can be determined by preliminary field studies and/or as was done in this study, consultation with experts in the field. An example from our study was the possible loss of family privacy arising from the large amounts of exterior glass used for collecting solar energy in a passive home. Another problem was loss of privacy among family members because of the open-plan concept used in passive solar homes to allow for natural convection of heated air (an open plan is one in which living, dining, and kitchen areas are openly connected to one another without walls). The activity of one family member could now easily interfere with another's. Both these critical factors were suggested to us by an architect who had designed several passive solar homes.

To determine whether these critical factors are real problems, and if so, their causes, an assessment is conducted, the third task. This stage bears the greatest resemblance to traditional research in that conventional research instruments and techniques are most likely to be found in use. Like a research hypothesis, critical factors are tested and evaluated. In the Integrated Design Project, a case study approach was used employing field techniques of interview and observation. It is from the results of this assessment stage that specifications are created.

Adaptations of design research process to accommodate an integrated or interdisciplinary approach. To those familiar with design research, this brief review holds no surprises. What is likely to be new, and certainly a challenge to us, is how to incorporate an interdisciplinary perspective. In our research, the residential environment was viewed as an ecosystem where household members, clothing, interior space and furnishings, and houseshell interdependently contributed to maintenance of thermal equilibrium. The implication for design is that one can choose from among different layers of the near environment to achieve an optimal combination of components. For example, would thermal comfort in a home be better achieved by increasing insulation of clothing, furnishings, walls, or some combination of all three?

Objectively it was not difficult to state this perspective. As illustrated in Figure 2, clothing, interiors, and shell were recognized as mediating thermal comfort factors of radiation, conduction, evaporation, and convection between the body and the environment. Exact patterns of heat exchange and materials performance information were obtained from technical sources and combined into an overall model.

What was difficult was transcending discipline boundaries of the various design professions represented on the research team. Because of prior training, interior design or architecturally oriented members found it difficult to think intuitively of clothing when considering relevant design components to manipulate. Similarly, clothing designers found it difficult to think of furniture or space as a medium to manipulate. What was needed was a practical or everyday analogy to demonstrate or illustrate the concept of integrated design. The solution was found in the creation of an heuristic model based on backpacking apparel and equipment. Backpacking was a useful paradigm because its need for portability (compactness and lightness) has necessitated careful consideration
Figure 2
of function and utility of each piece of equipment. Function of clothing, equipment, and shelter are so interdependent as to allow one to substitute for the other or to integrally complement each other; for example, ponchos serve both as raincoats and tents, and sleeping bag insulation is augmented by use of clothing.

Our heuristic model was created by diagramming these interdependencies using thermal comfort for sleeping on the trail as an example. An analogous diagram was made for sleeping in a conventional house. These are shown in Figure 3. From this model, it was easy to understand that insulation of a sleeping bag served the same purpose as insulation in the wall of a house. This recognition in practical terms through the intermediary analogy of backpacking opened the way for design research team members to think of other functional substitutions.
While serving as an effective reference of inspiration, it was discovered in and of itself the backpacking model was not sufficient to totally overcome the discipline boundary problem. We discovered it must be complemented with an effective management strategy that allowed for the likely possibility of individual team members reverting to old ways of thinking. Some examples illustrate.

The initial interviews for the study were developed by an interior architecture oriented individual. While information about interior space arrangements and equipment operation for passive solar homes was well detailed, clothing information was not. This necessitated revision of the original instrument. The task was given to clothing team members. As might be expected the result was a considerable improvement in clothing detail, but problems also developed; for example, individuals who were asked about their clothing adjustment when noticeably warm or cool were not asked where in the home they were located or the time of day at time of measurement. As passive solar homes are expected to have significant temperature variations by time of day and location in the home, this oversight was significant. Information on simultaneous use of furniture to augment body insulation (i.e., curling up in an upholstered chair) also was not asked.

Given that team members had had many years of prior socialization in their design disciplines and only a few months at integrated design, this result was not surprising. The remedy was to subject all individually developed instruments to team review, with the open expectation that biases might occur and would need to be corrected. It would be misleading to claim this review process always went smoothly and without dispute. However, having developed an heuristic model that all team members could relate to helped place differences of opinion in perspective and bring about the necessary compromises.

The lesson to be learned from this experience is that a team management approach is a necessary component to interdisciplinary research. While it adds a seemingly cumbersome step of subjecting every step of the research process to team discussion and review, it is the only means of ascertaining whether biases are being introduced into the research.

Product

Having taken care in the development of an "integrated" research data base, care must continue to be taken in translating this data into "integrated" design specifications. The challenge is not to lose the holism contained in the research data when specifying the design criteria. Some examples from the Integrated Design Project will illustrate. The following partial table from the Project's final report shows some of the initial analysis data we were working from to create specifications for clothing:
Table 1. Coldest Activity

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
<th>Body Position</th>
<th>Coldest Body Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>getting out of bed</td>
<td>AM</td>
<td>sitting, bending</td>
<td>feet, head, legs</td>
</tr>
<tr>
<td>dressing</td>
<td>AM</td>
<td>bending, reaching</td>
<td>feet, ears</td>
</tr>
<tr>
<td>breakfast</td>
<td>AM</td>
<td>sitting</td>
<td>feet, torso, head</td>
</tr>
<tr>
<td>eating dinner</td>
<td>PM</td>
<td>sitting</td>
<td>feet</td>
</tr>
<tr>
<td>sedentary recreation</td>
<td>PM</td>
<td>sitting</td>
<td>feet, shoulders, hands, arms</td>
</tr>
</tbody>
</table>

Some important categories of information are covered: activity, time of day, body position, and coldest part of body. The challenge in developing specifications was to convey this information in a manner that placed it spatially and temporally in the context of a passive solar home—its operation and family routine. While one can infer location and time for the first four entries, the location and time of "sedentary recreation," a rather broad category of activities and by far the most commonly occurring activity of the five listed, is insufficiently defined. We also do not know relationship of body position to furniture in use (though we know the person is sitting; chairs come in great varieties, if the person is sitting on a chair).

An appropriate design criteria for this problem would then indicate time, place, body position in relation to furniture, as well as a clearer indication of the nature of the activity. The solution to these requirements was development of a comprehensive pattern language (graphic symbolization). The Project's titles for the pattern language were—Level III Space/Time/Activity/Thermal Patterns. These titles show the distribution and types of activities occurring throughout the home at five representative times of the day: (1) getting up and getting to work, (2) daytime at-home activities, (3) returning from work or school, (4) dinner, and (5) evening activities.

Figure 4 illustrates the activity set for "returning from work or school" and "dinner." Note that adult activities are distinguished from children's activities and that each is located in plan. To provide detail on body position, furniture support, and cold areas of the body, anthropomorphic figures were developed for each of the activity location sets indicated in Figure 4. These are illustrated on Figure 5.

From these graphic design criteria, it is not difficult to realize inferences can be made about furniture design as well as clothing design—or better yet, furniture-clothing combinations. Figure 6 illustrates several such integrated design ideas resulting from a design competition conducted as part of the study. The sofa with blanket/shawl arms allows one to literally cover-up as well as curl-up. The "stuffables" located in a storage wall box between the warmer part of the house and the
III. Space/Time/Activity/Thermal Patterns

C. RETURNING FROM WORK OR SCHOOL

D. DINNER

CC1 - Child Bedroom Retreat (Homework, TV, Friends to Visit)

CC2 - Kitchen Snacking

CA1 - Adult Catching Up on News of Day (Read Newspaper, Talk with Spouse, Read Mail)

CA2 - Adult Preparing Meal

CA3 - Adult Napping

CA4 - Adult Changing Clothes

CA5 - Adult Doing Chores (Outside/Inside)

D1 - All Family Gathers Around Dinner Table

Note: Adult activities concentrate in the communal area. Children activities concentrate in their bedrooms, thus CC1, CA1, CA2 are dominant activities. If the house has cooled down (afternoon chill), auxiliary heat is turned up to take the chill off. Wood stove is frequently brought into use, and burns through rest of evening.

Figure 4
Figure 5
cooler buffer area allows easy access to extra apparel to cover the extremities in this thermally more vulnerable area of the home. Perhaps the best representation of a truly integrated idea is the bedrest with arms, an improvement on the ineffective back support of a pillow as well as the inadequacy of bedcovers for covering shoulder and arms while still allowing mobility of the upper torso. It is not difficult to see the relationship of this last solution to pattern language CCl illustrated in Figure 5.

Developing specifications from an integrated or interdisciplinary design research project begins with a strategy any design research project should begin with, accommodation of the design process. According to this approach, the first step is to outline the "problem structure." The second is to determine "critical factors" or special problem areas in the overall structure. The third is to assess both with a particular focus on critical factors. The resulting data become the basis for developing design specifications.

An interdisciplinary perspective requires the additional need to incorporate concepts beyond the scope of any one discipline. This is best accommodated in the "problem structure" stage by creating an interdisciplinary model. To make this model second nature to the thinking of research team members, it helps to translate the technical model
into a heuristic one based on practical examples. Backpacking apparel and equipment served this purpose in the Integrated Design Research Project. As the native discipline training of research members is likely to be much too ingrained, heuristic models can not be relied on completely to transcend disciplinary boundaries. Thus, it is necessary to incorporate a management strategy into the project that assures team review of concepts and instruments at all stages of the research.

If the integrated design research effort is successful (properly conceived, planned, and managed) the resulting data set should enable the creation of integrated design criteria. These criteria should convey simultaneously all the information that represents an integrated concept. Graphic representations are especially helpful. In the Integrated Design Research Study, we were seeking to promote design solutions that would simultaneously use clothing, furnishings, and interior space design to achieve thermal comfort. Thus, in conveying information about thermally uncomfortable body parts the additional information of the particular activity engaged in, time of day, room location, and body position in relationship to furniture in use were incorporated in the form of pattern language. Hopefully designers are being provided with sufficient insight from these criteria to develop the integrated solutions envisioned.

*The official title for this project was "Integrated Design Research for Household Energy Conservation: Clothing, Interiors, and Housing." Funding was provided by a grant from the National Endowment for the Arts. Additional support was provided by the University of Tennessee and its Agricultural Experiment Station, as well as the Michigan State University Agricultural Experiment Station where the research idea originated. The principal investigator for the project was the author, the co-investigator was Jacqueline Orlando DeJonge--both from the Department of Textiles, Merchandising, and Design--University of Tennessee-Knoxville. Research was conducted between January 1981 and June 1982. For a complete report of the study, see Case et al., 1982 and for an overview of the original research idea see Case and DeJonge, 1982.

References:


WHY SHOULD AN AGRICULTURAL EXPERIMENT STATION
CONDUCT TEXTILES AND CLOTHING RESEARCH?

Richard J. Sauer, Director
Minnesota Agricultural Experiment Station
University of Minnesota

As Director of the Minnesota Agricultural Experiment Station, I have responsibility for the administration and coordination of a large and diversified research program. The program consists of research conducted on 340 projects by faculty in five colleges of the University of Minnesota. These colleges are Agriculture, Forestry, Home Economics, Veterinary Medicine, and Biological Sciences.

Our mission is to organize scientists (university faculty) to conduct research on the production, processing, marketing, and distribution of food and other agricultural products; forests and forest products; family life; rural development; public policy; human nutrition; recreation and tourism; and overall environmental quality, to the benefit of the citizens of Minnesota, the region, the nation, and the world. I want to emphasize that our mission is much broader than the name of our organization implies and broader than that of many other experiment stations—yet appropriately so, given our situation in Minnesota. We are based in a seven-county metropolitan area in which half of the state's population resides. We also have an unusually diverse state in terms of agriculture and other natural resources and in terms of communities and family life.

We take considerable pride in our research efforts in the College of Home Economics. We think we have a relationship with that college and its faculty that is duplicated by few, if any, other experiment stations and is, in fact, envied by many. We have experienced significant growth in state funding for our research in home economics in the last dozen years. As a result, that college has emerged from a primarily educational role in 1970 to fulfilling with strength and leadership the triumvirate mission of teaching, research, and extension in a land-grant university.

Despite the above, we are entering an era where we are being challenged regarding our allocation of research funds to areas such as clothing design, clothing and textiles research generally, and in fact to all of home economics and any other research area not considered mainline agriculture. We have seen communications to Secretary Block, the President, and Congress (including the 1982 Report of the National Agricultural Research and Extension Joint Users Advisory committee) that recommend the emphasis in our research (and extension) programs should be placed on agriculture production and economics.

Related questions include—Does textiles and clothing research fall into the purview of present USDA concerns? Is this area of study even appropriate for USDA attention? Are textile and clothing investigators misdirected in seeking federal support from USDA? Is research funding from this source justifiable?

Just as federal budget problems and the current agricultural economy have led to concerns on the national level, we fully expect to face the same questions and criticisms when we begin working with the 1983
Minnesota Legislature in January. I expect this despite the strong state support we have had for our broad and diversified research program in the past. This is true not only because of our state's economic problems but also because we are entering an era of increased accountability. Thus, we need your assistance in telling the story—telling how research that experiment stations and USDA now support in your department and program has an impact on and is a benefit to residents of your state and the nation, and why it is appropriate to support this research with public funds, state and federal.

For some time we have been conducting investigations to evaluate the impact on and benefits to the economy and to society from our research. These evaluations have been focused mainly on our agricultural research, especially our production agriculture research. More recently, similar efforts have been initiated in forestry and other natural resource areas. Results of the evaluation in agriculture have demonstrated annual returns to our economy of 30 to 60 percent or more on public investments in our agricultural research. In turn, this has been used to demonstrate that with such high rates of return, we are actually underinvesting with public funds in agricultural research. By and large the leadership for conducting this evaluative research lies in our departments of agricultural economics.

My challenge to you: Is the impact of textiles and clothing research (and educational) programs to improve the well-being of people and communities (and perhaps government and the economy) measurable—in quantitative as well as qualitative terms? And, a related question: Are there ways to evaluate the impact of textiles and clothing research to justify continued funding? Are your present program accomplishments and outcomes adequately evaluated and publicized? We often spend too much time talking to ourselves and not enough time telling our story to others. Are textiles and clothing research/educational/outreach programs in good standing—are they understood, respected, and supported—within and outside the university community?

I know of at least some College of Agriculture department heads at our institution who feel our allocations to textiles and clothing (and most other areas of home economics) are resources wasted! And yet most experiment station administrations are based in agriculture. You need to start interacting with your colleagues in agriculture. Do business, industry, and human service organizations seek information and talent from textiles and clothing academic professionals? Is the knowledge generated by you and your colleagues useful for your private sector practitioners so that their work is facilitated and enhanced? Have you assessed your research plans and priorities to focus on those that will result in "most useful" anticipated outcomes? What guidelines should you follow as you conceptualize the relations between knowledge production and knowledge use?

We also must face the hard reality that all public funds, state and federal, for academic research will be harder and harder to come by. Your colleagues in agriculture and forestry are shifting more aggressively to draw in private-sector support. They not only are developing creative programs to increase private sector gifting and endowments but are rethinking their present and future relationships with industry.
At our university, less than two months ago, our Board of Regents passed a resolution instructing our Central Administration to develop new policy and guidelines for fostering university/industry relationships and cooperation. In the past, university faculty generally have been reluctant to work very closely with private industry for fear the academic pursuit of knowledge might somehow become tainted and objectives become too utilitarian. This philosophy is being reconsidered, hopefully with a positive and beneficial outcome.

Based on the progress to date at our institution, faculty in agriculture and forestry have been much more aggressive than those in home economics in pursuing new sources and greater amounts of private-sector funding. They are concerned about their very survival, and you should be too.

We have enjoyed great flexibility in how we use our state appropriations for the Agricultural Experiment Station. I personally have no problems justifying to myself my resource allocation decisions regarding research in textiles and clothing and other areas of home economics. However, I lack the data base and examples of benefit that I need to defend those allocations and request additional resources from our state legislature as well as our congressional delegation. I do not have any immediate answers but the challenge is obviously there; it is immediately before us and urgent. You need data, quantitative where possible, to document the benefits of your programs not only to people and families, but to communities, industry, the economy, government, and society in general. I challenge you to get on with it.

THE POLITICS OF SURVIVAL IN TIMES OF STRESS

Keith N. McFarland
Dean, College of Home Economics
University of Minnesota

In 1975, Bea Litherland, now Dean, College of Home Economics at the University of Missouri-Columbia, examined the role perceptions held by a broad sample of home economics administrators in U.S. collegiate institutions. (Litherland, 1975). Her findings, generalized, suggested that prime concerns often were those of curricular structure, teaching methodologies, and administrative detail. A minor proportion gave top ranking to questions of "educational politics," to relationships across department, college, and community lines, and to those concerns that, in final analysis in times of stress, were likely to determine the survival of the unit. What value curriculum, goals, and objectives, if the program and/or department be gone?
Those whose tenure reaches back from the 1940s to the early 1970s knew years of reasonable growth in facilities and staffing, or at the least, a stability that permitted planning over time, the luxury of anticipation, reasonably assured, and long undisturbed relationships with colleagues. Interunit competition, though always keen, was not cut-throat. It was possible to exist "without disturbance," since the funding situation, though never luxurious, did not force that type of self- or institutional examination that usually accompanies a decline rather than advance in growth.

Over the last six to eight years the worm has turned. At the University of Minnesota, colleagues are asked to review their programs/departments on the basis of six decision-making criteria (Academic, 1982):

**Quality.** Particularly in academic programs, it is difficult, as a practical matter to build quality in a conscious and deliberate way. Where it occurs, it is often the result of the happy combination of opportunity, good luck, and foresight. Thus, once a university has achieved a high level of quality in a program, it should make every effort to preserve it; and where an obvious opportunity exists to make a substantial improvement in quality with a realistic investment of resources, it should be taken.

**Connectedness.** This somewhat awkward word refers to the extent to which the programs of a department or college serve other departments and colleges. Where this connectedness is high, it is unrealistic to consider extensive reductions in its activities unless alternative arrangements can be made to provide for instructional or support activities.

**Integration.** The university's particular commitment to teaching, research, and service suggests that those programs that integrate all of those activities well are especially appropriate and important. In large part, this is because the university is committed to and responsible for both the generation and transmission of knowledge, and those activities are best stimulated and provided for in an atmosphere in which individual faculty and programs are committed to both.

**Uniqueness.** It is certainly true that the university's land-grant mission suggests that where we have a unique and useful program, we should have a strong commitment to maintain it. However, in making this determination, it is also important to consider whether the program is appropriate to the university's role and strengths, and whether it could or should be offered elsewhere.

**Demand.** Demand is obviously an important factor, but we must be careful not to interpret it too narrowly. That is, we must avoid considering demand to be measured only by the number of students seeking admission to regular, full-time undergraduate or graduate programs. Part-time students and outreach audiences also must be considered in assessing demand, and, from another point of view, needs of employers for individuals trained in certain disciplines constitute a form of demand. Moreover, the demand for the other "products" of the university, such as its research contributions to the solution of pressing economic and social problems, and its contributions to the quality of life are equally valid issues to be considered in assessing this factor.
Cost-effectiveness. Whether in an era of growth or contraction, our aspirations are always limited by the resources available. Thus we must continually examine our programs to see if there are less costly ways to offer the same program or more efficient ways to accomplish the same ends. Yet cost alone must not govern our decisions, for the effectiveness of the program also must be weighed. When taken together, cost and effectiveness provide one important measure of whether we are putting our funds to their best use.

In turn, colleges are similarly appraised, and those among them that fall short in these measures suffer retrenchment in part or whole. And these decisions are made by whom? By central administrators, operating as a "budget executive," with advice from faculty committees drawn from senate membership, in our case the Senate Consultative Committee and the Senate Committee on Educational Policy. And suddenly it is very important that the units closest to our hearts either have faculty representatives on these committees, or be close to those who do comprise membership on these pivotal groups. Further, it is the fortunate unit whose behavior has been such that its program is "felt" across the campus, that has a perceived vitality, high status among like units in peer institutions, confident and visible leadership, and the image of success. Even more fortunate are those who have captured a "named chair" or two, whose grant funding seems never to end, and whose calendar of workshops and symposiums point clearly to the unit as being, indeed, the very heart's blood of the institution.

Of all attributes common to "survivors in times of stress," perhaps the most basic is a program that is well understood by colleagues across the institution and considered to be basic to the principal mission(s) of the institution.

In this respect, do not home economics units, and perforce textiles and clothing departments, find themselves in a double bind, out of step with two powerful groups in modern university settings? When finances are limited, we hear the rallying of those in the liberal arts, citing their departments as being central to the "idea of the university." As I prepared for this session, I encountered a now yellowed letter to the editor from the Minnesota Daily, with date not specified on the page remnant, though reference to the on-going Vietnamese conflict would place it at least a decade ago. The letter was an excerpt from John Stuart Mills' *Essays in Literature and Society*, opening with the following sentiments:

"The proper function of a University in national education is tolerably well understood. At least there is a tolerably general agreement about what a university is not. It is not a place of professional education. Universities are not intended to teach the knowledge required to fit men for some special mode of gaining their livelihood. Their object is not to make skillful lawyers, or physicians, or engineers, but capable and cultivated human beings. It is very right that there should be public facilities for the study of professions...but these things are no part of what every generation owes to the next, as that on which its civilization and worth will principally depend. They are needed only by a comparative few...and even those have been completed..."
Our units would not pass this test of purity, would they, though we would argue that the general education component of our curriculums mitigates against an undue vocationalism?

And on the other end of the continuum are the specialized departments, where even their integration involves a high degree of sophistication, often quite focussed. Dr. Peter Brown, of the Department of Textiles and Clothing at Minnesota, brought back from a 1982 conference on Research in Home Economics in Leeds, England, a most interesting paper by L. Ecroyd, of Ilkley College, entitled, "What Does Home Economics Research Tell Us About Home Economics Research?" Professor Ecroyd notes,

"...there would probably be fairly wide agreement that the strength of Home Economics lies not merely in its content but also in the type of questions it asks and in the process of integration. The concept of integration is embodied in definitions of Home Economics and in the objectives of its journals. The teaching of Home Economics, particularly at the undergraduate level, often seeks this orientation..." (Ecroyd, 1982:4).

Later in the paper Professor Ecroyd writes,

"The organisational (sic) context for Home Economics research is beyond the scope of this paper, but it can have important effects. The effect of organisational structure on interdisciplinary courses has been discussed by Squires et al (22) who suggest that organisations may have to choose between specialisation and interdisciplinarity, and that interdisciplinary courses proposed within organisational structures catering for specialisation may not be adequately developed and may be most vulnerable in times of scarce resources. The above appears equally applicable to interdisciplinary research." (Ecroyd, 1982:9).

Couple the competing forces of liberal education and highly sophisticated specialization with central administration representatives for whom the terms "home economics" or "textiles and clothing" may conjure up images growing out of a long-past exposure to the apron making and biscuit baking of an earlier year junior high school curriculum, and suddenly certain of the challenges facing your programs become immediate and imposing.

Has the basis for an understanding of and respect for textiles and clothing been established in our university communities? Is there not some truth in the suggestion that over the years textiles and clothing researchers and teachers have interacted, for the most part, with departmental colleagues and with their counterparts in other institutions, perhaps more so than with their own university colleagues in other departments, schools, and colleges? University faculties are, by and large, traditional in orientation. They have limited experience with terminology that reflects other than their own traditional disciplinary orientations. Unless they participate in cross-disciplinary research, and/or teaching activities, or read in their own disciplinary journals the treatment of problems in textiles and clothing, it is likely that
they know little about the field, and something that is not known is often undervalued, a state that could prove damaging in times of fiscal stress.

Dr. Sauer has dealt with the general questions of research funding, and I would wish only to note the evident lack of complete understanding of the work of your field, or of its implications, in both research and extension, and highlighted in the February 1982 Appraisal of the Proposed Budget for Food and Agricultural Sciences, a report of the National Agricultural Research and Extension Users Advisory Board. Many institutions represented here today rely on the USDA for funding support for outreach and research activities. The National Agricultural Research and Extension Users Advisory Board is advisory to the President and the Congress on expenditures of federal funds for research and extension. Its July 1982 policy recommendations were not encouraging. The flavor of these is suggested by the four recommendations noted below:

"We expect program administrators of research and extension establishments to manage efficiently by redirectly or eliminating programs and shifting personnel so they directly serve the needs of producers of U.S. food and fiber."

"We believe that Hatch Act and Smith-Lever Act formulas need to be revised in order to improve the productivity of our national agricultural system."

"The performance of publicly supported research and extension programs must improve in order to gain needed public and congressional support for programs essential to solving agriculture's long-term problems."

"We strongly believe State cooperative extension services should be directed to serve primarily the needs of the people of rural America—particularly those who live in less affluent areas and who do not enjoy the extensive social and other public services that are available in cities and suburban communities."

Of 10 recommendations noted, none spoke to the needs of families in terms of highlighted concepts and concerns central to textiles and clothing. These from a 21-member citizens' committee drawn from the length and breadth of the nation. Your challenge, it appears, is not confined to the campus alone.

Might not a survival program for times of stress as whether:

a. Your institutional colleagues know, understand, and appreciate the scope and the quality of your work.

b. Policymakers on local, state, and the federal level are aware of the potential you bring to the alleviation of human concerns and to the improvement of the human condition generally, and that your advice is heard and welcomed, in their councils.

c. Your working relationships with USDA, state Experiment Stations, and other funding agencies are in good working order.

d. The sweep of your activity is such as to convey the image of success in an arena where image is often the reality in the creation of attitudes on which decisions rest.
I speak to you as perhaps the most weathered department chairman in our field with only one year's experience. I am speaking to you after having been through the fire—a bloodbath, in fact—on our campus. This is a report from one who has been on the front lines. It seems to me the most important perspective I can bring you in response to our presenters is what we learned from that experience. I have been where I assume you wish not to go as I interpret the intent of this morning's program.

For those of you who may not have followed our situation closely, let me give a brief overview of what happened at the University of Missouri-Columbia in spring 1982. As I hear many of you speak of your concerns in your own states and on your campuses, it seems we may have been just a year or so ahead of where many of you are now. Thus, I would like to share highlights of our experiences and provide some perspectives for contemplation so that hopefully you will not have a similar occurrence.

In view of the fact that University resources were not keeping pace with expenditures, a situation compounded by inflation, the president of our system asked the administration at each of the four campuses to cut back on the scope of each respective campus' operations. The plan was that we would do less on each campus, but that the programs that remained after others were eliminated or substantially reduced would be better funded. It seemed a noble enough concept and
basically our campus accepted the notion—that is, until we saw how the process was handled—and more specifically, when some of us found ourselves among the "sacrificial lambs" who were to be offered in the name of maintaining quality.

Almost from the moment I arrived on August 1, 1981, the campus was braced for retrenchment. By retrenchment, I am referring to the elimination of programs to shift resources to remaining units. My first several months there were spent working with our faculty in preparing documentation to justify our existence—expecting we would have opportunity for input along the way. However, we were never given a chance to provide data or other information on our programs.

Eight months after I arrived, and before I had found the shortcut home from work, the retrenchment plan was unveiled. On April 1, 1982, after waiting in apprehension for months knowing major programs would be targeted for elimination, the campus learned details of the proposed $7 million cuts. Along with the elimination and/or reduction of many other programs on campus, primarily those that are people-serving in their focus, the College of Home Economics learned its operating budget would be cut by one-third and that the Departments of Clothing and Textiles and Housing and Interior Design should be considered for elimination. We were on the dreaded "hit list" that was finally made public. We learned a new name for our programs and ourselves: "targeted" programs and "targeted" faculty.

The primary reasons for which these two departments were singled out, as given to our dean, Bea Litherland, were—(1) poor research productivity and (2) that we were a little "soft," which we interpreted to mean that our student-teacher ratio was not as good as it might be. The fact that we had around 500 students in these two departments, by far our largest number of majors in the College, seemed irrelevant.

In short, we decided not to take it sitting down. In concert with some other targeted programs on campus, we pulled every political string we could find. Most of us had never done anything more political than vote. One day when I attended a hearing at the Capitol, the students who were with me had to help me find it. The next day I went back and called on influential committee chairmen. We called upon all our important constituent groups around the state who rallied in our behalf. A number of you were wonderfully supportive and helpful.

The weeks and months of spring 1982 were traumatic and stressful to an extent that cannot be reported adequately in words. The end result was that our governing board passed a resolution whereby there would be no cuts in academic programs on our campus. We feel we now have respect on campus that far exceeds what we have had before. We are in a forward-moving mode.

I believe we had the most crucial of all possible situations in which we had to look at how we are perceived and supported by groups such as those Dean McFarland mentioned. Having been told by your provost you should be considered for elimination forces introspection of the highest order!

Let me retrack briefly in our process at UMC to share a perspective that may be helpful. When initial retrenchment plans were announced, each campus had a committee develop criteria by which program modifications would be made. These were so similar for all four campuses that
they were later combined into one set for our system. Most of us felt the criteria were fair; we did not feel that was true of how they were applied. I brought copies of the criteria to share with you. These may be of value for you to see what one major university system considered important as programs were examined for elimination and reduction.

Basically the University of Missouri criteria, which follows this report, addressed four major areas: quality, mission, need, and cost. Each of these had several specific sub-areas. I suspect criteria of this type would vary little from one institution to another. Novice administrator that I was, I had assessed our position fairly accurately and knew we were particularly vulnerable in the research area, which was considered under the broader category of "quality." Perhaps your campus is already in the throes of developing similar criteria. If not, I would encourage you to take this set of Missouri guidelines and evaluate whether or not your department would survive close examination alongside campus peers if programs were going to be eliminated at your institution.

Whether or not our programs are facing pending doom, I believe we ought to be able to scrutinize them against similar criteria. We should have to prove ourselves worthy of funding, and we should be able to withstand the same scrutiny to which our peers in other academic programs are subjected. Or, if we look at this collectively for our field, if there were some "Great Criteria in the Sky" by which all academic fields were judged against one another, and only the best would survive, we should ask ourselves whether we would be among those to be saved?

In response to some of our earlier presenters' comments, let's think about our own programs and ask questions such as: Would all our activities in the department be deemed important by persons footing the bill--taxpayers or whomever? Does our work make a difference to anyone besides ourselves? Are there some parts of our programs that might seem frivolous to decision-makers? Unnecessary? Can you justify the value of the things you are doing? Who would care if your program did not exist? Do enough people care about what you are doing that they would help you save the program if necessary?

These were the kinds of life and death questions with which our department had to deal. I found myself having to face accountability for my department in a most urgent and revealing way. We won the battle to a great extent, I believe, through an effective lobbying and marketing effort. And, I must be very honest with you in admitting that in that kind of crisis situation, I played up some of our areas more than others. In that kind of battle one cannot spend too much energy worrying about treating every area equally. Faculty are very understanding when they are close to losing their jobs.

In many ways, we felt the decisions on program cuts reflected a typical male value system since it was, in most cases, the programs with large numbers of women students and women faculty that were targeted. So, I played that game, too--right back at our administrators. If they wanted to talk dollars and numbers, I would do that, too. I emphasized such information as the economic significance of apparel/textile manufacturing and retailing to state revenue, the number of people employed in those sectors, our healthy number of majors who were
being prepared to enter those areas, the number of graduates we had in important positions, the measurable value of our extension programs, and so on.

It was significant that on our campus, arts and science programs were untouched in the retrenchment effort. So, we perceived the administration valued areas such as design, history, and the behavioral sciences. However, I don't think we could have built a case to save the department if we had gone heavy on promoting what we were doing in those areas of our program. Don't misunderstand me, I think these are worthwhile areas, but heavy emphasis on these would have gained little ground for us given our setting. While those of us in our field understand the value of what we do in these areas, I fear they may sound frivolous to tough-minded, budget-conscious administrators. If we value these areas, we need to build strong convincing arguments for them. I think I did reasonably well in that respect, but I wished I'd had more ammunition.

While we were angry at our provost for having targeted our program, it was not without some justification. We did have a limited research record. I suspect ours was comparable to many of yours. I think it is easy for faculty in our field to become so laden with teaching schedules overpowered by laboratory sections that there is little time for research. Yet, particularly at universities, we must accept the fact that we have to play by the current rules of the game. It doesn't matter if you have 50 labs per week. That does not lessen the expectation for faculty members and departments to conduct research and publish. We're fooling ourselves if we think that we'll somehow be measured by a different yardstick from our peers in other units on our campus. And, maybe if we are laden with lab hours, then it is time to do some serious curriculum revision.

And, one last issue that concerned me as we were immersed in our battle is our name. The week after our "hit list" was public, I was part of a group of about 20 department chairmen invited to a Chancellor's coffee. She held several of these during the year to visit informally with chairmen. I was in a group that was heavy with representatives from science areas, the medical school, and veterinary school. As we introduced ourselves, and as I identified my department's name, "Clothing and Textiles," I heard it in a way I had not before. As I heard it fall on the ears of those department chairmen, who of course knew my plight at that point, I could hear them question in their minds, why we would need a department to study "clothing." My feeling after the spring experience is that perhaps the term "clothing" has outlived its usefulness as an effective label for us. While I do not have another definite alternative, I felt at times during the most stressful moments of that battle, that we have many other potential alternatives that could be better.

Part of our problem, too, was that we felt administrators had no idea of what we were about. At times, we wondered if they thought we were teaching students how to weave pot holders. But, then part of that is our fault. While we had not been given an opportunity for input during the process, departments shouldn't wait until that point. In conclusion, my word to the wise is: make yourselves visible, valuable, and indispensable all along. Don't wait until the crisis hits.
Criteria for Modification of Activities and Programs

1. Quality of the program, to include considerations such as:
   a) Ability of the students in the program
   b) Achievements of the graduates of the program
   c) Quality of the faculty, as measured by their experience, training, teaching ability, and research and other professional achievements
   d) Level and quality of scholarly activity and research associated with the program
   e) Quality of facilities and support services for the program
   f) Recent past external evaluation or accreditation judgments

2. Contribution of the program to the campus and University mission, including the land grant functions, to include considerations such as:
   a) Extent to which the program relates to the statement of mission of the campus and the University in the Academic Plan
   b) Importance of the program for other programs or activities on the campus and in the University
   c) General contribution to the state, to particular interest groups within the state, or to state priorities such as economic development
   d) General contribution to the quality of life in the University community, the state, or the nation

3. Need for the program or activity, including such considerations as:
   a) Current and projected enrollments
   b) Anticipated employment opportunities for graduates
   c) Demand for nonteaching services in the program
   d) Significance of research and scholarly activity produced within the program
   e) Impact of the program on the University’s affirmative action commitment
   f) Extent to which the program is duplicated within the University system
   g) Extent to which the program is available on other campuses, public and private, in the state and region
   h) Extent to which services could be available from external sources: e.g., food service

4. Financial considerations relating to the program or activity, including for example:
   a) Faculty/student ratios and costs per student credit hour
   b) Other measures of efficiency of operation as appropriate for research, extension, and service activities
   c) External support for the program
   d) Costs of improving quality or increasing size and scope
   e) Cost savings which could be achieved through reduction or elimination
   f) Opportunities to share in the cost of an activity by joint operation with another institution, campus, or other entity
   g) Cost reductions of an activity through the use of technology
   h) Passing the costs of an activity on to other parties, such as full costing of auxiliary enterprises where appropriate
In responding to the challenges by Drs. Sauer, McFarland, and Baizerman, I will first address the issues of whether it is appropriate and reasonable to expect research funding in textiles and clothing from the United States Department of Agriculture. Second, I will suggest some possible means for measuring the impact of research in textiles and clothing. This will be approached conceptually, but the ideas provide a foundation for practical measurement. Third, I will offer comments on needs I see for our field in its research endeavor.

Research Funding from U.S.D.A.: Appropriate and Reasonably Expected?

As we are all aware, the legislative basis does exist for funding research in home economics, of which textiles and clothing is a part. This legislative basis is summarized in A Comprehensive National Plan for New Initiatives in Home Economics Research, Extension, and Higher Education (USDA, 1981). Title XIV of the Food and Agricultural Act of 1977 specifically defines food and agricultural sciences as inclusive of the social, economic, and political considerations of home economics, human nutrition, and family life. It calls for new federal initiatives to improve and expand research programs in home economics (USDA, 1981). The 1977 Act and other preceding legislation establish the appropriateness of our seeking research funding in textiles and clothing as a part of home economics. However, whether we can, in fact, expect funding for our research depends upon priorities set at any particular time. This is really the issue, not whether it is appropriate to seek funding for research in textiles and clothing from the Department of Agriculture.

At present, we face a situation in which policymakers in the U.S.D.A. place highest priority on matters related to production agriculture and low priority on those related to areas in home economics, except for food science and nutrition. This is clearly evident in the 1982 priority recommendations to the Secretary of Agriculture and to the President and Congress made by the National Agricultural Research and Extension Users Advisory Board (USDA, Feb. 1982 and July 1982). It should be noted that the Users Advisory Board appears to be composed, in large part, of persons who represent groups whose incomes depend on the viability of production agriculture or who are professional nutritionists.

In our society, families rely heavily on the marketplace for goods and services. Thus, it is not surprising there will be strong motivation for maintaining or increasing income, which subsequently can be used for buying market goods and services. Furthermore, there is recognition consumers do gain from availability of low-priced agricultural products that result from a technologically efficient agriculture. However, placing nearly exclusive emphasis on production agriculture reflects a limited, but common, perspective of the economic role of consumers.

There is, among the public and much of the intellectual community, a pervasive perspective that the consumer sector's primary economic
function is to receive market-produced goods and services through market exchange. In this role, consumers are viewed as influencing the production of goods and services through their purchase decisions. Such a view ignores or diminishes the importance of production of goods and services by households for their own purposes. This household production occurs through household members' use of non-market inputs or resources, such as their own time, in combination with goods and services obtained through market exchange. This activity yields a substantial amount of goods and services that are consumed by households and contribute to the well-being or quality of life of families. Goods and services produced by households raise the real incomes of families and, in addition, compete with market goods and services. Household production activities related to textiles and clothing include, but are not limited to: the acquisition of clothing and household textiles, as by purchase or home sewing and knitting; the repair of textile items; and the cleaning of clothing and other textile products.

The value of the goods and services from all household production activities has been variously estimated to amount to 20 - 67 percent of the Gross National Product (GNP) (Hefferan, 1982). Yet because no direct payment is made for the labor input of household members in household production, this is not counted as part of the GNP. Robert Evenson, an economist at Yale University, has suggested this accounting convention has led to a perception of household production as being non-economic in nature. Thus, it is perceived as not involving work, not having resource management and production technology associated with it (Evenson, 1982). An unfortunate implication is the misperception that household production is nonexistent or not very important. Much of the research in home economics, and in textiles and clothing specifically, is related to household production activities. According little significance to these activities by consumers, who are our major clientele, may lead to placing little importance on textiles and clothing.

We must be able to demonstrate the importance of household production activities related to textiles and clothing in people's lives and to show the positive impact of our research on these activities. The impact of our research must be shown not only to persons outside of home economics, but also to colleagues in home economics. In the New Initiatives document, there is little mention of textiles and clothing in the four program thrusts in home economics proposed for the 1980s. There are, nevertheless, implications for textiles and clothing in these thrusts. In the HERAPP Report (Ritchey, 1978), research problems specific to textiles and clothing are in general given low priority, although, again, there are implications for textiles and clothing in other research problems of higher priority.

Regarding the issue of whether we can reasonably expect research funding in textiles and clothing from U.S.D.A., our success in receiving funding will depend upon the types of research we propose and our ability to show the value of our research. Based upon the recent reports by the Users Advisory Board mentioned earlier, the best chance of funding in the short term will be in research with a clear link to production agriculture and in that closely associated with the physical sciences and economics. The current pesticide-related research in textiles and clothing is an example of the first; this coincides with the concern for
pesticide effects on agricultural workers, expressed by the Users
Advisory Board (USDA, Feb. 1982). Now and in the future, our success
in receiving funding also will depend on our ability to demonstrate
the value of our research to the public, to research administrators,
and to our academic colleagues. This brings us to a discussion of
possible means for measuring the impact of research in textiles and
clothing. This is a key question posed by the challengers and one
which funding agencies increasingly require researchers to address
(Kiritz, 1980).

Measuring the Impact of Research in Textiles and Clothing

One approach for measuring the impact of our research involves
application of principles from welfare economics to determine the
return from investment in research. Thus, it becomes a matter of
evaluating output, or that which is produced as a result of research,
and comparing this to the dollar expenditures for research. Here we
are most concerned with expenditures through the Agricultural Experi­
ment Stations. This must, of course, be done for broad areas of research
encompassing many individual projects. Evaluations of the returns to
research have been done for agricultural research (Schuh, 1979).

Research expenditures are measured straight-forwardly, but the
output of our research may not be. Our research usually is not oriented
toward increasing the output of production processes in industry,
wherein its effects would be measurable in some physical units, such as
pounds or numbers of things. Rather, the output of our research is
often less tangible, resulting in some measurement difficulties. The
output is often, though not always, information, much as in many social
science types of research (Norton, 1981). Central questions in evalua­
ting the information output of research are--(1) who are the users of
the information, and (2) what types of information are produced? Both
of these bear on the impact of the research.

The users of information produced in our research may be (1) con­
sumers, (2) producers, or (3) policymakers, although consumers may be
the ultimate beneficiaries in many cases when the information is used
by producers or policymakers. Some types of information produced from
our research are--(1) textile product safety information, used by
consumers, producers, or policymakers; (2) textile product quality
information on product characteristics other than safety, used primarily
by consumers and policymakers; and (3) household management information,
used by consumers. This list is not meant to be exhaustive of the
various types of information output of research in textiles and
clothing. I will discuss each of the above types of information in
relation to measuring the impact of the research that produced it. In
each case, the idea of household production is relevant because, in
each, there is recognition that consumers do more with clothing and
textiles beyond simply receiving them through market exchange; they
carry on household production activities involving these products.

Textile product safety information. The information produced has
the ultimate purpose of reducing injuries or deaths to consumers in
wearing clothing or otherwise using textile products. The information
may be used by policymakers and contribute to legislation or other
policy; it might be used by producers in making products; or it might
be used by consumers, as in safety precautions. Two general areas of
recent importance are flammability and toxicity of chemicals used on textiles, for example, formaldehyde. In these cases, impact of research-producing information could be measured by reduction in injury or death. Monetary value can be placed on this, as by the saving in income-earning ability arising from prevented deaths and injuries. Similar analyses have been done in evaluating benefits from textile product safety regulations (Dardis, 1980).

Under the category of safety information, there is also that related to clothing specifically for use in non-household production situations. For example, it may concern protective clothing for agricultural or industrial work situations, as for handling pesticides or other toxic substances or for operating machinery. The impact of such research may be measurable in the saving of income-earning ability. However, another way of measuring the impact is through the effect on production costs, similar to the way Dardis et al. (1982) recently evaluated benefits of the cotton dust regulation. Protective clothing may lower the cost per unit of production, due to fewer worker injuries. This leads to an increase in producers' surplus or the difference between total revenue and total cost. Producers' surplus is a measure of the revenue over and above that which would have been necessary to induce production of the product. Graphically, producers' surplus is the area between the price line and the marginal cost curve (Anderson, 1977).

Product quality information. Product quality information concerns many types of characteristics that may influence consumers' satisfaction with clothing and textile products. For example, it may concern comfort, aesthetics, physical durability, or care properties. Relevant information has to do with decreasing the difference between satisfaction expected at the time of product acquisition and that actually realized by consumers. Information provided by our research may lead to supplying more, or more comprehensible, or more useful information to consumers at the time of product acquisition; to improvement in consumers' ability to assess product characteristics; or to provision of better products from which consumers will realize more satisfaction in use.

Kinsey et al. (1980) have proposed a conceptual framework for measuring losses in consumer welfare from either over- or under-consumption of goods, resulting from expected satisfaction being different from that actually realized. The losses are measurable through estimation of changes in consumers' surplus. Consumers' surplus is the total amount consumers would have been willing to pay over and above what they have to pay for a product, rather than do without it. Graphically, consumers' surplus is the area encompassed by the demand curve and the price line for a good (Anderson, 1977). The value of product quality information could then be measured as the saving resulting from consumers' more accurate assessments of expected satisfaction or utility. The savings are the losses that would have occurred without the information provided by our research.

Household management information. Research in textiles and clothing provides household management information that affects household production activities. The information may increase efficiency of these activities by consumers, or it may reduce losses from incorrect resource use. Obvious examples include information that may lead to more
efficient shopping by consumers or that may result in use of less
destructive care procedures for textile products. The impact of the
research that produced the information may then be measurable in
resource savings, such as of time or fuel, or in savings from less
frequent replacement of garments and other products.

The foregoing is not exhaustive of the many types of impacts our
research in textiles and clothing can have. Methodological problems
in actual estimation have not been addressed and would clearly need to
be resolved. However, hopefully I have provided some indication of
the impacts of our research and possible means for measuring these.

**Needs for the Research Endeavor in Textiles and Clothing**

The field of textiles and clothing is interdisciplinary, and, at
this point, often involves application of concepts, theories, and
methods from other disciplines in research. I believe our research
will be improved as we increase our knowledge in the basic disciplines
from which we draw. A knowledge base must be established during under­
graduate and graduate education. Throughout our professional lives,
we must each build on this knowledge base through continued study in
basic disciplines and sustained interaction with colleagues in these
disciplines. In these ways, we become better able to apply this
knowledge to new research problems, and we keep abreast of new knowledge
in the relevant disciplines. In addition, as we increase our knowledge
in basic disciplines and apply it in our research, this may foster an
improved perception of the unique integration of that knowledge with
the field of textiles and clothing.

Our field and the research we do will be made more cohesive and
stronger as we develop greater understanding of interrelationships
among diverse segments of textiles and clothing. Horn (1981) made a
similar point in calling for "shared commitment to a common goal, a
common language, a shared set of values..." in home economics. I hope
we can become more aware of and better able to communicate, to our
students and others, the ways the parts of the field fit together.
Regarding one aspect of this, a more holistic view of apparel and other
textile products is needed. For example, clothing represents a
structural level in which characteristics depend upon those of several
components, for example, fabrics, and the way these are combined.
Apparel design brings together a set of elements into a composite
structure. Clothing is one of the main forms in which textiles are
used by consumers, and, thus, this structural level is significant in
determining consumer satisfaction in many use situations for textiles.

My final comment concerns the impact of our research in textiles
and clothing. We are in a time of accountability, when we are asked
to defend our research for the impact it has. Although we can and
should consider means for evaluating impact of past research, we each
bear responsibility for considering the impact of our research before
we embark upon it. We must each continually ask ourselves who will
use the results and in what way and to what degree they will be useful.
References:


Evenson, R.E. Implications of using the new household economics to study farm-household production. Paper prepared for the American Agricultural Economics Association Meetings, Logan, Utah, August 3, 1982.

Hefferan, C. What is a homemakers' job worth?: Too many answers. Journal of Home Economics, Fall 1982, 74, 30-33.


Challenges presented by the panelists to ACPTC membership are not unlike those considered in other professional/applied and basic disciplines. Although many examples may be cited from a wide variety of sources, the following should be illustrative. Kidd and Saks indicate that with the movement of social psychology into practical settings and problem-solving roles, social psychologists have been challenged "to take a hard look at the utility and versatility of their concepts and methods and to grapple more openly with the complexity of the real world..." (Kidd, 1980:14). The purpose of their first volume is to address some of the issues accompanying attempts to make social psychological knowledge more useful in applied settings and to stimulate debate accompanying issues to use knowledge.

Schubert indicates that in the field of education attention to the relationship between educational research and practice has been evolving since the 1970s (Schlater, 1970). One example of the concern may be evidenced in the work of Freema (1981). Focus is on the classroom setting in order to examine those activities accompanying transformation of theoretical knowledge into practical knowledge by the teacher—the user of knowledge.

A turn to the economics literature indicates that 50 years ago, Joseph Schumpeter expressed concern for a "crisis" in economics. He stated that among his contemporaries there was a belief economics had no universally accepted methods and results, that its body of knowledge was at best "a philosophy of economic life" having little if any bearing on real life (Schumpeter, 1982).

Throughout the history of home economics and of textiles and clothing as part of that field, similar issues have been considered by its professionals. Sailor speaks of her frustrating experiences encountered in defending home economics research before Congressional Committees and the Office of Management and the Budget. Such experiences led her to ponder about research efforts in the field. She says, "I was unable to point to clear-cut, well agreed upon findings in many areas that had received support and which justified additional funding..." (Sailor, 1977:141). Noting that federal units were becoming increasingly more skeptical about research activities generally and demanding greater accountability, she also noted that scientists failed to communicate research outcomes to non-scientific audiences. One professional responsibility, according to Stowe, is "to convince decision makers in the university, legislature and private sector of the value of the study of textiles and clothing as part of a curriculum—an responsibility more apparent in times of severe economic constraints" (Stowe, 1982:42).

In an article directed to professionals in the field, Horn (1981) identifies as one of two basic issues central to problems of the status and image of home economics and its professionals the lack of congruence between the way we define ourselves and the way we perform—the
connection between definition and practice. One need not be reminded of the apparent untiring and continuous efforts of Brown and others in helping to direct our attention to critical issues in the home economics field (and its sub-areas)--its mission, its conceptual structures, its theoretical and practical import--and in challenging each of us to an insightful, analytical, and critical examination of what we do (Brown, 1967, 1979, 1981). Without clarity, consequences ensue for advancement of the field and the nature of professional commitment and identification among its professionals.

Awareness of the pervasiveness of these issues throughout various fields of study and an acquaintance with different ways by which these issues have been addressed, my response to the challengers will be presented within a framework that conceptualizes the knowledge system of textiles and clothing and uses it as an organizing device for confronting the issues. The term "knowledge system" is employed by Holzner and Marx (1979) to refer to activities and social arrangements surrounding knowledge processes--from its creation to its utilization and evaluation. In this paper, first, the elements—the production or creation of knowledge, its organization and synthesis, its application, and utilization, and evaluation of knowledge produced—will be described. Each of these components will then be examined with respect to the textile and clothing knowledge system. In concluding, this framework will be used to respond to selected issues.

Knowledge Creation

In a study of factors associated with the creation of scientific knowledge (as distinct from technological, historical, or legal knowledge), Nelson (1979) differentiates several dimensions that should be taken into account when examining this type of knowledge. The first is the environment in which knowledge is created. This context, which includes social, political, cultural, economic, and ideological factors, exerts pressure on both the substance and the way in which knowledge is produced. A second dimension considers the resources for knowledge creation—funding for research, personnel or man-power, equipment, and facilities. The formal and informal groupings within which scientists work and interact with each other, the roles played, and the dynamics of the process that affect both the process of discovery and the flow of information, comprise a third dimension. Attention would be given to the reward systems or invisible colleges and ideologies such systems lead to. Finally, the products of knowledge created in both the basic and applied realms—research, demonstrations of policy formulation, and evaluation of action programs—along with the producers of knowledge must be taken into account.

When questions are raised concerning the nature of knowledge created in the textile and clothing area, generally, two aspects are addressed: (1) the resources for knowledge production and (2) the products of knowledge. For example, Zentner reports on the scope of funded university research in textiles and clothing (Proceedings, 1976). Included in the quantitative information provided is (1) the number of people engaged in research, (2) the number of projects, project titles, and location of research (university, state, region), (3) the number of "textile" and "clothing" projects and so on. Other reports
provide comparisons of textile and clothing research with other areas in home economics (Tripple, 1982 and Zentner, June 1976). Although Zentner alludes to formal and informal groupings and the diversity of research interests among personnel, information is not available about other forms of knowledge production, the categorization of basic and applied research, or the contextual and ideological dimensions of knowledge creation, among other omissions.

Knowledge Organization and Synthesis

The processes of arranging the substance, methodologies, and findings of research into cohesive structures is engaged in by members of an epistemic community. It is an integrative activity mirroring the accumulated knowledge in a field. According to Glass, this act requires the best minds. He suggests that integrating activities have lacked prestige; they are not considered valuable contributions in many fields of study, but "should be more highly valued than many forms of original research" (Glass, 1977:353).

Synthesizing knowledge is generally viewed as requiring the special skills of philosophers, whether in education, mathematics, physics, or sociology. If knowledge is to have an impact in practice, in policy decisions, and in advancing the field, then synthesis must occur. To merely talk about research areas, to count the number produced in select categories, to list titles and publications, to provide abstracts, and so on--these activities are not consistent with the requirements for knowledge synthesis. What is required are conceptual structures of knowledge for both researchers and practitioners. Recognition of the importance of such an activity in the field of education has long been supported by the program on Dissemination and Improvement of Practice in the National Institute of Education. The outcome has been the establishment of a new research area in Educational Knowledge Studies whose purpose is to "encourage and support studies of knowledge characteristics and of processes involved in knowledge synthesis." Expected contributions in this new research area will be the "development of more effective strategies for dissemination and use of knowledge in the improvement of practice" (Ward, 1981:52).

Classification of research in the textile and clothing area is generally in categories so labeled. On occasion, other subject matter areas such as "clothing construction" provide a basis for categorization. Within each of these classes may be found subclasses, for example, clothing research may be classified as aesthetic, social psychological, economics, etc. These ways of organizing knowledge do not satisfy the requirements for knowledge synthesis.

In 1970, our goal for research in home economics was to improve the physical components in man's near environment (Schlater, 1970). Included in this broad goal were guidelines for and ways of classifying textile and clothing research problems. Although this was not a conceptual structure, a modified version appeared in a later document in 1978 (Ritchey). Employing this way of categorizing, DeJonge developed descriptions of the nature of research in each area (1982). Lakner, after an examination of four years of research activities by NCR-65, developed a threefold classification system for the types of research output, namely, social science related, fabric testing and textile research, and qualitative projects (Lakner, 1982:79).
One can see that the ways of classifying research mentioned above are not syntheses of theoretical and practical knowledge. Conceptual structures of both types are required. Currently, there are two available in the field that may provide a basis for organizing and synthesizing knowledge for utilization and evaluation. If neither is satisfactory, then new ones must be developed. Williams has satisfactorily employed the Brown-Paolucci model for organizing substantive knowledge and methodology about clothing and human behavior as systems of action.

**Knowledge Application**

Federal funding agencies in cooperation with the academic community have suggested that diverse sets of activities associated with applying knowledge to alleviate social problems may be divided into three categories. The first of these is demonstrations for policy implementation—small scale programs that attempt to test the desirability of a particular course of action by applying existing knowledge. The development of materials is the second category. These materials, such as training curricula and curriculum materials are produced as a result of research and used in a variety of educational and training settings. The set of activities undertaken by research managers to promote the application and use of knowledge—dissemination—comprises the third category. Included would be such activities as (1) publication and distribution of scientific and technical information, (2) research syntheses written for the use of practitioners and decision makers, and (3) support of conferences and creation of networks and consortia to diffuse information (Abramson, 1978:13).

The potentiality (if not the actuality) exists in the textile and clothing area to demonstrate policy implementation (as well as formulation). Product labeling, quality, and safety are prime foci as well as policy for people with special needs and in particular situations or circumstances. Laughlin, Handschuck, and many others have drawn our attention to issues surrounding the labeling and safety of textile products. Kaigler-Evans and Pinaire-Reed have provided expertise in raising issues surrounding clothing for the elderly at a Governor's Conference on Aging in Texas. There is also ample evidence (as reported in ACPTC Newsletters) that clothing and textile professionals have provided information in unusual settings. For example, the Kids'N'Clothes Project was developed by the Cooperative Extension Service to help Connecticut parents of young children know how to dress warmly. Shopping malls and libraries were among the educational settings chosen.

By far, the most organized information exists around dissemination activities. Annual reports to funding agencies provide information about the number of articles and bulletins printed, and theses and dissertations completed, for example. Zentner says, "the overall publication record seems to indicate that not as much research information is being disseminated as might be expected" (Proceedings, 1976:67). All of us are aware of the information services provided through CRIS; additional retrieval systems developed by Fetterman, Hutton, Reich, and Shannon may provide complementary, perhaps substitutable knowledge data bases. Nowhere is there information about research syntheses that have been developed for practical uses.
Knowledge Utilization and Evaluation

The use of knowledge is a complex process involving political, organizational, socio-economic, and attitudinal components in addition to the specific information employed. In its organized and synthesized form, it is the single most important criterion for assessing the success (or failure) of programs and policies that are directed toward improving the conditions and functioning of individuals, groups, institutions, and communities. Academicians and practitioners have developed and suggested the use of methods and techniques of evaluation research to provide some measure of the extent to which knowledge makes a difference in realizing goals and to assist decision makers in determining and making choices among future courses of action. However, to the extent of the knowledge of this author, there is no evidence of assessment in terms of theoretical perspectives and the quantitative and qualitative methodologies provided by evaluation research.

One way by which federal funding agencies may assess the activities of knowledge production and application is according to the amount of dollars invested in three categories: (1) broad policy areas, (2) organizational location of the funding unit, and (3) the agency's goals and target populations toward which activities are directed. Traditionally, the Agricultural Experiment Station has been a large financial supporter of knowledge production and application in the home economics discipline. In fact, of the major cabinet-level funders of social knowledge production and application in the federal government, the Department of Agriculture was found to be the second largest (outranked by HEW) (Abramson, 1978:41). Two reports provide some information about the dollar investment in textile and clothing knowledge related activities (Ritchey, 1978 and Zentner, June 1976). From the literature, one is led to believe the dollar investment in textile and clothing knowledge production and application is more heavily concentrated in category (3) above, rather than (1) and (2).

The goals and target audiences of the Science and Education Administration of the Department of Agriculture, the controversies surrounding additional goals, and future expenditures for agricultural research and extension have been discussed by McFarland (1982) and reported in several documents (USDA, 1981 and 1982). One goal—"to improve the well-being of people and communities" has provided a focus and incentive for knowledge-related activities to proceed in home economics generally and specifically in textiles and clothing. This goal of the funding agency does not appear to be inconsistent with statements issued by home economics administrators (Ritchey, 1978 and Schlater, 1970). Vagaries in interpretation appear, however, when one examines the statements encompassing the activities of textile and clothing professionals. Explicit statements by these professionals about the relationship of their knowledge-related activities with respect to the funding agency's goals and target audiences are not available at this time. What we do, however, is believed to be important. DeJonge, a spokesperson in textiles and clothing says:
Conclusions

Since my purpose in discussing the components of the knowledge system and in examining them with respect to textile and clothing knowledge-related activities was to provide a framework within which issues could be confronted, this paper will be concluded by stating a position on selected issues with supporting argument.

The allocation of money to support textile and clothing research as a knowledge production activity should be continued with agricultural funds. Although an argument from tradition would be suspect, certainly the widespread funding of social research by the Department of Agriculture is consistent with at least one of the agency's goals. Those of home economics, textile and clothing research generally and especially of clothing design, though not clearly articulated, are not inconsistent. Textile and clothing professionals are not misdirected in seeking funding from this agency for this form of knowledge production. They would be prudent, however, to seek funding for the other forms of knowledge production as well as focusing/designing research on the family as a target group.

For knowledge to be useful and subsequently evaluated for its impact, it must be organized and synthesized. Such syntheses must be encouraged by the reward systems in the textile and clothing area and the funding agency. The activities of the National Institute of Education should be paralleled by the Agricultural Experiment Station in funding proposals for textile and clothing knowledge integrative activities around alternative paradigms. Knowledge can then be used more productively in practical settings. Knowledge use in such settings should be accumulated as well as theoretical knowledge that has value in basic and applied research arenas.

An examination of the practical settings of extension programs, as well as the classroom, permit one to view knowledge-in-use, the transition of theoretical knowledge to practical knowledge by the textile and clothing educator. Additional settings for use of knowledge must be developed so that both quantitative and qualitative assessments of the significance of knowledge in changing people's lives may be made.

As textile and clothing professionals attain greater clarity and understanding of the knowledge system and the complexity of the interrelations among its components, strategies will be developed to evaluate the position of textile and clothing knowledge-related activities. Such emphases will help provide a more complete bases for indicating to other groups (home economics and other administrators), funding agencies, and other colleagues within the universities, both inside and outside home economics) what we do.
References:


A review of literature indicated different studies of window treatment (WT) were conducted over the last few years. The literature suggested research design used from one study to the next varied greatly, making comparisons of results across studies difficult. Balanced, fully crossed designs were used by some researchers, while others gave no indication of any research planning. Many independent variables were not controlled, therefore it was difficult to single out significant impacts. In many studies different instruments were developed and used to measure thermal performances of WTs under winter conditions. However, no study compared instruments in terms of precision or accuracy. The purpose of this study was to determine precision of instruments measuring thermal transmission through a window by determining: (1) precision of each instrument under specified test conditions, and (2) differential behavior of each instrument under different temperature levels.

Seven conventional WTs and three temperature levels were randomly selected and evaluated using an instrument (WTTI) currently used by an independent and retail testing laboratory. A 7x3 fully crossed, balanced, factorial experimental differential was taken and used to calculate thermal transmission (U, W/m²K). In addition, data were collected from three published studies (three different instruments) and analyzed in terms of research design and precision of instrument.

Analysis of variance was used to determine precision of the WTTI instrument; how well one was able to reproduce thermal transmission, and how magnitude of variation changed as specified test conditions were altered. Precision was found to be better at the higher temperature level than either of the other two temperature levels. As temperature level increased, variation in thermal transmission decreased. Temperature level was associated with 57.31% of the variation in thermal transmission variation, while WTs were associated with 63.15% of variation in thermal transmission variation. There was no difference in precision of the instrument when six of the conventional WTs were tested. There was a difference when the foam-backed drapery was tested. This WT produced a larger variation in thermal transmission than all other WTs evaluated.

Statistical quality control charts were used to determine precision of the three other instruments because research methodology used with each instrument prohibited application of analysis of variance. The limitations of the experimental design used in each study included nonrandomized samples, unbalanced and not fully crossed designs. The number of replications and independent variables studied varied greatly. In many cases no replication was performed. Control charts indicated no significant difference in precision of these instruments. A comparison of these control charts with a control chart for the WTTI showed no significant difference; however, the WTTI had the smallest average standard deviation.
This information helps the researcher interpret the data and determine correct sample size to use when testing WTs. To determine if significant differences exist between WTs, instrument precision along with average mean difference between WTs are used in the calculations for sample size. Without precision information, researchers can only guess at an appropriate sample size. Finally, this study provided a basis from which this study combined with results from future precision studies on other instruments can be used by the industry to select instruments to be used in a cost benefit analysis. Cost benefit analysis would provide a basis for selecting an instrument to be used in the standard.

Liquid Ammonia Treatment of High Wet Modulus Rayon Fabrics

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Renewed interest in rayon as a viable alternative to cotton can be attributed to two factors: technical improvements in the man-made cellulosic fiber itself and inherent economic and processing advantages of rayon over cotton. Many performance property limitations of "regular" viscose rayon have been overcome with the development of high wet modulus (HWM) rayon fibers. These new fibers are regarded as highly competitive with cotton in physical and aesthetic attributes.

Cotton fabrics are often mercerized with sodium hydroxide to improve luster, strength, and dyeability. In contrast, rayon fabrics are severely degraded when exposed to this treatment. As a result, liquid ammonia treatment has been suggested as an alternative to sodium hydroxide mercerization. Previous research has indicated physical performance properties of viscose and cotton are not adversely affected and dyeability is improved by liquid ammonia treatment. Little information is available on the response of newer HWM rayon fibers to treatment with liquid ammonia.

The purpose of this project was to evaluate the effects of anhydrous liquid ammonia on physical properties and dyeability of fabrics composed of selected high wet modulus rayon fibers.

Fabrics made from two varieties of HWM rayon, regular viscose rayon and cotton, were exposed to anhydrous liquid ammonia. A parallel set of fabrics was slack mercerized with sodium hydroxide. Two aspects of fabric dyeability were investigated: quantity of dye actually taken up by the fabric, and visual color yield of the dyed fabric. Dye uptake was measured by spectrophotometric quantification of dye content in initial and exhausted dyebaths. Color yield was evaluated instrumentally using a colorimeter that measured color difference between control and treated fabrics. Tensile strength, abrasion resistance, shrinkage, and moisture regain were evaluated according to standard ASTM test methods.

Fabric shrinkage was similar under all treatment conditions, although rayon exhibited higher levels of shrinkage than did cotton. All rayons showed severe decreases in wet and dry tensile strength and abrasion resistance after NaOH mercerization. In contrast, ammonia treatment resulted in minimal degradation of rayon fabric properties. Cotton fabric increased in strength characteristics after both NaOH and NH₃ treatments.
Dyeability of all fabrics increased after both sodium hydroxide mercerization and liquid ammonia treatment. Average dye uptake increases ranged from 8-16% for ammonia treated fabrics and 11-19% for sodium hydroxide mercerized fabrics. Increased depth of color after all treatments also was demonstrated although, there too, increases were greater after NaOH than after ammonia treatments. Total color difference units, ΔE, ranged from 3-7 units for ammonia treated and 6-12 for mercerized fabrics. Since color difference was much higher after treatment than was expected from the increased amount of dye on fiber, microscopic examination was undertaken to try and account for the differences. The apparent change in cotton could be attributed to the amount and quality of light reflected from the fiber surface as a result of the smoothing out of surface irregularities during the swelling process. In the case of rayon, swelling treatments modified the fine structure of the fiber and permitted more dye to penetrate into the fiber skin.

This study demonstrated liquid ammonia treatment is of potential commercial value as a pretreatment for regular viscose, HWM rayon, and rayon-blend fabrics. Rayon fabrics are not degraded by liquid ammonia as they are by sodium hydroxide treatments. Both the quantity of dye taken up by the fiber and visual color yield are increased by liquid ammonia treatment.

Hydrophilic Finishes: Effect on Polyester Fabric

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This study sought to determine relative soil redeposition and oily soil release capabilities of polyester fabric treated with selected hydrophilic finishes, to evaluate durability of those finishes after repeated launderings, and to evaluate effect of fabric softeners on those finishes.

A review of literature did not reveal comparisons of commercially available hydrophilic finishes on fabrics found in today's marketplace. The effect of fabric softener when laundering fabric treated with finishes had not been studied.

White polyester double-knit fabric treated with four different commercially available hydrophilic finishes was evaluated. The same fabric without a finish was used as a control. Soil-release properties and resistance to soil redeposition were measured using AATCC test methods (Soil Release: Oily Stain Release Method 130-1977, and 151-1977 Soil Redeposition, Resistance to: Launderometer Method). Launderings were conducted according to test method specifications with and without fabric softener.

Analysis of Variance using the F test for significance was used to statistically analyze the data. An alpha level of .05 was used to express differences. Results included:

1. All fabrics treated with finishes demonstrated excellent soil release capabilities through 20 launderings.
2. Fabric softener had a slightly deleterious effect on soil release performance of fabrics treated with finishes.
3. Fabrics treated with finishes varied as to soil redeposition capabilities through 20 launderings.
4. Fabric softener significantly improved soil redeposition performance of fabrics with finishes.
5. Soil release and soil redeposition performance of the untreated control was significantly lower than for fabrics with finishes when laundered without fabric softeners.
6. Fabric softener significantly improved both soil release and soil redeposition performance in the unfinished control.

It was concluded fabric softeners may affect fabric treated with hydrophilic finishes in different ways, i.e., soil release capabilities may be slightly decreased with use of softeners, whereas soil redeposition effectiveness may be greatly increased with use of softeners. The consumer might want to weigh the advantages and disadvantages of using fabric softeners in laundering such finished fabric. It was further concluded repeated use of fabric softeners on fabric without finishes may create a "pseudo" hydrophilic finish; commercially available hydrophilic finishes may not be equally effective in soil redeposition performance; and commercially available hydrophilic finishes may vary in durability over repeated launderings.

**Direct Dye Penetration Behavior of Selected**
**High Wet Modulus Rayon Fibers**

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Lenore Cheek, Louisiana State University

Regenerated cellulosic fibers, rayons, are expected to continue to increase in use following renewed interest which became apparent after the 1975 recession. Raw materials used in producing rayon fibers make use of lands unsuitable for cotton production and result in a fiber with properties similar to those of cotton. Until recently, rayon fibers have had severe performance limitations due to low wet strength. High wet modulus (HWM) rayon fibers have been engineered for specific end-use requirements that overcome these limitations and allow processing of fibers and fabrics on conventional machinery. These fibers can be resin treated in the same manner as are cotton fibers to provide ease-of-care characteristics. The HWM rayon fibers exhibit higher wet and dry strengths than regular viscose rayon, lower elongation and swelling properties than cotton, and the ability to be preshrunk and mercerized.

Cellulosic-related dye studies concentrate on dye behavior of cotton and regular viscose rayon with little specific information on dyeing of HWM rayons reported. Articles that do discuss the improved fibers state only that HWM fibers are dyed with the same dyes used for cotton and regular viscose rayon.

The purpose of the study was to determine if a difference existed in rates of dye penetration between cotton and Fibro regular viscose rayon, Avril, Avril III, Prima, and Viloft HWM rayons and between Fibro regular viscose and the four selected HWM rayon fibers. Fibers varied in cross-section shape and skin-to-core ratios.
Samples of the six fibers--cotton, Fibro viscose rayon, Avril, Avril III, Prima, and Viloft HWM rayon fibers--were individually dyed, each with three different dyes: C.I. Direct Yellow 106, C.I. Direct Red 80, and C.I. Direct Blue 218. Throughout the dye cycle, uniform aliquots were drawn from each dye bath and analyzed spectrophotometrically for transmittance readings. The transmittance readings were converted to absorbance figures that were averaged for each dyed fiber. Average absorbance was plotted against time to achieve rate of dyeing curves and times-of-half dyeing for each dyed fiber. Percent change from the two fibers used as standards, cotton and Fibro viscose rayon, was calculated.

Fiber samples for photomicrographs were dyed on specially designed holders. These samples were embedded in a butyl methacrylate-methyl methacrylate mixture that was catalysed with benzoyl peroxide. After embedding, samples were sectioned on a sliding microtome to a thickness of eight microns. Sections were mounted in the most compatible mountant, corn syrup, and photographed with a Zeiss photomicroscope. The resin mixture provided a satisfactory media for cross sectioning fiber samples. The system is suitable for most laboratories and few problems are foreseen for the system. Photomicrographs provided a permanent record on fiber cross sections; however apparent color yield as a result of dye treatment was difficult to ascertain.

Red dye had a higher overall exhaustion than did yellow or blue dyes. Cotton dyed to the lowest percent exhaustion at equilibrium for all dyes and Prima HWM rayon exhausted to the highest percent exhaustion for all dyes. The remaining four fibers did fall into a pattern; Viloft HWM rayon had the lowest exhaustion of the HWM rayon fibers for all dyes, and exhaustion values for Fibro regular viscose, Avril HWM, and Avril III HWM rayons were similar. Indications provided by rate of dyeing curves and times-of-half dyeing supported the distinctive nature of direct dye-stuffs. There were observable differences in rates of dye penetration found to exist among various fiber comparisons. Further study is recommended to investigate the patterns observed.

Results indicated the study was a successful beginning in establishing an easily duplicated laboratory method for observing dye penetration characteristics in both natural and man-made cellulosic fibers.

Communicating the Problems of Workers in the Textile Industry:
The Case of J.P. Stevens and ACTWU

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The Amalgamated Clothing and Textile Workers Union (ACTWU) has, for a number of years, been a leader in organized labor's efforts to use the mass media. This study explored the labor/media relationship extensively by examination of changing legal and historical circumstances affecting it, and intensively through a case study of the ACTWU campaign against the J.P. Stevens Co., the nation's second largest textile manufacturer. This campaign not only touched on most of the issues examined in the entire research project, but also demonstrated a new level of sophistication and commitment in the labor/media relationship. The protest model used in
the analysis allowed consideration of a wide range of interview and documentary data bearing on legal, political, and economic aspects of the relationship and enhanced understanding of it.

There were four interrelated segments of the ACTWU/Stevens confrontation. The first two, concentrated organizing of Stevens' mills in North and South Carolina and a series of unfair labor practice charges against Stevens, were undertaken by the Textile Workers Union of America (TWUA). Following the merger in 1976 of the TWUA and the Amalgamated Clothing Workers of America, two additional strategies emerged, a consumer product boycott and the corporate campaign. All of these union strategies were vigorously opposed by the company.

While all segments of the campaign incorporated media strategies, the segment that is probably most familiar to the general public is the boycott. ACTWU's objective in declaring the boycott was to persuade retailers to remove J.P. Stevens' products from their shelves. Since a direct approach to retailers might involve ACTWU in the legal complexities surrounding secondary labor boycotts, ACTWU went instead to consumers, informing them through the mass media about issues involved in the boycott. Issues the union chose to develop had a social justice emphasis rather than involving narrow labor/management disagreements. National press, television, and radio accounts of the situation focused on a giant, powerful corporation that violated labor laws, cared little about worker safety and health, discriminated against blacks, and provided few company benefits.

The social justice emphasis was effective in recruiting activists who, of course, were consumers as well. These people, many of whom were community leaders, were the ones who directly communicated with retailers. The retailers' image of Stevens, obtained through media and direct pressure from influential consumers, caused many retailers throughout the country to reduce or curtail purchases and promotion of Stevens' products.

The model employed in the analysis shows graphically the necessity for a relatively powerless group, ACTWU in this case, to activate third parties to enter into the conflict in ways aiding protesters. These third parties need to be reference publics of the protest target to be effective. Retailers are one reference public of J.P. Stevens, but retailers could not be persuaded directly by ACTWU due to widely divergent goal orientations and secondary boycott laws. Therefore, the ACTWU had to mobilize constituents who could approach retailers by framing issues of the campaign in such a way as to attract broad and sympathetic media coverage. It was able to do both.

Retailers' Views and Purchasing Patterns of Apparel Imports

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Retailers are seen as having played a key role in the proliferation of apparel imports in U.S. markets. Maas (1980), Heiland (1980), Dale (1978), Haecker (1982), and a Georgia Tech study for the Department of Commerce (1980) have noted retailers have been forced to source internationally to be competitive in price and exclusivity and to offer a full range of price points abandoned by domestic manufacturers.
Pregelj's Library of Congress study indicated, however, that retailers benefit a great deal financially through sale of imported apparel products since they take larger markups on imports than on domestically produced items. Thus, retailers, not consumers, benefit from the sale of lower-cost imported items. While retailers have generally refused to reveal internal pricing data, some acknowledge imports do more than their share of defraying operating costs.

The purpose of this research was to determine if there was a relationship between retailers' views of apparel imports (and their effects on the U.S. apparel industry) and purchasing patterns of imports for their stores. The researcher sought to determine retailers' perceptions of the balance of trade in apparel and whether they believed imports are damaging to the domestic industry. It also sought retailers' views on quality of imported versus domestic apparel, advantages and disadvantages of carrying each type, and whether they believed imports should be further restricted. The goal was to determine if these views appeared to influence purchasing patterns for their stores.

A proportional sample of major types of retail stores carrying apparel was selected randomly from telephone directories in 21 areas of the eastern United States. Areas were selected to include cities, small towns, and rural areas; a combination of areas heavy in textile/apparel manufacturing and those that were not; and geographic representation.

Managers and merchandise managers (N=191) were surveyed by means of a structured telephone interview. Descriptive statistics and chi-square tests were used to analyze data and to test for relationships among variables. Some noteworthy findings were as follows: 47% viewed imports as inferior to U.S. apparel; 49% experienced problems in carrying imports. A majority perceived the United States had an apparel trade deficit and expressed concern for U.S. industry; 47% believed our government should pass stronger laws to limit imports.

When retailers' purchasing patterns were questioned, however, only 35% said their concerns influenced whether they bought imports or not. In a majority of the chi-tests for a relationship between purchasing practices and concerns, there was not a significant relationship. Overall results indicated that while retailers viewed imported apparel products as less desirable and expressed sentiment for the U.S. industry, these concerns did not influence purchases to the extent they said they were concerned about the domestic industry. One may speculate, on the basis of Pregelj's study, that retailers' concern was diminished by higher potential markup on imports.

The study has implications for educators who are teaching consumers and who are preparing graduates for the retailing field. It is important that both these groups be able to evaluate economic, qualitative, and fashion issues when purchasing in an international market—either as a consumer or as a retail buyer.
A Comparison of the Ability of Family Life Cycle and Family Composition Models to Predict Family Clothing Expenditures

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Family life cycle variables have been used as independent variables in studying a wide range of family financial characteristics and expenditure patterns. While income and assets, as well as expenditures for food, housing, and durable goods have been studied extensively, there have been few studies relating stage in the family life cycle to family clothing expenditures. Those few studies are based on outdated information.

Existing studies using family life cycle variables have been criticized for two reasons. First, alternative definitions of the family life cycle concept have not been tested. Second, most of these studies have failed to control for effects of socioeconomic and demographic variables, especially income. It is likely that much of the observed effect of family life cycle on expenditures for goods and services, including clothing, reflects changes in family income as the household head ages.

A number of conceptual and empirical limitations to the usefulness of family life cycle variables have been cited in the literature. Among these limitations is the fact family life cycle variables obscure both the size and the age and sex composition of the family, variables that have been found to be important in determining family clothing expenditures. A set of family composition variables may then be more effective than family life cycle variables in predicting family clothing expenditures.

This research was based on a sample of clothing expenditure data, collected from 10,034 families, as part of the 1972-73 Bureau of Labor Statistics' Consumer Expenditure Survey. Multiple regression techniques were used to meet the following objectives:

1. To compare effectiveness of a traditional family life cycle model to that of a revised family life cycle model in predicting total family clothing expenditures.
2. To propose a family composition model as an alternative to either the traditional or the revised family life cycle models in predicting family clothing expenditures.
3. To determine the size of effects of traditional family life cycle, revised family life cycle, and family composition variables in models controlling for socioeconomic and demographic variables, including total consumption expenditure, a proxy for income.

All models were significant at the 0.01 level. The $R^2$ value for both the traditional and revised family life cycle models was 0.24, indicating those models explained a moderate amount of the variance in family clothing expenditures. The $R^2$ value for the family composition model was 0.25, showing that model to be slightly more successful than either the traditional or the revised family life cycle models in predicting family clothing expenditures.
The three controlled models were highly successful in explaining variance in family clothing expenditures. The $R^2$ value for each of these models was 0.54. F-tests showed that the sets of traditional family life cycle, revised family life cycle, and family composition variables in the controlled models were significant. However, a series of squared part correlations demonstrated that each of these sets of variables explained only 1% of the variance in family clothing expenditures.

Three major conclusions were reached. First, neither the revised family life cycle nor the family composition model offered much improvement in predictive ability beyond that of the traditional family life cycle model. Second, the predictive ability of family life cycle and family composition models can be improved by controlling for socioeconomic and demographic variables. Finally, family life cycle and family composition variables contribute little to the explained variance in family clothing expenditures when socioeconomic and demographic variables are controlled.

Male and Female Style Preference and Perceived Fashion Risk

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Consumers perceive risk in buying situations because consequences of their decisions are unknown. Six types of perceived risk have been identified: economic, physical, social, psychological, and performance risks, and time loss. Fashion change involves risk because a consumer cannot predict how long a style will remain in fashion; perceived fashion risk is the additional uncertainty involved when choosing a fashion good. Fashion risk seems to be a part of economic, social, psychological, and performance risks, rather than a separate type of risk.

Previous research has examined male and female style preferences and risks they perceive in styles for themselves. This research examined preferences of males and females and the risks they perceived when judging clothing for themselves and for the other sex.

Because an evaluative factor (e.g. favorable-unfavorable) is a dominant factor in decision-making situations, a preliminary trial was conducted to select stimuli for the final instrument. Sixty college men and women judged 79 styles using the word pair well-dressed/poorly-dressed. Twelve garments (six men's suits, six women's dresses) were chosen because females and males evaluated them similarly.

Final data were collected from 30 husband-wife couples ages 20 through 40 years. The instrument included drawings of the 12 stimuli, polar adjectives to describe the risks perceived, and a full forced-choice paired comparison to measure fashion preferences. Responses were given on a 99-point certainty scale, then transformed to normal deviates. Analysis of variance was used to examine main effects for couple, sex, and garment and interactions couple by sex, sex by garment, and couple by garment.

Males and females agreed on preference rankings of styles for themselves and for the other sex, classified styles into the same stages of the fashion cycle, chose identical words to describe most-preferred and least-preferred styles, and perceived performance and overall risks.
similarly. Both sexes associated preference with aesthetic appeal and performance risk for suits and dresses and with overall risk for dresses.

Males and females evaluated aesthetic appeal and monetary risk of garments differently. Each sex judged aesthetic appeal of styles for the other sex more favorably than those for themselves; perhaps people are less sensitive to the social-psychological risk involved in clothing for the other sex. Males described five of the six suits as less costly than females did. Disagreement on costliness of dress styles showed no pattern.

Clothing Wear and Care Practices of Field Consultants Exposed to Insecticides

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Recent concern regarding exposure of farmers and other field workers to insecticides has stimulated research on protective clothing and on methods of laundering contaminated clothing of these individuals. Much of the work done to date has involved fabric and fiber types assumed to be commonly worn by persons working in insecticide-treated fields. Little information is available to support these assumptions or to provide a basis for selection of test fabrics, test garments, or laundering procedures for research designs.

A questionnaire survey of licensed professional consultants in Louisiana was conducted in spring 1982. The objectives of the study were to: (1) develop a profile of field consultants and work habits relating to insecticide exposure; (2) develop a profile of garment and fabric types worn by field consultants into insecticide-treated fields; and (3) determine care and cleaning practices used by field consultants for insecticide-contaminated work clothing. Data collected in Part I of the questionnaire included demographic information, type and extent of exposure in insecticide-treated fields, habits and attitudes related to protective wear, and types and combinations of garments worn in the field. Part II of the questionnaire gathered information regarding methods of cleaning work garments, time elapsed between contamination and cleaning, and types of products used in laundering. Descriptive statistics were used to analyze data.

Results of the study indicated consultants spent a high percentage of the work week in insecticide-treated fields and might be exposed to several different insecticides during that time. Over 50% of the respondents were unaware of the availability of specially designed disposable protective garments and 85% indicated they never wore any type of protective wear. Definite patterns were evidenced for types of garments worn on the upper and lower torso. Short-sleeved shirts were worn more frequently than sleeveless or long-sleeved shirts. Woven shirts were worn more frequently than knit shirts. Two shirt layers were seldom worn. Full-length denim or khaki work pants were worn to the exclusion of other types of garments for the lower torso. Some respondents wrote comments indicating that high cotton content was a desirable characteristic.
Cleaning practices reported by respondents indicated home laundering was the most common method employed (97%). Contaminated garments were washed with other family laundry by 26% of the respondents, and contaminated garments were usually washed within two days after exposure. Eighty-seven percent of respondents used granular or powdered detergent. Laundry products other than detergent used in laundering contaminated work garments included bleach (46%), fabric softener (49%), and spot removers (15%).

Survey results indicated education of consultants and other field workers is needed regarding work habits and cleaning practices that could reduce hazards associated with insecticide exposure. The profile of garment types developed should be used by researchers in selection of fabrics and garment designs for future study. Attitudes regarding protective clothing and preferred garment styles should be considered before extensive work is done to develop protective wear for these individuals. Research on home laundering of contaminated fabrics should be broadened to include other types of laundry products used by consumers.

**User Evaluation of Functionally Designed Protective Clothing for Agricultural Workers**

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New products must meet perceived as well as actual needs of the consumer (Rothschild, 1978). Traditionally, satisfaction has been measured through postpurchase evaluations (Czepiel and Rosenberg, 1977) without giving attention to expected satisfaction before purchase and use. The confirmation of expectations paradigm is characterized by a buyer decision process involving a sequence consisting of such variables as: expectations → postpurchase evaluation → confirmation of expectations → satisfaction → intention to repurchase (Prakash, 1981).

The major purpose of this study was to evaluate user preferences for prototype spray garments for agricultural workers exposed to pesticides. Two garment styles designed from specifications from previous research were constructed of Gore TexR, Storm ShedR, and TyvekR. The traditional wear test was used with modifications for measuring overall consumer satisfaction in an incomplete random block to eliminate any effects of individual evaluators. Twenty-two fruit farmers in Michigan participated in the study during their spray season.

User satisfaction was measured through confirmation of expectations concerning specific garment characteristics rated important by participants. Reasons behind the user's garment evaluation were explored through the participant's attitudes, perception of health risk, uncontrolled variables, demographic variables, and the likelihood of future wear.

Results of the analysis of variance model for participant, style, fabric, and style/fabric interaction for overall satisfaction were not significant for participant, fabric, or style/fabric interaction. There was a significance at the .05 level for style. The chi-square test showed a significant difference in user preference for the jumpsuit over
the labcoat. The post-wear-test evaluation (postpurchase evaluation) indicated no preference between fabrics or individual garments but the user satisfaction process (confirmation of expectations) revealed Tyvek garments confirmed a high level of satisfaction.

No statistically significant change in participants' attitudes and practices toward pesticide use was found. The majority of subjects perceived a high level of health risk related to pesticide exposure and use; but analysis of variance did not show any significance between perception of health risk and garment evaluations. As number of wearings a garment was to receive in high afternoon temperatures increased, the amount the subject was willing to pay increased. Garment evaluations were not significantly affected by demographic variables of age, education, and size of farm. Overall, participants expressed the intention to continue to wear a majority of the garments evaluated. Tyvek emerged as the preferred choice in the area of cost. Finally, launderability of contaminated fabrics may have an effect on fabrics recommended for final design of this protective garment.

References:


The Origin and Development of the Victorian "Crazy" Quilt in America

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E. McClung Fleming states we have not made "progress in differentiating the information level from the conceptual level in research with collections," and that more attention needs to be paid to the conceptual levels of cultural analysis and interpretation (Winterthur Portfolio #9, 1974). Fleming's proposed model for artifact study was used in the historical textile study of American crazy quilts reported here.

With interest in American quilting history at a peak, relatively little attention has been focused on the crazy quilt that was popular to the point of "mania" in the 1880s—a time when they were reportedly selling for as much as $75-150 at fairs. Sally Garoutte (Quilter's Journal, Fall 1978) states English curators believe the technique originated in America. Her own research suggested the crazy quilt was a well recognized type by 1882, but "before that year, the documented record is still blank."
Data concerning crazy quilts were gathered from American ladies' periodicals, needlework manuals, advertising, literature, photographs, and extant quilt specimens and accessories recorded or preserved in publications, museums, historical agencies, or the stock of dealers. These data were analyzed using Fleming's proposed model for artifact study.

Results of this investigation indicate crazy work originated at the grass roots level in America in the late 1870s. Peterson's (Nov. 1879) reported a "new work, which consists of scraps of all kinds being appliqued on to serge, and ornamented with colored silk in imitation of Eastern work." American periodicals first observed the craze for this work and speculated about its origins in their editorial sections, rather than claiming credit for its invention or introducing it in their European-oriented work table sections. Such treatment of the crazy quilt by the periodicals supports the idea the work originated in America. Once crazywork was established, these periodicals and companies producing fabrics, thread, and patterns capitalized on the trend and provided directions and materials.

The term "crazy work" was not well established in the literature until 1883, winning out over other labels such as kaleidoscopic, mosaic, and Japanese patchwork.

Twentieth-century publications on embroidery and crazy work have focused attention on the influence on English art needlework designs and techniques introduced at the Philadelphia Centennial Exposition of 1876. This study suggested that while these were important, they were less important than Japanese and Chinese exhibits at the same exhibition. Nineteenth-century documents focus heavily on Japanese influences.

It seems likely American women used irregular crazy work shapes as their way of achieving the asymmetrical order they admired in Japanese design. When these irregularly shaped pieces were decorated with the forms of fancy work featured in ladies' periodicals, women were able to combine an exotic and oriental effect with the latest techniques from Europe into one pièce-de-résistance, to be shown off to all friends and family.

By 1887, Godey's editors had tired of this fad and labeled crazy work a waste of time and energy "too awful for words." But design and material analysis of extant quilts prove American women continued to fabricate this type of quilt in significant numbers in silk, wool, and even cotton fabrics well into the twentieth century.

This study has proven useful in establishing guidelines for dating crazy quilts and related decorative accessories. It has helped establish cultural significance of the crazy quilt as a visual textile artifact communicating aesthetic and social influences on family needlework in the late nineteenth century.

Consumer Satisfaction: Attitudes Among Retirees

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The purpose of the study was to assess attitudes of Michigan retirees at three stages of retirement (early, age 60-64; middle, age
65-69; and later, age 70 and above) toward selected marketplace practices, consumer dissatisfaction, and complaint resolution.

The research was cross-sectional in design and used mail survey methodology. Attitudes were measured by Likert-type statements and closed and free-response questions. The study was restricted to retirees who had been retired for at least one year and were 60 years of age and older.

The survey was sent to 866 retirees from six Michigan cities and towns during March and April 1982. One hundred ninety-six usable questionnaires were analyzed in the study.

While the hypotheses were not found to be statistically significant, descriptive analysis indicated some differences in attitudes among groups. The younger retirees reported a greater tendency toward price consciousness, comparison shopping, and the use of newspaper advertising for product information. Retirees in the middle stage of retirement most frequently ranked new products and brands as inferior in quality to older established products. Retirees in the later stage of retirement reported the greatest frequency in paying cash for consumer purchases, preparing shopping lists, experiencing health and transportation problems hampering shopping activities, and needing shopping assistance by sales personnel.

All three age groups reported more product problems than service problems. Specifically, product problems related to food and clothing and service problems concerning general repair were the most frequently reported. The most frequently cited reason for dissatisfaction was the quality of the product or service.

Blame for consumer problems was most often attributed to the retailer, followed by the manufacturer. The complaint action taken most frequently by all age groups was to complain to the retailer. The majority of retirees who reported a complaint concerning a consumer problem were not satisfied with the resolution of the complaint.

Completeness of Methyl Parathion Residue Removal After Multiple Launderings of Contaminated Fabric

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One laundry cycle does not totally remove pesticide residue from contaminated fabrics and remaining residue may be biologically active. This study was undertaken to determine how many washings are needed to thoroughly remove residue from contaminated fabrics, and to determine when laundered contaminated fabrics are no longer biologically active.

Denim swatches and unlaundered controls were contaminated with 1.25% field strength active ingredient (a.i.) or undiluted 54% a.i. methyl parathion emulsifiable concentrate (MeP). Contaminated swatches were individually laundered one through ten complete laundry cycles in an Atlas Launder-Ometer. A 49°C (warm) wash and rinse water temperature was used as this combination is most frequently selected by consumers. After laundering, fabric swatches were solvent extracted and gas chromatographically analyzed. ANOVA was used to test differences in residue removed in laundry. Biological activity of the laundered contaminated denim fabrics was measured via bioassays with Blattella germanica (L); (German cockroaches) biotype: Orlando normal.
Distinct differences were noted between the two concentration levels, with the 1.25% concentration more completely removed during laundering. Significant differences (p < .05) were found between subsequent wash cycles up to, and including, the third laundry cycle. After the third cycle, amount of MeP removed was consistently in excess of 99%, but the undiluted 54% concentration was almost impossible to remove due to retention of MeP in the fabric. Even after 10 cycles, only 66.7% of the full-strength MeP residue had been removed, and the detected residue on the fabrics was 2,435 ± 406.8 g/cm². MeP residue in this range on laundered fabric have been identified as the causitive factor in the death of an adult man.

Bioassays performed on the 54% a.i. contaminated unlaundered controls and fabric laundered through 10 laundry cycles showed 100% mortality to German cockroaches within 24 hours. The 1.25% MeP contaminated laundered fabrics, however, were found to be biologically inactive after the third washing. From these results, discarding clothing contaminated with highly concentrated pesticides would be a well-advised recommendation; for clothing contaminated with lesser concentrations, a minimum of three launderings may be appropriate.

Effects of Methyl Parathion Concentration on Residue Removal through Laundering Contaminated Denim

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Some pesticide residue is readily absorbed into the body through the skin, yet different parts of the body absorb various pesticides at unequal rates. Easley, Laughlin, Gold, and Schmidt at the University of Nebraska reported residue removal was dependent on detergent type and water temperature, yet with the most successful combination of heavy-duty liquid detergent and 60°C water temperature, sizeable quantities of biologically active residue remained in laundered denim. Pesticide studies to date have used field strength dilutions of concentrated pesticides.

Pesticide-applicator clothing is most likely to become contaminated by full-strength concentrates and dilute pesticide solutions during mixing, handling, and application of chemicals. The effect pesticide concentrations have on ease of removing such residue from clothing by laundering has received limited study.

The purpose of this study was to determine the completeness of removal of diluted and concentrated pesticides with one laundering of contaminated denim fabric. Five concentrations of methyl parathion (MeP) emulsifiable concentrate (EC) were prepared as contaminants: 0.25%, 0.5%, 1%, and 2% and 54% (undiluted). Contaminated fabric swatches were laundered through one cycle that included a 60°C (hot) wash and two 49°C (warm) rinses. Swatches were individually laundered in stainless steel canisters—an Atlas Launder-Ometer—using a 0.13% heavy duty liquid detergent solution. Following laundry, swatches were solvent extracted and analyzed using gas chromatography. Statistical differences between amounts of MeP (ug/cm²) and the unlaundered control and laundered swatches were tested with ANOVA.
A linear relationship was found between the initial MeP concentrations and the amounts of residue remaining following laundry. The doubling of concentrations (i.e., 0.25% to 0.5%, 0.5% to 1%, and 1% to 2%) caused decreasing rates of removal.

These findings emphasize the difficulty in removing MeP residue from fabric as the concentration level increases. While lower-level concentrations were more readily removed (75%-96%), the full strength of undiluted concentration was particularly difficult to remove. The fact that less than 20% of the concentrated pesticide was removed by one laundry cycle indicates that pesticide applicators need to use extreme caution when working with full-strength chemicals.

Removal of Pesticide Residue as Affected by Laundering Variables

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Pesticide residue is picked up by farm clothing worn during pesticide applications. When the clothing comes in contact with skin, the residue can be absorbed into the body, causing skin irritation as well as other more serious symptoms. Appropriate care methods for contaminated farm clothing need to be identified to reduce the risk of pesticide exposure. Few published research findings are available on the removal of pesticides commonly used with corn and soybeans. Objectives of this research were to determine whether wash-water temperature, use of detergent, and immediacy of washing after contamination affect removal of fonofos (insecticide) and alachlor (herbicide) from 100% cotton 6- and 14-oz. denims.

Wash-water temperature at three levels (60°C, 49°C, 40°C), use of detergent at two levels (with detergent, without detergent) and immediacy of laundering at two levels (immediate wash, 24-hour delayed wash) were the three independent variables in a 3 x 2 x 2 block design. The dependent variable was the residue amount remaining in the washed specimens.

Test specimens (8 x 8 cm swatch) were contaminated by injecting a known amount (0.5 ml) of pesticide using a precision pipette. A modified AATCC Test Method 61-1975 was used to launder the contaminated specimens using an Atlas Launder-Ometer. For detergent wash, a commercial, phosphate-built detergent was used. Washed specimens were air dried on a rack inside a hood for 24 hours. Pesticide residue was extracted from the washed specimens using benzene as solvent. A one micro-liter extract solution containing residue was analyzed using a gas chromatograph. Analysis of variance was performed with the data of residue amounts.

The amount of residue removed differed significantly (p < .01) by chemical type and fabric weight: fonofos-contaminated fabrics retained more residue, and within the chemical type, heavier-weight fabrics retained more residue than lighter-weight fabrics. The difference in residue amounts between chemicals suggests that each pesticide should be examined separately to determine efficient laundering methods. Although lighter-weight fabrics showed lower residue retention, it is premature to recommend them for pesticide-protective clothing because
there are other potential problems than the care methods, such as the transfer of pesticide to the skin.

Wash-water temperature did not establish a distinctive pattern in efficacy of residue removal: hot wash was more effective in removing residues from heavier-weight fabrics, whereas for lighter-weight fabrics either warm wash was more effective than for heavier weights or wash-water temperature was not a significant factor.

The without-detergent wash (rinse wash) removed the larger portion of pesticide residue from all four pesticide/fabric combinations. However, use of detergent significantly increased further residue removal in these fabrics. Therefore, use of detergent is recommended in washing fonofos or alachlor-contaminated clothing of 100% cotton denims.

Immediate washing is recommended because this procedure resulted in significantly greater residue removal than when washing was delayed for 24 hours. Findings in this study indicate a need for further research to identify laundering methods that will result in more complete removal of fonofos and alachlor, and to determine biological activity of any remaining residue.

**Effect of Storage and Weathering on Fabrics Contaminated with Pesticides**

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Significant levels of pesticide residue in workers' clothing have been reported (DeJonge, unpublished; Finley, 1969). Washing has been proposed for removal of pesticide residue and recently there have been a limited number of studies directed at pesticide removal. Finley (1974) showed a significant amount of pesticide residue remained in fabrics even after three washings. Easley, et al, (1981) found no differences between fabrics during an evaluation of removal of methyl parathion from two types of denim. However, a significant difference was found between laundry treatments and pesticide formulations. In the available literature, research has not been directed toward investigating the effect of exposure to weather on removal of pesticide residue nor the effect of storing fabrics contaminated with pesticides prior to laundering.

The objective of this research was to contribute to the development of functionally designed protective clothing by investigating launderability of fabrics contaminated with pesticides and to determine if storage and weathering variables affect pesticide removal. Fabric selection enables comparison of two fabrics commonly worn by the pesticide applicator, 100% cotton denim and chambray, and alternate fabrics, Gore Tex® and Tyvek®, that have been shown to provide greater protection against pesticide penetration. The pesticide Captan was used to contaminate the fabrics. A spray system designed to simulate a field spraying application was used to expose fabric samples to a uniformly dispersed pesticide spray. Contaminated fabrics were analyzed to establish the initial level of pesticide contamination. This level was then used as a baseline when evaluating effects of storage and weathering treatments. Solvent extraction and gas chromatographic analysis of extracts were used in analysis of pre and post treatment residue.
The effect of storage on initial level of pesticide residue showed a decrease of contamination while weathering resulted in virtually no change. Overall, the effect of storing Captan contaminated fabrics showed an increase in amount of pesticide residue removed by laundering and exposure to weathering showed a significant decrease in amount of pesticide residue removed. Differences in removing pesticide residue by laundering were dependent on fabric type, as Captan residue were significantly more difficult to remove from denim than from the chambray, Tyvek®, or Gore Tex®.

References:


Analysis of Specified Clothing Attributes for Men and Selected Demographic Variables

Lucille M. Terry, Bowling Green State University, Ohio

Clothing for adult males represents an important segment of the apparel market, however, little research has been done to analyze purchases of male clothing. Most research has been restricted to female clothing. Consequently, the purpose of this study was to analyze how the demographic variables of age and section of the country affected purchases of specified clothing attributes for men's slacks and shirts. Clothing attributes included color, fiber, and form of fabric (knit versus woven).

Data were obtained from a continuous consumer panel conducted by the Market Research Corporation of America. The panel consists of 7,500 households scientifically selected and stratified according to various demographic variables to correspond as closely as possible, uniformly proportional to the latest report of the Bureau of Census. Each household submits, monthly, an extensive diary of all purchases, with clothing purchases comprising one category.

The sample included 13,399 purchases of slacks and shirts for males 19 years and older during the year 1979 as reported by the consumer panel. For comparison of the demographic variables, age was divided into four
categories (19-30, 31-45, 46-65, and over 65 years of age) and section of the country into five categories (northeast, south, north central, mountain/southwest, and Pacific).

A multivariate analysis that Goodman (1970) developed for analyzing interactions between qualitative variables was used: (1) to determine if there were significant interactions between each of the demographic variables and each of the clothing attributes for both slacks and shirts; and (2) to determine which combination of levels of demographic variables and clothing attributes were responsible for rejecting the null hypothesis of no significant interaction effect.

Results revealed section of the country was significantly associated with all of the clothing attributes (color, fiber, and form of fabric) for both shirts and slacks, whereas age was significantly associated with color, fiber, and form for slacks and with color and fiber for shirts.

Analysis of factors responsible for these differences revealed the following major significant results for each clothing attribute.

**Form of Fabric.** Fewer woven shirts and slacks were purchased in the Northeast than elsewhere. Fewer woven slacks were purchased in the 19-30 age group, while more knit slacks were purchased in the 31-45 age group.

**Color.** More green shirts were purchased in the South, while more green slacks were purchased in the Northeast. Also more print slacks were purchased in the North Central, while fewer print shirts were purchased in the South. The 19-30 age group purchased more patterned shirts (i.e., print, stripe, and/or plaid) and solid color slacks while those over 45 did the opposite, purchasing more patterned slacks and solid color shirts.

**Fiber.** Northeasterners purchased fewer 100% polyester shirts and slacks and more 100% cotton shirts and cotton/polyester blend slacks than those in other sections. More cotton shirts and slacks were purchased by the 19-30 and fewer by those over 45 years of age.

Two general conclusions can be drawn from the results. First, the 19-30 age group is almost the exact opposite of those in both the 46-65 and over 65 age groups in the choices of clothing attributes. Second, those in the Northeast appear significantly different on more attributes whereas those in the Mountain/Southwest are least different.

Reference:


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**A Comparison of Managers' and Consumers' Perceived Image of Discount Stores: A Multi-Attribute Attitude Model**

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Michigan State University

The purpose of this study was to investigate perceived image of three discount department stores and success with which retailers offer
store attributes desired by the consumer. Research objectives for this study included: (1) to identify salient evaluative criteria for discount stores, (2) to measure consumers' and managers' professed overall impression of each of the stores in the study, (3) to identify consumers' and managers' perceptions of the ideal amount of each store attribute, and (4) to compare consumers' and managers' perceived images of each store and the success to which the retailers offer the store attributes desired by the consumer.

The sample consisted of consumers and managers of three discount stores. Managers were included because an analysis of managements' professed image of the store as compared with consumers' professed image of the store will assist retailers in determining whether or not desired store image is being effectively portrayed. The total sample consisted of 186 consumers, 9 managers from store one and 28 managers from store two.

The Beckwith and Lehmann Multiple Attribute Model was used as a tool for analyzing professed store image of three discount stores and an hypothetical "ideal" discount store. The method for operationalizing this model is--

\[ \hat{A}_j = \sum_{i=1}^{n} W_i \left| B_{ji} - I_i \right| \]

Where: \( \hat{A}_j \) = estimated overall attitude toward store \( j \)
\( W_i \) = weight of the \( i \)th store attribute
\( B_{ji} \) = the perception of the \( j \)th store on the \( i \)th attribute
\( I_i \) = the ideal point on the \( i \)th attribute

For each store attribute, the consumer has an ideal point—a certain amount of an attribute is perfect; any more than the ideal point is saturation; any less than the ideal point is a deficit. Based upon the level of importance of each attribute, respondents were asked to allocate a total of 100 points between six store attributes for their hypothetical ideal store. The six attributes for each discount store were then evaluated by comparing ideal amount of each attribute with that perceived to be offered by store one, store two, and store three.

The ideal level of three store attributes was significantly different between consumers and managers. Managers from store one and store two had a lower ideal level of quality of merchandise than did consumers. Furthermore, the total sample of managers had a significantly higher ideal level of employee sales service and store atmosphere than consumers.

Store One: Consumers and managers from both store one and store two had significantly different professed beliefs of three attributes for store one. Managers from store two rated the store atmosphere, value for price, merchandise selection, and quality of merchandise at store one consistently lower than that of consumers and store one managers. Locational convenience was the only attribute that store two managers rated significantly higher than consumers or store one managers.

Store Two: Consumers and store one managers had a significantly lower professed belief of locational convenience and employee sales service of store two than did managers from store two concerning their respective store.

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Store Three: Managers from store one evaluated the six attributes for store three significantly higher than did consumers and store two managers.

The difference between ideal weight of an attribute and amount offered by each store assisted in comparing degree to which a store successfully portrays an image. An analysis of the data revealed significant differences between consumers' and retailers' professed beliefs concerning ideal amount of an attribute to be offered by a discount store. Projected image of each store also was viewed significantly different between managers and consumers.

Clothing for Warmth: A Victorian Perspective
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This research investigated design of women's clothing for warmth in the Victorian period (1880-1900) in the United States. The objectives were to (1) catalog and analyze primary source material of both dress reformers and fashionable Victorian women and (2) compare and contrast clothing for warmth and clothing for fashion in this particular period. Warmth in clothing is of current concern. Rising cost of home heating and the shortage of fuel have created need for investigation of previous periods in history as a means of accumulating ideas to cope with this problem.

The traditional method of historic research was used in this investigation. Source material contemporary to the period of study was examined to reconstruct (a) the Victorian perspective of fashion and (b) dress reformers' design of clothing for warmth. Documentary evidence of clothing design was extrapolated from primary sources of the period including periodicals, newspapers, advertisements, and books. Illustrations of fashionable Victorian dress were found in the following popular magazines: Ladies Home Journal, Godey's Magazine, Peterson's Magazine, Town and Country, Pictorial Review, and Harper's Bazaar. Literary information on the dress reform movement was taken from scholarly nineteenth-century articles published in The Arena, Review of Reviews, Chamber's Journal, Outlook, Popular Science Monthly, and Living Age.

Examination of these historical documents provided descriptions of Victorian fashion and of reformers' designs. Victorian fashions distorted the natural shape of the body, thus preventing warmth and comfort. In the 1880s, such devices as bustles, hoops, and corsets not only changed women's proportions but added tremendous weight. By the 1890s, the enormous skirt with its bustle disappeared only to be replaced by the so-called "hour-glass" figure. The design focused on the importance of the large leg-of-mutton sleeve emphasized by an elongated waistline "laced to the point of distress."

Fashionable dress was a Parisian design of sumptuous fabric of silk, brocade, satin, or velvet, which weighed from 10 to 40 pounds; however, the design did not provide needed warmth. Alluring underwear of silky batiste was feminine with its dainty lace and pastel-colored ribbon. Lacking warmth, rustling petticoats of taffeta were made to be seen and heard—a sound that indicated family wealth.
In contrast, the dress reformers, relying on scholarly research, advocated clothing with true body contour and layered lightweight fabric that trapped air for warmth. Dress design of the reformers included a loose lightweight woolen skirt sufficiently short to avoid dampness that would cause chills and illness. Certain reform styles were designed for the Victorian housewife, including (1) the Syrian dress—a divided skirt gathered around each leg and allowed to blouse over the ankle, (2) the gymnasium suit, which had a full skirt made of soft wool divided to give freedom and a loose bodice with a foundation waist underneath for support, and (3) the American costume, which was a short princess gown or shirtwaist with a removable jacket. The business woman's dress for winter was a woolen union undergarment that had a high neck, long sleeves, and legs reaching the ankles. The outer garment was a well-fitted, boned waist with equestrian trousers plus low heeled or flat shoes.

In spite of the sensibleness of the dress reformers' recommendations, the Victorian woman refused to accept them. The arguments against Victorian fashion of the day were countless and none could be offered in favor; yet women continued to cling to fashion. The philosophy of Victorian women was "We might as well be out of the world as out of fashion." Additional proof of rejection of reformers' recommendations was found in numerous articles listed in O'Brien's Bibliography on the Relation of Clothing to Health.

As the present-day problem of energy conservation intensifies, clothing for warmth may become very important. Since current styles of loose multiple layers are more compatible with warmth principles, there is a greater likelihood that today's woman will incorporate them into her dress more readily than did the Victorian.

Energy Efficient Clothing: Effects of Method of Dissemination on Knowledge, Attitudes, and Behavior

Sally Francis and Sara Butler, Miami University, Ohio

Interior temperature adjustment is one energy- and money-saving technique frequently used in public buildings. Budget-conscious university officials have found high energy costs can be alleviated to some extent by altering classroom thermostat. The immediate clothing environment then becomes the logical point at which students can maintain body comfort. Unfortunately, researchers have found the general public does not use energy efficient clothing for comfort adaptations. Although several extension and commercial publications summarizing basic energy-efficient textile and clothing knowledge are available, no research has been conducted as to their effectiveness. The purpose of this study was to investigate effects of method of dissemination of energy-efficient clothing information on the knowledge, attitudes, and behavior of college students.

A posttest-only control group design was employed. The independent variable was mode of dissemination of energy-efficient clothing information. Two treatments, a booklet and a slide/tape program, and a control were used. The dependent variables were knowledge of energy-efficient clothing information, attitudes toward clothing use for energy conservation,
and clothing behavior change. A pretested, 20-item objective test measured knowledge. Attitudes were assessed using a 5-point Likert-type scale on which subjects responded to 20 attitude statements. Clothing behavior change was measured by means of a 5-point scale on which respondents indicated degree to which they had altered clothing practices. The sample was composed of 113 undergraduate students enrolled in three introductory home economics courses. Each class was randomly assigned to a treatment level (booklet or slide/tape program) or the control.

One-way analyses of variance were used to determine effect of mode of information dissemination on the knowledge, attitude, and behavior variables. Results indicated the group that viewed the slide/tape program and the group that received the booklet scored significantly higher on knowledge of energy-efficient clothing than did the control group. No significant differences were found among the three groups on any of the attitude variables. A significant difference among the three groups was found for one of the four clothing behavior change variables, "Wear slacks instead of a skirt." Students who received the booklet reported a greater change on this variable than did students in either of the other two groups.

It was concluded that a mass education program using either print or visual material could be successful in increasing student knowledge about energy-efficient clothing, but that materials other than those developed for this study would be required to affect attitudes and/or behavior.

**Pattern As a Design Aspect: Multidimensional Scaling Analyses Using Visual Perception of Its Properties**

Joyce M. Camacho and Joan Laughlin
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Art or artistic design is considered to be a structure that consists of many components; one of these is pattern. However, pattern has not been recognized by many authorities. Faulkner and Faulkner labeled it as "ornament," (Ocvirk, et al) and Bevlin referred to it as "a part of texture." How is pattern visually perceived? What are its properties? In an effort to improve evaluation and enhance appreciation of pattern as a design aspect, this study was conceived.

The purpose of this research was to determine dimensions or properties of nonnaturalistic all-over pattern and to organize these properties into a framework from which a definition of pattern could evolve. Since the structure was based on visual perception data, a further purpose was to develop an instrument using Multidimensional Scaling analyses for establishing the properties of pattern. Torgerson, Attneave, and Shepard developed methodology of scaling programs for analyses of percepts.

Seventy-four female undergraduate students, ages 18-35, were subjects for the visual perception evaluations. In addition, 10 female graduate students, ages 22-45, participated in the pretest. Subjects completed a response form in which they rated similarity and dissimilarity of pairs of pattern samples on a scale of one to ten. Pattern samples were
nonnaturalistic all-over patterns that appeared on surfaces of pliant wall coverings. Of the 36 total stimulus-objects, 12 were straight geometric patterns, 12 were straight and curved patterns, and 12 were a combination of geometric and abstract patterns. Seven patterns were duplicated within the three groups. Every stimulus-object was paired with every other stimulus-object in each group; thus, each participant evaluated 66 paired comparisons of patterns.

The Multidimensional Scaling program analyzed matrices of data to arrive at configurations in two-dimensional space. Orthogonal axes revealed both qualitative and quantitative dimensions or properties of pattern. Qualitative properties included line direction, type of formation, type of line, type of balance, type of repeat, and type of formation outline. Quantitative components of pattern were quantity of directions, quantity of contrasts, quantity of formations, size of formations, and quantity of formation variations.

Comparisons of configurations for three age ranges were made. The researcher concluded an evolution of design perception based on maturation was occurring. Younger subjects evaluated line direction as an important property, while older subjects perceived the continuum of simple components to complex components as dominant.

Once the entire listing of both qualitative and quantitative dimensions had been analyzed, a definition of pattern was formulated: Pattern is the repetition of quantitative and qualitative elements in an artistic arrangement. This repetition occurs at regular or measurable intervals or at irregular or random intervals. The artistry of arrangement is either creative or imitative, or a combination of these two.

A framework of pattern was structured to include major categories and verifiable properties. Major categories related to source or subject matter were--naturalistic, combination of naturalistic and nonnaturalistic, and nonnaturalistic. Each was divided into linear, radiating, and all-over pattern. Listed as part of nonnaturalistic all-over patterns were qualitative and quantitative dimensions perceived by subjects.

Implications of this research include establishment of both a definition and a framework for pattern as a design aspect. Further research can be founded based on these basic items of knowledge. Visual percepts of pattern based on differences in human sexuality and in cultural differences and similarities of approaches to pattern could lead to a better understanding of others.

An Empirical Investigation of Aesthetic Rules As Applied to Women's Evening Dress

Elizabeth D. Lowe, University of Illinois

Aesthetic rules of proportion derived from the Greek golden mean abound in college textbooks (for example, Horn, 1981; Kefgen and Touchie-Specht, 1981; and McJimsey, 1973) used in beginning clothing courses. With overwhelming consistency these texts state good proportion may be achieved by avoiding too much sameness and too much difference between the parts of the design. Thus, for good proportion to occur, the length to width ratio of various parts of the design should approach the golden
mean, e.g. skirts should be longer than they are wide. Yet one need not
look far to observe designer outfits that seem to break these rules of
proportion. This investigation examined these rules empirically. Thus,
the questions addressed in this study were--how closely does women's
fashion follow these rules and what are implications for teaching rules
of proportion to our students?

Data include metrical measurements of six dimensions (skirt length,
waist length, decolletage length, skirt width, waist width, decolletage
width) of women's evening dress taken from pictures from four high-fashion
magazines (Vogue, Harper's Bazaar, L'Officiel, L'Officiel-U.S.A.) between
1926-1980. An average of 22 different pictures was measured for each
year in a manner consistent with methodology used by Richardson and
Kroeber (1940, pp. 113-116).

All six dress dimensions were converted to ratios to the total
height of the figure to provide comparability of data. The total height
was measured from center of the mouth to tip of the toe bearing weight
or to center of the skirt if no feet were visible, thus eliminating
problems associated with changing hair styles.

To test aesthetic rules, all possible pairs of the six dress dimen-
sions were examined on scattergrams. The aesthetic rules were rephrased
in terms of mathematical relationships between relevant dimensions of
dress. For example, to avoid cutting the body in half, the ratio of
waist length to skirt length (or WL/SL) should not equal 1:2. According
to McJimsey's (1973, pp. 127-129) interpretation of the golden mean,
ideal spacing between WL/SL should be between 1:2 and 1:3. Examination
of the scattergram for WL and SL lends only partial support to these
rules. If a line is drawn from origin of this scattergram through points
representing a 1:2 ratio between WL and SL, only two out of 1,143 data
points lie below this line, that is, represent waistlines that are
placed more than one-half the distance from the mouth to the hem of the
skirt. On the other hand, a line representing a 1:3 ratio between WL
and SL does not bound the opposite side of the cluster of data points.
Instead, such a line lies in the middle of a dense cluster of points with
the majority of points actually representing waistlines that are less
than one-third the distance from the mouth to the hem of the skirt.
Clearly there is more aversion to cutting the figure in half lengthwise
than there is to dividing the body in a very unequal manner.

Comparing skirt width (SW) to skirt length (SL), it is apparent the
aversion to too much sameness is also followed closely for this pair of
dimensions. Skirts are only rarely just as wide as they are long. On
the other hand, the golden mean of 2:3 is far from the most common mani-
festation of the SW to SL relationship. What does seem to be the case is
that SW is allowed greater freedom to vary when skirts are long. Thus,
very long skirts may be either narrow (creating a very unequal ratio) or
wide (creating a more even ratio) while short skirts are only moderate in
width. Similar results were obtained for other pairs of dress dimensions.

While quantitative studies of dress dimensions obviously overlook
subtleties of design, they allow examination of testable hypotheses. In
several cases, sheer magnitude of the discrepancy between what is taught
as good proportion and empirical reality suggests certain aesthetic rules
may need to be rephrased.
Factors Affecting the Selection of Clothes on Daily Basis

Yoon-Hee Kwon, Northern Illinois University

The purpose of this study was to determine which factors influence an individual's selection of clothes on a daily basis. Although we know biological, social, psychological, and practical factors determine individuals' daily choice of attire, it is not known exactly why a person chooses one particular set of clothes over another on a given day. It also is not known the degree of emphasis individuals place, consciously or subconsciously, on these different factors, since clothes act as a buffer between the biological and psychological aspects of self and the wider physical and social environment.

The major objectives of the study were to (1) identify important functions of dress in their order of importance in influencing individuals' selection of daily clothes, (2) determine importance of these functions according to sex and personality variables, and (3) determine degree of interrelationships of these different functions of clothes.

Early theories explaining functions of clothes have dealt with modesty, protection, and aesthetic aspects of clothing (Flugel, Laver, Langner, Hiler). Maslow's need theory of motivation in relation to clothing behavior was advocated by Creekmore. Although theories about functions of clothes have existed for many years, little research has been conducted in this area, especially on people's daily practice of selecting clothing. This study sought to develop new perspectives to theories on functions of clothes, test the theories, and add to the existing literature on clothing behavior. Results of this investigation also might provide valuable information for consumer behavior and market research in clothing.

A questionnaire was developed to survey subjects in order to identify and rank functions of clothes influencing selection of clothes on a daily basis. Variables included consideration of biological function (weather condition and interior temperature), social function (social activities), psychological function (subjects' evaluation of mood and physical self), and practical limitation (availability of items). The questionnaire also gathered information related to demographic information and personality characteristics of subjects. Rotter's Scale measuring Internal vs External Control was used to determine subjects' personality dimensions.

For the exploratory level of this study, data were collected from 101 female and 78 male students at Northern Illinois University. Multiple regression, analysis of variance, and Spearman's Correlation were used in the statistical analysis.

Statistical analyses of data from both sexes indicated external conditions such as weather and social activities had stronger influence on individuals' choice of daily clothes than did psychological factors (mood and evaluation of physical self) or practical limitation (availability of items). This finding tends to support the hierarchal order of Maslow's needs theory. However, in every function, mean values of subjects' responses indicated females in general were affected by clothing functions more than males. Females tended to consider clothing functions more intensely than males in the selection of daily clothes. Multiple
Effects of Appropriate and Inappropriate Attire on Attributions of Personal Dispositions

Jane E. Workman and Franklin G. Miller, Purdue University

It has been suggested people make an effort to explain what they see when what they see is unexpected. As with other forms of unexpected behavior, questions arise when someone dresses in a manner that seems inappropriate for the situation. Observers may infer motivations, intentions, or personal characteristics based on a single encounter with another person. Correspondent inference theory predicts these inferences may be more extreme and made with more confidence when observed actions are low in expectancy than when observed actions are high in expectancy.

In an effort to ascertain whether clothing cues are used in the manner predicted by correspondent inference theory, subjects were exposed to one of two videotaped interviews. In a complete factorial design, the interview was described as one for a campus position as either (1) an orientation adviser or (2) a groundskeeper. The interviewee was dressed in either (1) a pair of overalls with a plaid shirt or (2) a skirted suit. After viewing the videotape, subjects rated the interviewee on various personality traits. It was predicted that rating of personality traits would be more extreme and given with more confidence when the interviewee was inappropriately dressed for the interview than when appropriately dressed.

Contrary to prediction, analysis of variance revealed no interaction between job and clothing on extremity of trait ratings. There were two "inappropriate" cells: groundskeeper--suit and orientation adviser--overalls. Neither received significantly more extreme ratings than the "appropriate" cells. There was an interaction between job and clothing on confidence ratings, but it was not in the direction predicted. The "inappropriate" cell, where interviewee was dressed in overalls for the orientation adviser job interview, yielded significantly less confident ratings, rather than more, as predicted.

Post hoc analyses of the manipulation check items suggested subjects appeared to seek and find a reason for the inappropriate attire in both of the "inappropriate" cells. In the case of the groundskeeper interviewee dressed in a suit, subjects judged her as having had less choice and perhaps as trying to impress the interviewer thereby increasing the chances of being hired (motivation was perceived as high). In the case of the orientation adviser interviewee dressed in overalls, subjects judged her as less interested in being hired for the job. But, apparently, ambiguity surrounding this lack of interest resulted in subjects being less confident in their evaluations of the interviewee. When there is lack of choice and lack of interest, little information about personal characteristics can be gained. Subjects in the present study apparently acted in accord with this explanation, as they gave modal responses and avoided extreme ratings.
RESOURCE EXHIBITS

Pattern Making: A Flat Pattern Lab Manual
Donna M. J. Albrecht, University of Wisconsin-Stout

A lab manual, numbering about 30 pages is used to assist students learning about pattern making in the beginning level flat pattern course offered at U.W.-Stout. All flat pattern students are required to purchase this lab manual.

The first section of the manual contains pattern manipulations not currently found in either of the two textbooks. Some manipulations include moving the back shoulder dart into a yoke seam, shortening a lowered neckline, developing hip pockets, making a shirt cap from a dressmaker's cap, etc. Assignments calling for these pattern changes are then in the students' possession, thereby making references outside of the texts unnecessary.

Another section includes a variety of information including standard markings that should be placed on patterns to be turned in for grading; grading policy for course; and other flat pattern book references. Standard outlines of misses', men's, and children's figure types are inserted for students sketching designs, as sketching is not a prerequisite for flat pattern.

The last section entails eight assignment worksheets. Each of the eight assignments have standardized, realistic drawings of garments that the students are expected to execute in pattern form. The assignments are numbered in order of difficulty. Each design/drawing is numbered, has pattern pieces to be executed indicated, has the appropriate page numbers listed from required references (both texts), and has blanks left so figure type (i.e., misses', men's, child, toddler, etc.) and scale (i.e., full or half) can be written in as indicated by the instructor. Each assignment represents a week (one hour of lecture and two hours of lab and one hour of discussion) of work by the student.

One merit of this lab manual is the inclusion of projects within the assignments. Projects are not exact duplications of what is found in the texts; thus students use texts only as a guide for achieving solutions, not the total solution. Also, students must develop an eye for detail, proportion, etc., in the projects as they are not exact duplications of materials in the texts. Other teachers of pattern making would probably find the worksheets useful in teaching their classes. Even if the textbooks are not the same, basic pattern making concepts are covered in the projects/worksheets.

Another merit of this lab manual includes examples of developing direction sheets for specific pattern manipulations. Others teaching pattern making, etc., may get ideas about how to present an idea and follow through by making similar direction sheets of their own. Inclusion of directions for producing typical designs suitable for physically handicapped individuals is an additional benefit.
How the Teenage Male Can Apply Line, Design, and Color to Clothing Choices

Joy Bostrom, University of North Dakota

Today the current body ideal for both men and women is a naturally curved, slender, physically fit form. Both men and women come in an infinite number of sizes and shapes; however, most current literature and visuals instruct the female audience in the use of line, design, and color.

Teenage boys also are concerned about physical appearance and how clothing can be used to achieve a more perfect visual physique. Warden and Colquett reported in "Clothing Selection by Adolescent Boys," Journal of Home Economics, Spring, 1982, "Clothing that could make a small boy look larger or a large boy smaller was more important to the older boys."

This slide/tape presentation (80 slides, cassette tape, and manual) illustrates the use of line, color, design, and proportion in creating visual impressions to aid the teenage male in making clothing decisions to enhance his assets and camouflage his problems. High school and college males with different body types serve as models for the slides. In addition, line drawings are used for special emphases.

Textile Trends and Production Issues Course

Sara Butler, Miami University-Ohio

This course is designed as an advanced-level textiles course for retailing or interior design students who can benefit from a knowledge of textile trends and production. An input/output model serves as an organizational foundation for the course. Inputs include factors of production, governmental regulations, and characteristics of the economic environment. Outputs, in addition to the product, include undesirable wastes and jobs. Textile firms are responsible for transforming inputs into outputs. This framework encourages students to consider some of the complicating factors (i.e., government regulations) that must be considered in production of a textile product.

The course begins with a review of trends in fibers, yarns, fabrics, coloring, and finishes and a description of the structure of the industry in each area. Trends in the three major textile markets are then discussed, followed by a detailed presentation of government regulations affecting textile production. Regulated areas discussed include water, air, and noise pollution, cotton dust, flammability, toxic chemicals, and labeling. Other influences on production presented are energy availability and costs and labor issues. Domestic economic influences, the effects of imports and marketing techniques also are discussed. The course concludes with a review of several textile firms in terms of products, labor policies, production philosophies, histories, and marketing strategies.

The major laboratory project is designed to allow for application of lecture material. The project has a two part thrust: product performance
and production analysis. Students are required to purchase two woven fabrics, select a particular end use, and perform laboratory tests to measure suitability of the fabrics for the selected end use. The second part of the project requires students to evaluate production difficulties of the fabrics. For example, cotton flannelette may perform exceptionally well in laboratory tests, but producers of the fabric must solve problems of noise and water pollution, cotton dust, and flammability before the fabric can be efficiently produced for use in children's sleepwear. In the final section of the project, students must make some predictions regarding the future of their fabrics in relation to selected end use. Their opinion must be based not only on performance as determined by laboratory testing, but also on production difficulties that may make cost-effective production unrealistic, such as with cotton flannelette.

Current textile journals and government publications are the primary resources used for readings and to update lectures. Students also are required to review the literature related to their fabrics as a part of the laboratory project. Textile and apparel trade association information also is used as resource material.

A complete description of procedures for conducting laboratory tests has been compiled to allow students to perform tests on their own with a minimum of instructor assistance. A list of all tests that can be conducted in the laboratory is provided for students to choose the most appropriate tests for the end use selected for their fabrics. Laboratory time is then "open," with students conducting tests according to their own schedule.

The course is useful to students interested in an advanced textiles class that does not focus on textile chemistry. The laboratory assignment allows for the experience of testing and encourages students to examine production advantages and disadvantages of a fabric. The course also covers a wide range of topics a smaller college or university cannot offer as individual courses.

Dressing for Energy Conservation: Slide/Tape Presentation

Sally Francis and Sara Butler, Miami University-Ohio

This resource consists of an automated slide/tape presentation focusing on dressing for energy conservation. The intended audience is college students who may find such information useful in dressing for cooler classroom and dormitory environments. Male and female student models wearing common college fashions illustrate basic concepts of dressing for energy efficiency. The presentation could be useful in clothing classes, extension presentations, and talks to more general college audiences.

The slide/tape begins with a discussion of the four channels of heat exchange between the body and the environment: radiation, convection, conduction, and evaporation. Thermal comfort properties of a clothing system are then presented. Fibers such as wool, acrylic, cotton, linen, rayon, polyester, and olefin are reviewed in terms of their potential for insulation and/or moisture absorption. The importance of evaluating blended fabrics also is mentioned. Fabric structure is presented in relation to insulative capabilities of dead air space. Bulky and waffle
knits, pile, and duofold are shown as examples of fabrics that trap dead air space. Clothing design and fit are discussed in terms of the amount of coverage provided, extent to which limbs are encased, type and location of closings, and proper fit. Layering is emphasized as a technique related to garment fit.

The final portion of the slide/tape focuses on examples of how to dress for hot and cold weather. Clothing items modeled for warm weather include cotton knit shirts, sundresses, and cotton undergarments and loungewear. Many more examples of dressing for cold weather are provided since the bulk of student time spent in the classroom occurs during the winter months. Flannel shirts, turtleneck sweaters, and wool pants and blazers are used to illustrate cold weather dressing. Items less frequently used by college students such as wool socks, tights, and thermal undergarments are introduced. Information is presented which indicates thermostat changes that can occur when given types of clothing are worn.

The slide/tape concludes with two examples of especially efficient clothing systems and a description of reasons for their warmth. A blanket sleeper has a thick fabric structure with a fuzzy surface to trap air, is close fitting at openings to prevent loss of body heat, and provides maximum coverage and encasement. Similarly, a layered outfit is composed of a Viyella shirt that is absorbent, soft, and warm; a turtleneck sweater that inhibits the "bellows effect"; and a corduroy blazer with a pile structure that traps dead air and increases warmth.

Still photos and word slides were used in presenting fiber and fabric information, dress forms were used to illustrate garment design and fit, and live male and female models in classroom and dormitory settings were used in providing examples of dressing for hot and cold weather.

Apparel Manufacturing

Betty G. Cagna, Lexington, Missouri

This visual resource is a composite study of manufacturing. It is designed to give an understanding of general apparel manufacturing methods without being complex. It is of special interest to--

- fashion merchandising and clothing teachers
- career and job counselors
- distributive education coordinators
- retailing and manufacturing personnel training programs
- professional fashion organizations

It provides a valuable resource for colleges and high schools because it--

- adds visual dimension to classroom lectures and discussion;
- gives students a better understanding of step-by-step procedures in garment production;
- provides a complete tour of plant operations in lieu of field trips;
- clearly illustrates actual methods and equipment used at Unitog in Warrensburg, Missouri;
- works as a self-instruction model for library use.

This slide/tape presentation is in lieu of a field trip. It takes you through a Unitog apparel manufacturing plant at Warrensburg, Missouri. Unitog has created and managed image-building uniform programs since 1932,
when the founder, A. B. Brookfield I, began providing a one-piece coverall to Coroco dealers. In 1982, Unitog celebrated its 50th anniversary in business with three generations supplying business clothing to companies in every type of industry throughout the country.

The plant at Warrensburg, Missouri is one of the largest of the 28 facilities in the United States. Customer sales at this plant average over $10,500 per hour with an operating expense of $1,000 per hour. The largest shipping day was November 11, 1981, with over $26,221 shipped per hour.

APPAREL MANUFACTURING (Slide/Tape)
Conceptual Outline

I. Unitog - Warrensburg, Missouri
   A. Business clothing
      1. Postal uniforms
      2. 7-Up
      3. Coca-Cola

II. The Pattern
   A. Computer
   B. Digitizer
   C. Buncher
   D. Piece goods
   E. Making the marker

III. Cutting Department
   A. Spreading the fabric
   B. Cutting machines
   C. Marking
   D. Bundling
   E. Die cutting

IV. Production
   A. Transportation systems
   B. Collars
   C. Cuffs
   D. Gripper snaps
   E. Zipper application
   F. Sewing on buttons
   G. Buttonholes
   H. Hemming
   I. Care labels
   J. Trimming and inspection
   K. Seam finishes - rainwear

V. Equipment
   A. Keyhole buttonholer
   B. Pocket serging machine
   C. Automatic back stop
   D. Overlock machine
   E. Flat fell machine

VI. Quality Control
   A. Abrasion rating machine
   B. Random tumble piling tester
   C. Mace tester
   D. Tensil-testing machine
   E. Elmendorf tearing tester
VII. Pressing
A. Large pressing equipment
B. Tandem machine

VIII. Distribution Department
A. Processing orders
B. Training program
C. Special orders
D. Packaging
E. Boxing
F. Shipping

STAYWARM with Clothing Computer Program

Bette Jo Dedic and Jo Ann S. Hilliker, University of Kentucky

STAYWARM is a computerized analysis of the insulation value of clothing. The program is designed to acquaint individuals with methods of maintaining thermal comfort when indoor temperatures have been lowered during the winter. The program is appropriate for County Extension Agents to use with clientele in organized learning activities or in public demonstrations.

The program includes 18 men's and 26 women's representative ensembles of clothing. An ensemble is an appropriate collection of garments, such as a shirt, undershirt, shorts, trousers, socks, and shoes. The terms cool and warm have been used to describe estimated thermal insulating properties of a garment or ensemble. These terms were assigned on the basis of an opinion formulated from visual inspection of the garment by judging thickness, fiber content, fabric and yarn construction, weight of fabric, and garment design (Seppanen et al., 1972).

The program yields an estimate of the insulation of an ensemble of garments worn by the participant. This estimate is expressed in CLO index numbers.

CLO is defined as the amount of insulation necessary to maintain comfort (warmth) at an average mean skin temperature of 92°F in a room at 70°F with air movement not over 10 feet per minute, humidity not over 50 percent with metabolism of 50 Calories per square meter per hour (normal "at rest" body heat usage).

If data are available on the CLO value of the specific combination of garments chosen, the CLO index number will be printed. If data are not available for that combination of garments, the following statement will be printed: "Sorry, there are no data for the outfit you are wearing. However, you can increase the CLO value by adding a jacket or sweater."

Users will be asked to indicate level of activity on a four-point scale of little or no activity to very active. Recommended CLO values for the selected activity level at three temperature ranges (65°-68°, 68°-70°, 70°-72°F) will be printed.

The data base for the program is research published in ASHRAE Transactions (Seppanen et al., 1972).

CLO values estimated for the garments indicated is an average measurement. It does not include a high degree of accuracy due to the many possible variations of garment fabric, fiber, and style the participant may be wearing.
The research base indicated some types of clothing do not contribute significantly to the insulation of the total outfit. Therefore, women's underwear and men's and women's shoes are not included in the program. Lack of an adequate data base regarding sweaters and jackets also has shortened the list of garments from which to select.

**HARDWARE:** TRS 80 Model II, Line Printer VI.

**References:**

Dedic, Bette Jo. *Keep Warm with Clothing*, Kentucky Cooperative Extension Service (HE 2-340), University of Kentucky College of Agriculture, Lexington, KY 40546.


**Availability:** Documentation available from University of Kentucky, Cooperative Extension Service, Department of Public Information, Room 131, Agricultural Experiment Station Bldg., Lexington, KY 40506-00643.

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**Format for Conducting a Class Research Project**

Sally K. Francis, Oregon State University

Upperclass and graduate students enrolled in "Social-Psychological Aspects of Clothing" at Miami University designed and conducted a quasi-experimental study as part of the regular course requirements. The purposes of the research assignment were to familiarize students with the research process, provide a central theme to guide class discussions, and to stimulate further interest in behavioral aspects of clothing.

The assignment involved the following steps:

- selection of topic
- instrument development
- data collection
- final report

In addition, an article authored by the instructor appeared in the *Review* (1980-81), an occasional publication of the School of Education and Allied Professions, Miami University. Four classes over several years have participated in this activity using a variety of topics. The project has always been positively received and has generated much discussion.
Fabric Stain Removal Computer Program

Jo Ann Hilliker, University of Kentucky

The Fabric Stain Removal computer program provides consumers with information on how to remove specific stains from either washable or nonwashable fabrics. The program is being used by County Extension Agents for Home Economics as a teaching tool for consumer groups and as a resource for answering consumer questions.

Washable fabric is defined as any fabric that can be washed as a whole without damaging it. This would include most articles of clothing (check care label), curtains, and small rugs. Nonwashable fabrics are those that cannot be washed because of size, or because the care label does not recommend washing.

A total of 154 stains are grouped into 10 general categories:
(1) food; (2) ink; (3) cleaning products; (4) waste-human and animal (5) beverages; (6) medicines; (7) glue and adhesives; (8) makeup and grooming products; (9) carbon, dye, paints, crayons, shoe polish; and (10) other. Users receive better information if they can identify the general category of the stain. However, if the stain in question does not fit in one of the named categories, the "other" category where an "unknown" response is available is selected.

One to five methods of removing each stain are in the data base. The user may choose to receive only one method or all available methods. The consumer is told to try each method in order. For example, they are told to try method 1, and if the stain remains, try method 2. This program is designed for a video display or a printed copy. The user makes the decision on type of output based on computer equipment used.

The data base for the program is research conducted at the International Fabricare Institute (IFI) in Silver Springs, Maryland and published in the USDA Home and Garden Bulletin 62, Removing Stains From Fabrics. Data on skunk and smoke odor was obtained from IFI but is not published in the USDA bulletin.

Fabric Stain Removal is available on floppy disk for the TRS-80 Microcomputer Model II and by long-distance phone connection to the HP3000 minicomputer.

References:


An Introductory Textile Manual

Jane W. Hooper, June Grossbart, and Carol Davey
Wayne State University-Detroit

This textile manual has been designed to supplement the introductory textile course and may be used with any basic textile textbook. Use of the manual provides students with opportunities to perform nontechnical tests using simple equipment. This allows the student to gain a broader understanding of basic textile concepts. The manual is particularly useful when textile courses are taught in a large lecture format and/or in schools with limited testing facilities. Some experiments, such as making felt, may be completed at home; other exercises may be used during class periods, allowing for further exploration on the topic.

To conform to the basic organization of most introductory textile textbooks, the manual is divided into five units: Fibers, Yarn Structure, Fabric Construction, Dyes and Design, and Finishes. The units may be used in any sequence to coincide with the course structure. Each unit consists of (1) textile study project(s), (2) textile terminology, (3) review questions, and (4) related fabric samples. A consumer-oriented approach allows students to acquire information necessary to select the best fabric for a specific end use, taking into consideration the components of the textile end-product.

The study projects provide hands-on experiences in fiber identification, yarn analysis, fabric construction, aesthetic qualities of dyes and designs, and finishing methods. Federal legislation also is covered. Textile terminology and review questions in each unit serve as self-testing and preparation for examinations. Fabric samples provide students with a basic fabric reference library. Sample sheets for mounting swatches are included at the end of each unit. Suggested fabrics and additional aids for the instructor can be found in the appendix.

The manual is currently being used in large university lecture classes, community colleges, and postsecondary professional schools. Response has been extremely favorable, with students indicating completion of the projects has given them a far greater understanding of textile concepts.

The Clothing Index

Sandra S. Hutton, University of Nebraska-Lincoln

A computerized data base of the clothing periodical literature was announced and discussed at the 1980 National ACPTC Conference in Washington, D.C. Subsequent additions to the data have periodically been announced.

Each periodical citation contained in the clothing data base has been entered with complete bibliographic information, a summary of the article, and has been classified by several levels of key terms allowing various types of searches of the data base. Results of searches of the data base can be printed in several forms.
One form of output from the data base is the Clothing Index. Three editions of the Index (1970–1979, 1980, and 1981) were presented at the juried poster session at the 1982 Central Region Conference. The poster accompanying the Indexes illustrated various steps required to enter each citation in the data base, i.e., search for references to articles, acquire the article, analyze and classify information contained, write the summary, code key terms, enter citation with summary into the computer, proofread the entry, and print results of a search.

The Clothing Data Base is contained on a 26 megabyte rigid disk attached to a 64K Cromemco personal computer. As of October 1982, citations and summaries of 5,252 periodical articles published between January 1970 and December 1981 were contained in the data base. The author intends to update the data base yearly and will acquire and enter periodical articles published prior to 1970 at some future time.

Footnotes:

1 Hutton, S. S., A clothing behavior data base: Investigation, development, and microcomputer application. ACPTC Proceedings, 1980, 64–65.


A Team Teaching Approach Towards Instruction Via Interactive Television

Rita M. Kean, University of Nebraska–Lincoln
Bette Tweten, University of Nebraska–Omaha

An interactive television course was offered by the Department of Textiles, Clothing, and Design in the College of Home Economics, University of Nebraska. The method of instruction was undertaken in response to the interest of the University of Nebraska Board of Regents and Administration in using interactive television as an effective way to broaden student learning experiences through use of talent and resources within the university system.

Textiles, Clothing, and Design 123, a survey course focusing on the fundamentals of clothing selection, was one of five courses selected by the University of Nebraska Office of Academic Affairs to participate in the experimental project during the spring 1982 semester. The course was team taught by two instructors, Rita McKenna Kean on the Lincoln campus and Dr. Bette Tweten on the Omaha campus. Both instructors cooperated in the design and development of the course. Each instructor was responsible for certain instructional lessons.

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Class enrollment consisted of 57 students—28 of which participated in Omaha and 19 were enrolled on the Lincoln campus. The Omaha students met in the Engineering building in a classroom equipped to accommodate interactive television courses. Lincoln students attended class in a studio at the Nebraska Educational Telecommunication Center in Lincoln, adjacent to the East Campus.

Lecture/discussion was the most consistent method of instruction. A variety of audiovisual materials and guest speakers were integrated into the class presentation. Dr. Audrey Newton was one guest speaker who presented her research related to clothing for persons with special needs.

Each student was required to give one oral presentation during the semester. In addition to sharing subject matter information, students were given a "hands-on" experience with television production. Students were responsible for coordinating narration and visual materials involved in their presentations.

Students' reactions and responses to the interactive television instructional method were closely observed. Students' attitudes toward this method of instruction were positive and enthusiastic. Both instructors believe the team-teaching approach is an effective means of using instructional interactive television. Support from Dr. Audrey Newton, chairperson of the department, and Dean Hazel Anthony, Dean of the College of Home Economics, was essential toward contributing to the success of the course.

The disciplines within the home economics field lend themselves to using communicative media, and the more exposure students have to this media, the more effective they will be in their professional roles.

**Hi-Tech Buying Decisions: Fashion Merchandising**

Grace I. Kunz and Mary Jezek, Iowa State University

"Hi-Tech Buying Decisions" is a computer assisted learning experience used as part of the merchandising program at Iowa State University. The computer program for the project was developed by Mary Jezek with the assistance of a programmer from the Computer Science Department. Jantzen Inc. and sales representative, Steve Bick, supplied catalogs and made a videotape of a sales presentation. The result of the cooperation of the Textiles and Clothing Department, the Computer Science Department, and Jantzen Inc. is a multimedia learning experience for students in merchandising.

**Objectives**
1. To become familiar with computer use.
2. To experience style selection for a specific target market and store type while staying within a certain open-to-buy.
3. To experience the decisions buyers make regarding style, color, and size.
4. To price merchandise for a specific customer and store.
5. To receive immediate feedback on buying decisions.
Procedure
1. Write a summary of the type and size of store for which you will be buying, including a description of your target customer.
2. Establish and defend a mark-up percent.
3. Obtain open-to-buy from the computer.
4. View the videotape of the sales presentation.
5. Decide which merchandise to buy.
6. Enter purchase order on the computer.
7. Examine ratios (size and style) and remainder of open-to-buy.
8. Revise order if necessary.
9. Print out satisfactory order.
11. Hand in summary of store type, defense of mark-up, and justification of merchandise selection along with printout of purchase order.

Trade Publications for Clothing and Textiles

Holly Schrank, Purdue University
Dorothy Behling, Bowling Green State University, Ohio

Most ACPTC members are familiar with daily trade publications such as Women's Wear Daily and Daily News Record. The purpose of this exhibit was to provide an opportunity for members to review lesser known apparel, textile, and retail trade publications that have potential for use in the textiles and clothing classroom. Publishers contributed sample copies of their journals and magazines, and these were displayed. Handout materials were provided and included subscription forms for all materials displayed and sample assignments to illustrate ways in which readings in trade publications could be included in classroom instruction. Sample assignments included (1) abstracts of articles from a variety of trade publications (menswear, womenswear, accessories industries; manufacturing sector, retailing sector, etc.); (2) following a specific news story over time in a single publication; (3) analysis of the scope, purpose, audience, and content of a specific trade publication; and (4) reading an assigned publication and speculating/projecting about ways the publication would be used by professionals in the field.

Clothing on Video

Norma Deyo and Joyce Smith, Ohio State University

"Clothing on Video" is a series of videotapes produced for use in classes and with consumer/education groups. A pictorial exhibit giving the titles and use of tapes was presented at the Resource Exhibit. Program content, format, and ordering information follow.
1. A New Beginning: Coping With Mastectomy
   30-minute videotape, available in ½" VHS
   The videotape, A New Beginning: Coping With Mastectomy, is in two parts. Part I is an interview with a physician and relates to the
physical and medical aspects of breast surgery, including current research and procedures. The second part is a three-member panel of extension homemakers who discuss the physical and personal concerns and the adjustment process following surgery. From this medical and personal base, the program content for which Extension has expertise—fitting, adapting, and selecting clothing to meet special needs—evolved. The tape served to introduce an Extension program: *A New Beginning: Your Wardrobe and You.*

For more information on using the videotape or developing programs on coping with mastectomies, contact Norma Deyo, Extension Clothing Specialist.  

2. **Sewing for Profit**  
44-minute videotape, available in 3/4", 1/2" VHS, and 1/2" Beta.  
Sewing for Profit is an interview with a successful custom dressmaker. Topics discussed include pricing, advertising, recordkeeping, managing home and family, dealing with clients, and keeping up-to-date. The dressmaker interviewed discusses special challenges such as fitting handicapped and large figure individuals and developing mail-order services.

For more information on using the videotape or developing programs for custom sewers, contact Joyce Smith, Extension Clothing Specialist.

3. **Wake Up Your Wardrobe**  
5 to 14-minute videotapes, available in 3/4", 1/2" VHS, and 1/2" Beta.  
Designed for and aired on a commercial television station as 4-H leader training, the content is applicable to youth, adult, and non-4-H audiences.

Topics of the five tapes are—  
- The Well-Dressed Look (7 clues to a total look: design, fit, construction, fashion, posture and poise, grooming, personal qualities)  
- The Wardrobe That Works (wardrobe planning)  
- Adding Something New (buying clothes)  
- Updating the Old (accessorizing, recombining and recycling for a current fashion look)  
- Sewing for the Smooth Look (reducing bulk, including pressing equipment and techniques)  
The tapes include demonstrations, modeling of clothes, and interview of Extension Clothing Specialists with program host.  
For more information on program content, contact Norma Deyo or Joyce Smith, Extension Clothing Specialists.

1 Mailing address: Department of Textiles and Clothing-Extension, 1787 Neil Avenue, The Ohio State University, Columbus, Ohio 43210.

2 Available from The Ohio Cooperative Extension Service Film Library, Attn: Dale McClarren, 343 Kottman Hall, 2021 Coffey Road, The Ohio State University, Columbus, Ohio 43210. $5.00 rental fee per tape or set; make check payable to The Ohio State University.
ACPTC NATIONAL JURIED EXHIBITION OF FIBER ARTS
AND WEARABLE ARTS -- 1982

Ardis M. Rewerts
University of Texas

The first ACPTC national juried exhibition of fiber art and wearable art was sponsored by ACPTC-CR with the opening included in the program of the 1982 Minneapolis Conference. The exhibit was installed in Goldstein Gallery at the University of Minnesota. Jurors were Dr. Mary Stieglitz, chairman of the Design Department at the University of Minnesota and Ms. Jean Laman, professor of art at Southwest Texas State University, San Marcos, Texas.

The jury selected 23 pieces from 51 entries. Three were student works. Three artists, Rob Hillestad, Virginia Noerr, and Mary Ruth Smith, were invited to exhibit work in addition to pieces selected by the jury. Awards of excellence were presented to Peggy Bass Albin for "Mingling Downward," Rob Hillestad for "Les Mannequins," Virginia Noerr for "Homage to Leone," Ardis Rewerts for "Untitled IV," and Mary Ruth Smith for "Infinity." Virginia Noerr's "Breakfast Jacket" and Ardis Rewert's "White Structure" received honorable mention.

Margaret Warner was student recipient of an award of excellence for "Forest Fantasy" while Donna Bonino received honorable mention for "Tunic and Skirt."

The Central Region Association of College Professors of Textiles and Clothing sponsored the exhibition in the interest of supporting fiber art and wearable art as areas of research in the study of textiles and clothing. Statements submitted by the jurors summarize the nature of the exhibition.

Mary Stieglitz: "The work reviewed presented a number of dichotomies, the most obvious being repetition and novelty. Some work showed tired concepts, rehashing often-used ideas. In contrast, other work appeared trendy, with novelty as the only goal. Offsetting this, were examples that did offer individual statements while combining aesthetic and technical quality. The selected work also displays contrast when viewed as a group. Variety is apparent in both concept and form...yet most have the commonality of a personal vision. It is this individual extension of the artistic viewpoint that can be found and appreciated in a number of works in the show."

Jean Laman: "It is difficult at best for an artist to submit work with the knowledge that someone will choose or not choose to include it in an exhibition. To those artists I salute your fortitude; to those who were chosen I congratulate you; and to those who were not chosen I sincerely hope that it will only spur you to try again. Various techniques are represented in the exhibition, with perhaps the strongest statements being those incorporating surface design, specifically stitchery and silk screening as a vehicle for the artist's expression. Beautiful craftsmanship reigned as a common denominator among all of the works. With such obvious skills in technique I wished
for more innovative ventures into little tried territories. This expertise should free the artist to explore confidently new and inventive solutions rather than depending too heavily upon statements that have been made before.

"The works chosen for the exhibition represent those that seemed to approach most successfully the 'whole' concept from the standpoint of technique, design, personal interpretation and innovation. There is great variety within this context which should combine to produce a most pleasing exhibition."
I. The meeting was called to order at 9:15 a.m. by the President, Mary Littrell, at the North Star Hotel in Minneapolis, Minnesota.

A. Presidential address: In St. Louis, the presidential address was initiated, reflecting on the work of the past year; current status of ACPTC, focus and directions.

1. ACPTC cannot continue to expand because of finances.
2. Cost of proceedings has risen $300 each year.
3. Universities have given excellent support, but cannot continue; lack large amounts of discretionary funds.
4. Where do we look for guidance in ACPTC?
5. The goals and purposes, the work of an association.
6. Future seminar - exploration of directions for the field of Textiles and Clothing.
7. Establish priorities for ACPTC.

B. Priorities of President.
1. Facilitate futures development.
2. General methods for seminar participates and ACPTC members.
3. Provide leadership in establishing priorities.

II. The minutes of the October 1981 business meeting were distributed by the Secretary. Imogene Ford moved that the minutes be accepted; Barbara Schlinkert seconded the motion. The membership voted to accept the minutes.

III. Nelma Fetterman, Treasurer, distributed the financial statement:

Working Account, balance on hand brought forward $1050.00. An account of projected membership dues and disbursements was given.

Nelma Fetterman moved that the treasurer's report be accepted, Ann Stem seconded the motion.

IV. Committee Reports

A. Nominating: Ruth Marshall indicated that because of the recent By-laws change, the second and third alternate to the National Board will not function.

B. Membership: Patricia Horridge presented the report for Lynne Richards. ACPTC has eighty new members. Brochures have been sent to 417 potential members.

C. By-laws and Handbook Committee: Barbara Schlinkert reported that 82 votes were cast for the by-laws change.

D. Fellowship: Joanne Hilliker presented the report. Kathryn Daily is the recipient of the ACPTC fellowship.
V. Other Report

A. ASTM - Coila Janecek asked that all persons interested in ASTM meet in the Rosewood Room at 8:00 a.m. for a special meeting.

B. Newsletter - Gloria Williams indicated that the deadline for news is November 7.

C. National ACPTC Activities - report given by Charlotte Bennet. National meeting will be in Hawaii, July 4, 1983. National Executive Board meeting will be July 9, 1983. Membership as of June, 1982 was 698. An Ad Hoc Committee has been appointed to evaluate membership - each region has a representative.

D. Futures Development Committee: Report given by Shirley Friend.

1. New Initiative's document. The workshop will include administrators, teachers, researchers, Extension personnel, a mix of subject-matter specialities. Consultant will be Ms. Peggy Danilow. Applications must be postmarked by November 13 for workshop. Selection process to be completed by December. Suggestions of persons to attend: Central Region Council will make the decision. Membership will be apportioned according to size of university.

2. 1984 Regional meeting theme will be "Futures."

VI. Old Business:

A. 1984 meeting will be in Knoxville, Tennessee. 1985- Iowa 1986- Houston - National Meeting.

B. Clothing and Textiles Journal - Report given by Mary Littrell. Sent to everyone who has paid dues by December 1. Five to seven articles in Journal. No long range plan for financing Journal. The first issue will be financed by national from funds from the Washington meeting. All members will receive all publications.

VII. New Business:

A. Mary Littrell presented information about a tour of Southern Mills, July-August, 1983, sponsored by the American Textile Manufacturing Institute. Mr Donovan is the liaison person. Thirty members from ACPTC may participate. Individuals who would like to receive information about the tour should submit their names.

VIII. Announcements:

A. Anna M. Creekmore indicated that the Costume Society of America may begin a publication. Blanch Payne left a manuscript in a file drawer at the University of Washington, Seattle, "European peasants prior to WWII," which could be published if a group would sponsor.
B. Betty Wass thanked the Program committee and chairpersons. Do not forget to turn in evaluations.

C. Sandra Hutton announced that a complete set of proceedings of ACPTC since 1944 is available.

IX. THE ACPTC Business meeting adjourned at 10:36 a.m.

Respectively submitted,

Imogene M. Ford
Secretary
ASSOCIATION OF COLLEGE PROFESSORS OF TEXTILES AND CLOTHING, INC.

CENTRAL REGION

ANNUAL FINANCIAL STATEMENT
November 1, 1981 - October 31, 1982

Submitted by: Nelma Fetterman, Treasurer

I. GENERAL FUNDS (First National Bank, Fargo, ND)

<table>
<thead>
<tr>
<th>1981 BUDGET</th>
<th>1982 RECEIPTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance on hand from 1981 fiscal year</td>
<td>$666.58</td>
</tr>
<tr>
<td>Membership dues (1982) projected: 300 @ $8.00 75 @ $5.00 actual: 287 @ $8.00 93 @ $5.00</td>
<td>2761.00</td>
</tr>
<tr>
<td>Return of funds forwarded to 1981 conference registration committee</td>
<td>200.00</td>
</tr>
<tr>
<td>Conference '81</td>
<td>2331.24</td>
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<tr>
<td>TOTAL RECEIPTS</td>
<td>$5958.82 $5958.82</td>
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DISBURSEMENTS

<table>
<thead>
<tr>
<th>1982 BUDGET</th>
<th>Budget Category</th>
<th>1982 Disbursements</th>
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<tbody>
<tr>
<td>$1500.00</td>
<td>Joint Proceedings.................</td>
<td>$1702.26</td>
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<td>1100.00</td>
<td>January Planning Mtg..............</td>
<td>1895.12</td>
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<td>25.00</td>
<td>Nominating Committee...............</td>
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<tr>
<td>100.00</td>
<td>Membership Committee..............</td>
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<tr>
<td>75.00</td>
<td>By-Laws and Handbook...............</td>
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<td>450.00</td>
<td>President's Expenses..............</td>
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<tr>
<td>300.00</td>
<td>Secretary's Expenses..............</td>
<td>167.26</td>
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<tr>
<td>50.00</td>
<td>Treasurer's Expenses...............</td>
<td>57.06</td>
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<tr>
<td>41.58</td>
<td>Contingency (no more than 15% of total disbursements)</td>
<td>39.00</td>
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<td>Advance to Conference '82 Registration Committee</td>
<td>200.00</td>
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<tr>
<td></td>
<td>TOTAL DISBURSEMENTS</td>
<td>$4728.25</td>
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</tbody>
</table>

BALANCE ON HAND (October 31, 1982) $1230.57
II. SCHOLARSHIP AND PUBLICATIONS FUND

A. Fund Working Account (Hawkeye Savings & Loan, Ames, Iowa)

RECEIPTS
Balance on hand October 31, 1981 $790.80
Interest on Money-Market Certificate through September 25, 1982 1350.17

TOTAL RECEIPTS $2140.97 $2140.97

DISBURSEMENTS
Fellowship Selection Committee Expenses $30.80
2nd Installment, 1981-1982 Fellowship 500.00
1st Installment, 1982-1983 Fellowship 500.00
Invest Interest on new Money Market Certificates 610.58

TOTAL DISBURSEMENTS $1641.38 $1641.38

BALANCE ON HAND (OCTOBER 31, 1982) $499.59

B. Investments (Hawkeye Savings & Loan, Ames, Iowa)

March 19, 1982 - September 17, 1982: $10,782.51 Money Market Certificate at 13.21% + compounding
September 17, 1982 - March 18, 1983: $11,082.51 Money Market Certificate at 9.954% + compounding

III. JURIED ART SHOW FUND (Ames Savings & Loan, Ames, Iowa)

RECEIPTS
Investment on April 1, 1980 $500.00
Interest on 2 1/2 yr. treasury certificate 174.68
Entry fees for Juried Art Show 340.00

TOTAL RECEIPTS $1014.68 $1014.68

DISBURSEMENTS
Flyers $43.96
Entry forms 106.04
Postage 15.15

TOTAL DISBURSEMENTS $165.15 $165.15

BALANCE ON HAND (OCTOBER 31, 1982) $849.53

MEMBERSHIP STATEMENT
August 10, 1982: Active 287
Reserve 35
Graduate Student 58
TOTAL 380
Eastern Region
ACPTC-ER EXECUTIVE COUNCIL

November 1, 1981 - October 31, 1982

Dr. Frances Duffield  President
Dr. Judy Flynn  President-Elect and Archivist
Dr. Kay Obendorf  Secretary
Dr. Leatha Darden  Treasurer
Dr. Jane M. Lamb
Dr. Elizabeth Rhodes
Dr. Barbara Starke  Past-President and ACPTC-ER Rep. to National
Dr. Carol Avery  ACPTC-ER Rep. to National
Dr. Mary Ann Gaydos  ACPTC-ER Rep. to National

Committee Chairpersons

Dr. Wanda Grogan  Local Arrangements
Dr. Nadine Hackler  Hospitality
Dr. Wanda Grogan  Hospitality
Dr. Jane Lamb  Proceedings
Mr. Grant Greapentrog  Evaluation
Dr. Barbara Scruggs  Research
Dr. Carol Warfield  Membership
Dr. Jo Paoletti  Newsletter
Dr. Carol Warfield  ACPTC-ER ASTM Representative
Ms. Nora MacDonald  Nominating Committee
Dr. Barbara Starke  By-Laws
Dr. Mary Barry  Public Relations
Dr. June Mohler  Public Relations

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ACPTC Eastern Region Conference
October 20-23, 1982
Terrace Garden Inn
Atlanta, Georgia

"Clothing and Textiles Industries: Revolution or Evolution"

**Wednesday, October 20**

8:00-11:00 a.m. Executive Council Meeting
9:00-10:30 a.m. Early Registration for Tour Members
11:00-5:00 p.m. Pre-Conference Tour, Milliken Design Center, LaGrange, GA
6:00-8:00 p.m. Executive Council Meeting
8:00-10:00 p.m. Registration

Reception

Juried Poster Session
Coordinator: Ruth Weibel, West Virginia University
"Authority Messages in Neckwear of Women Lawyers as Perceived by Jury Members"
-- Joann Boles, Ph.D., Assistant Professor, Virginia Polytechnic Institute and State University
-- Charlene Lind, Ph.D., Professor, Brigham Young University
"Nineteenth and Twentieth Century Appalachian Quilts of Floyd County Virginia"
-- Susan L. Davis, Ph.D. in progress, Graduate Student, Virginia Polytechnic Institute and State University
"Photographic Study for Teaching Research, Fashion Documentation and Fashion Theory to Undergraduate Students"
-- Judith Z. Flynn, Ph.D., Associate Professor, Framingham State College, Massachusetts
"The Industry-University Connection: Waterproof Motorcycle Jacket Designs for Gore-Tex™ Fabrics"
-- M. Jo Kallal, M.S., Assistant Professor, University of Delaware
"Home-Based Enterprises"
-- Judith J. Leonard, Ed.D., Assistant Professor, Florida State University
"Special Clothing at VGRS--Development and Evolution into the Mass Market"
-- Nora M. MacDonald, M.S., Associate Professor, West Virginia University
"Kids 'N Clothes"
-- Anita Malone, M. Ed., Cooperative Extension Home Economist, University of Connecticut

**Thursday, October 21**

8:00-9:00 a.m. Registration
8:30-10:30 a.m. Opening Session

Welcome:
-- Dr. Frances Duffield, President, ACPTC-Eastern Region, Auburn University
Symposium: "Clothing and Textile Industries: Revolution or Evolution"

Moderator: Dr. Theresa Perenich, University of Georgia

Participants:
-- Mr. Fred Fortess, Director, Textile and Apparel Research, Philadelphia College of Textiles and Science, Philadelphia, Pennsylvania
-- Ms. Susan Mead-Ramos, Designer, May Apparel Design, Inc., Mebane, North Carolina
-- Ms. Frankie Welch, Frankie Welch of America, Alexandria, Virginia
-- Mr. Charles E. Whalen, Jr., President, Warren Featherbone, Inc., Gainesville, Georgia

10:30-10:45 a.m. Refreshment Break

10:45-12:15 p.m. Business Meeting
-- Dr. Frances Duffield, President, ACPTC-ER

2:15- 5:00 p.m. General Session, Atlanta Market Center
Presiding:
-- Dr. Phyllis Tortora, President Elect, National ACPTC, Queens College
"Revitalization of the Downtown--Making It a Place for People to Work, Play or Live"
-- Mr. John A. Hayes, III, Marketing Director, John Portman & Associates, Atlanta, Georgia

Atlanta Market Center
-- Mr. Jack Sasser, Jr., Vice-President of Apparel and Assistant Director of Atlanta Market Center

Friday, October 22
7:00- 7:30 a.m. Late Registration
7:00- 8:00 a.m. Continental Breakfast
7:15- 7:40 a.m. "Fashion Design for the Physically Disabled"
-- M. Dolores Quinn, Drexel University
8:30-11:30 a.m. Buses leave for tours of Arrow Shirt plant and Southern Technical Institute

12:00- 1:30 p.m. Luncheon
Presiding:
-- Dr. Kay Obendorf, Secretary ACPTC-ER, Cornell University
"New Directions in Technology: Space Suit Development"
-- Dr. L. Howard Olson, Georgia Institute of Technology, School of Textile Engineering, Atlanta, Georgia

1:45- 3:00 p.m. General Session
Presiding:
-- Dr. Carol Avery, Senior Member of National Executive Board, Florida State University
"A Brief History of the Computer"
-- Dr. W. David Lewis, Hudson Professor of History and Engineering, Auburn University, Auburn, Alabama
"Marriage of Retail Systems: Human and Technological"
-- Ms. Gwen Marie Gardner, General Instruments Corporation, Business Systems Division

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3:00- 3:10 p.m. Refreshment Break
3:10- 4:00 p.m. "New Directions in Technology"

Reaction Panel:
-- Dr. Mary A. Crenshaw, Dean, School of Home Economics, University of Alabama
-- Mr. Ralph T. Brannan, American Textile Manufacturers Institute, Inc., Corporate Vice President and General Manager of Information Services, M. Lowenstein Corporation, Rock Hill, South Carolina
-- Dr. Ruth L. Galbraith, Dean, School of Home Economics, Auburn University, Auburn, Alabama
-- Mr. Larry Haddock, Department Head, Apparel and Textile Engineering Technology, Southern Technical Institute, Marietta, Georgia
-- Dr. Emily Quinn Pou, Dean, College of Home Economics, University of Georgia
-- Ms. Velda Rankin, Program Leader, Textile and Clothing, USDA, Cooperative Extension Service, Washington, D.C.
-- Dr. Edwin G. Speir, President, Georgia College

4:00- 5:25 p.m. Research Sessions

Session A -- Textiles
Presiding:
-- Dr. Barbara Scruggs, University of Rhode Island
1. "Air Permeability of Textile Fabrics: A Comparison of Measured and Statistically Predicted Values"
   -- Helen H. Epps, Ph.D., University of Georgia
2. "The Distribution of Residual Oily Soil of Fabrics After Laundering"
   -- S.K. Obendorf, Ph.D., N. E. Breen, and D.J. Durnam, Cornell University
3. "Nondegradative Bleaching of Historical Textiles"
   -- M. D. Hurwitz, Ph.D., Sarah L. Cowan, Ph.D., and C. O. Gahagan, B.S., University of North Carolina-Greensboro

Session B -- Historic Costume and Textiles and Fashion
Presiding:
-- Dr. Linda Welters, University of Rhode Island
1. "Clothes Make the Boy, 1860-1910"
   -- Jo B. Paoletti, Ph.D., University of Maryland
2. "Fashion Opinion Leadership, Perceptual Style, and Clothing Preferences: An Exploratory Study"
   -- Flora E. Cunningham, Ed.D., Cook College - Rutgers University
3. "The Usefulness of Ultraviolet-Visible Spectroscopy and Fourier Transform Infrared Spectroscopy in the Documentation of a 19th Century Bodice and Skirt"
   -- Kathryn A. Jakes, Ph.D., and Lucy R. Sibley, Ph.D., University of Georgia

Session C -- Social-Psychology
Presiding:
-- Dr. Lois Gurel, Virginia Polytechnic Institute and State University
1. "A Demographic and Psychographic Assessment of a Specialty Store's Customers and Non-Customers"  
   -- Dayle Ingerick Thorpe, Wesleyan College
2. "Men's Fashion Store Image Perceived by Purchasers & Non-purchasers, and Various Social Class Groups of Men Consumers"  
   -- Barbara E. Densmore, Ph.D., Virginia Polytechnic Institute and State University
3. "The Influence of Dress on Hiring Recommendations Received by Women Applying for Management Positions"  
   -- Sandra Monk Forsythe, University of Georgia

Session D -- Clothing
Presiding:
   -- Dr. Lydia L. Roper, University of Alabama
1. "Selected Body Measurements of Women Aged Sixty-Five and Older"  
   -- Carol A. Patterson, Ph.D., Florida A & M University - University of Florida
2. "Body Expansion As Affected By Garments: An Exploratory Study"  
   -- Marjorie J. T. Norton, Ph.D., and Ruby S. Pangan, M.S., Virginia Polytechnic Institute and State University; Robert F. Johnson, Ph.D., University of Minnesota
   -- Beate Ziegert, B.A., C.G.L.I., Cornell University

4:15-5:30 p.m. "Future Directions for Clothing and Textile Departments and ACPTC"
Presiding:
   -- Dr. Frances Duffield, President, ACPTC-ER

8:00-10:00 p.m. "Think Tank"
Presiding:
   -- Dr. Judy Z. Flynn, President-Elect, ACPTC-ER
   Futures Committee

Saturday, October 23
8:30-9:15 a.m. General Session
Presiding:
   -- Dr. Jane M. Lamb, ER Council, University of Delaware
   "The Cost of De-Regulation"
   -- Dr. Patricia A. Helms, Department Head, Textiles, Clothing and Related Arts, University of Rhode Island

9:30-10:15 a.m. Continuation of General Session
Presiding:
   -- Dr. Elizabeth Rhodes, ER Council, Georgia College
   "New Directions in Merchandising or Economic Impact of Direct Mail"
   -- Ms. Ann Kraft, A.B. Lambdin Catalogue Shopping, Inc.
   Chamblee, Georgia

10:15-10:30 a.m. Refreshment Break
10:30-11:45 a.m. "Creative Career Opportunities in Textiles and Clothing: Revolution or Evolution"
Moderator:
-- Dr. Barbara M. Starke, Howard University, ER Past President and National Council Member
Panel Members:
-- Ms. Susan Antonelli, Showroom Coordinator, Koret of California, New York City
-- Ms. Linda M. Hardwick, Employer Relations Representative, U.S. Employment Service, Tuscaloosa, Alabama
-- Ms. Susan B. Hester, International Trade Specialist, Expansion Division, Office of Textiles and Apparel, U.S. Department of Commerce, Washington, DC
-- Ms. Linda Kimmel, Textile Engineering Graduate Student, Georgia Institute of Technology
-- Ms. Paula Meyers, Assistant Production Director, Sherne Lingerie, Inc., New York City
-- Ms. Marie Williams, Production Manager, Rafshoon Shivers Vargas Tolpin, Atlanta, Georgia

11:45-12:00 noon Evaluation:
-- Mr. Grant Greapentrog, Drexel University
Summary
-- Dr. Judy Z. Flynn

12 noon Executive Council Meeting
THE EVOLUTIONARY AND REVOLUTIONARY STORY
OF WARREN FEATHERBONE COMPANY

C. E. Whalen, Jr., President
Warren Featherbone Company, Gainesville, Georgia

History of the Company
Warren Featherbone Company was founded by Edward K. Warren in 1883 through his invention of Featherbone. "Featherbone" was made from turkey quills and replaced whalebone as a stay material used in women's fashions. The product was so popular during the late 1880s and early 1900s that the Company's trademark "Featherbone" became a household word and can still be found in most dictionaries.

Warren Featherbone was a new company in a new nation. Since the American Revolution, a little over 100 years earlier, industry had begun to produce the "American Dream." Alexander Graham Bell invented the telephone in 1876. In 1879, Thomas Edison produced the first light bulb. In 1903, 20 years after the founding of Warren Featherbone Company, Henry Ford provided the first Model T's and in the same year, Wilbur and Orville Wright gave birth to aviation. This was a time when individuals like H. J. Heinz, John Wanamaker, Marshall Field, Richard Sears and Alvah Roebuck, and J. C. Penney would start businesses that would prosper long after their lifetimes. And the same was true for E. K. Warren.

The Company first began operations in Three Oaks, Michigan, where the original factory still stands. From 1883 to 1938, the Company satisfied the home sewing needs of American women through Featherbone and a wide variety of sewing notions.

During the roaring '20s and into the '30s, changing fashions reduced the demand for Featherbone. In the late '30s, a new material, vinyl resin film, was produced, which introduced revolutionary plastics. This eventually would replace Featherbone, as Featherbone had replaced whalebone. Normally this would be the end of the story—but not so with Warren Featherbone.

Remembering that every problem presents an opportunity, the people of Warren Featherbone began to experiment with the first of the vinyl films, Koroseal, developed by B.F. Goodrich, and "brainstormed" the idea of plastic baby pants. Plastic baby pants were a "natural"—lightweight, acid resistant, waterproof—a perfect replacement for the hot rubber baby pants then on the market. Thus, a new era began for the Company—again through innovation. Warren Featherbone produced and marketed the first plastic baby pants in 1938 and has since developed into a major supplier of all types of infants' wear throughout the United States and abroad.

Changing marketing patterns prompted the acquisition of the Alexis Company of Atlanta in 1953. Changing needs for supply points brought Warren Featherbone to Gainesville, Georgia in 1956. Today all operations are under "one roof"—though that roof is growing progressively larger! With respect to growth, the Company's philosophy since 1883 has been that "growth for growth's sake" just doesn't make sense. "Growth to fill consumer needs" does, however, and is in fact a corporate responsibility that will propel the Company into its second century.
How the Company Relates to the Apparel Industry

The current makeup of the apparel industry in the United States shows several interesting factors:

1. 15,000 apparel firms operating in 23,000 plants employ 1,260,000 workers in the United States. When combined with the textile industry, this produces a total of 2,448,000 workers.

2. Apparel is the largest employer of women in the United States and the seventh largest manufacturing industry.

3. Since 1973, the apparel industry has declined in employment by 12 1/2 percent.

4. In terms of employment, Warren Featherbone ranks in the top 300 of all apparel companies. We currently employ 440 persons versus an average of a little over 80 per company.

5. Apparel is America's best value. In 1972, 6.3¢ of each consumer's disposable dollar was spent for apparel. Today, 5.2¢ of each consumer's disposable dollar goes for apparel. Since 1967, apparel has increased in cost at approximately one-half the rate of increase of all other consumer products.

6. The import revolution in the apparel industry is startling. Since 1973, the number of apparel units imported into the United States has increased from 12 percent to approximately 35 percent. In terms of dollars, the increase is from 11 to 28 percent.

Looking Toward the Future

People still "make it happen" in the apparel industry, and that is our industry's best guarantee for the future. At Warren Featherbone, numerous employee benefit programs work together to produce a company with a very low turnover rate and a very high productivity level. If we develop people correctly, the technology will come. Our industry doesn't need to be second to anyone in the world as long as we're operating with properly motivated people.

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† See also "Featherbone Maker Prospers by Adapting as Product Dies," Wall Street Journal, October 11, 1982.

REVITALIZATION OF THE DOWNTOWN—MAKING IT A PLACE FOR PEOPLE TO WORK, PLAY, OR LIVE

John A. Hayes, III
Marketing Director
John Portman & Associates, Atlanta, Georgia

The topic I have been asked to address is a very broad one. It is one, however, to which our firm feels particularly close. A discussion of revitalization of downtown areas of major cities cannot ignore the important contributions of John Portman.
It has been said that commercial success and art are not expected to go together. This may be particularly true when it relates to real estate development and architectural design. All too often suspicion and unease prevail between these two elements necessary to bring about a development project. Architects are seldom consulted about a building's location, size, or use, and assumptions that developers or government officials make about budget tend to determine structure and materials. As a result, the basic design concept becomes a matter of routine—leaving the architect to translate other people's decisions into technical drawings. In addition, architects rarely have such influence over the final product that they can assure the building program is not slighted in some way in the name of cost or expediency.

Most buildings that win awards and are published in architectural journals these days, and for that matter, most of the major structures that stand as architectural edifices from the past, have been designed for situations in which finance was not the primary consideration. Headquarters for major corporations, nonprofit institutional structures, prominent government offices, or homes of wealthy individuals reflect this genre.

John Portman is an architect who can and does design, among other things, the headquarters for banks or nonprofit institutions. But he found the usual professional role of architect to be too limiting, too passive, too uncertain. As a result, he took up the additional role of real estate entrepreneur, developing projects for his own firm to design. By doing so, he has been able to change the practice of both architecture and real estate. Portman's vision as a designer has seen possibilities in situations that looked unpromising to conventional investors. At the same time, he has demonstrated that large and splendid spaces, which are usually found only in heavily subsidized institutional buildings, can be practical commercial investments.

The people who are drawn to the practice of architecture, more often than not, have quite different temperaments from those who are attracted to real estate, and the two professions are generally unreceptive to the subtleties of each other's work. Developers may have creative investment ideas, but their assumptions about buildings are likely to be ordinary and stereotyped. Architects may devise unusual buildings, but be unable to assess their practicability as real estate. By controlling both architecture and development, Portman has found new ways to give amenity and coherence to our everyday environment. Portman, in essence, has learned to think of real estate architecturally and architecture entrepreneurially.

The work of our firm in both architecture and development is related to urban growth in central cities. It is guided by a philosophy that appreciates the need for maintaining and improving the urban core, expanding its resources and its diversity, while heightening its attraction for people. What Portman calls the "coordinate unit" is a major factor in our approach to development. The size of the unit is based on the distance that an average person is willing to walk without looking around for some form of transportation. The coordination comes from a way of thinking about an urban center that is analogous to the process of designing a building. There are certain functional elements that need to be present, and they can be combined and arranged in various ways. If the design process is successful, the building, or urban center, will have
an integrity of its own; it will be more than the coming together of its separate parts. Such coordination makes for better architecture, and the building that is a necessary element of such an overall concept is also a better real estate investment.

There is clearly a movement back to the cities today that cannot be denied. People simply want to be closer to other people and the amenities and resources of an urban environment. As part of this process, a public/private relationship has evolved in which the city leadership has recognized its responsibility to participate more directly in the development process. Federal legislation also has facilitated this movement through the establishment of programs that leverage limited public dollars for larger private commitments and help catalyst development projects become a reality.

It is important to realize that this shift of public emphasis, including federal income tax policies that now promote investment in blighted urban areas, is not only a significant departure from previous public policy, but is of value to us whether we live and work in the city or its neighboring suburban communities. Past policies, from our nation's highway construction program to FHA loans that built the suburbs, have ignored the plight of the cities either directly or through simple ignorance. We can, however, through the gift of hindsight, now see that this approach has often been ruinous. Nevertheless, the trend has clearly shifted to a recognition of the importance of cities to the fabric of our nation and our culture.

As I indicated earlier, the work of our firm is urban-oriented. While our projects are generally large-scale, mixed-use, high-density, inner-city facilities, their central ingredients can relate to smaller communities as well. We always keep in mind an overriding consideration for people, space, scale, and density. All of these elements must be worked with at the same time.

A city, in a sense, can be looked on as a single building or as having a single fabric. Unfortunately what we find today in most of our modern cities is an odd mixture of forms, colors, and materials that are unrelated and unorganized. Such cities are unpleasant and the environment they offer people has failed. People, as a result, are failing the cities by moving away. It is very, very important that whatever we do in developing and rebuilding our cities is done in a fashion that creates an environment conducive to people.

Central to this thought is our response to the street. We need to recognize the difference and relationships between public spaces, such as sidewalks, streets and stores, and private spaces, such as offices and hotel rooms. When you leave your private space, you move into the public arena and become part of the public space. The dynamics of this relationship are very simple but far too frequently ignored. The importance of this concept must be recognized and promoted as part of any city's growth. You have to relate this public/private relationship to people and the environmental conditions you create for them. As architects and developers, we spend a lot of time observing people and cities. We have tried to understand what you can do within the city to create a variety of spaces of human scale inside very dense and congested areas and still make them pleasant.
When American cities were first laid out, there were narrow streets and narrow sidewalks; buildings were built along these corridors. Very narrow public spaces were created to serve this set of conditions. This situation and its relationship to the private spaces were appropriate at the time. As cities began to grow with more and more buildings, we still had the same old infrastructure of narrow streets and narrow sidewalks. The public, as a result, was being pushed out. There was less space to breathe in, less greenery to enjoy.

Of course, if you carry this to the extreme, we have a situation of very high density abutting very narrow sidewalks and streets. This is New York City and, despite its very high level of density, we find in Rockefeller Center an example of fine urban development in the 1930s that represents a very good attempt to create a balanced amount of public space with very high density. Even today you can go to Rockefeller Center and find it is extremely pleasant to be in the skating rink area or the channel gardens coming in from Fifth Avenue or even walking on the sidewalks close to the buildings. It is really a most pleasant place because they chose to add a greater amount of public space in this very dense situation.

Now, let's look at two examples that have been created since then on Park Avenue. The first is the Seagram's Building. It is an architectural gem. Critics credit it as one of the finest examples of Mies van de Rohe. Yet the plaza or the public space in front of the building is filled with fountains and large sterile paved areas—a very poor livable environment. As a result, it offers really nothing to the public arena.

The Lever House is one of the marvels of modern architecture, yet it offers only a small colonnade that follows the sidewalk around the street onto Park Avenue and into the side streets. While the structure is architecturally acclaimed, it makes very little contribution back to the general public or to the people environment. To carry this to the extreme is Wall Street with its tremendously high level of density.

I do not mean to suggest by these examples that we should build our urban environments as we build our suburban ones. Cities thrive on density and even congestion. They are people places of themselves by virtue of their density, their crowding, and their diversity. Where they fail, however, is in their lack of respect for coordinated design and the inclusion of amenities that heighten the individual's sense of well-being and place.

Let me digress in another direction and examine some ancient cities. In Sienna we see similar forms that are very beautiful, using similar materials and a common texture and rhythm and, yes, even plant life. As we go into Sienna we find great open plazas, bell towers, and a variety of architecture that appreciates, to a far greater degree than most of our American cities, a common palate of materials, a sense of scale, and a respect for spaces that respond to people doing the things they want to do, including the annual Horse Race in the center of the city. The notion of public spaces being provided as activity areas for the general public cannot be over-stressed.

If we move to Venice, we find a city that has waterways instead of streets. Yet within that very dense environment is created one of the most beautiful cities of the world. There are open spaces such as the Plaza de San Marco, which gives relief and allows people pleasant
opportunities to watch and communicate with other people in an unhurried fashion. It is certainly not a dull environment. The bridges, the outside shopping and cafes all offer both visual interest and opportunity for human contact of a very pleasant order.

Mikonos offers a similar illustration though it is completely different in its architecture. With its generic white buildings, there is a commonality of materials and yet a great deal of variety of form. It is clearly one of the places people most like to visit.

What I would like to do for you now is translate this into what we believe is necessary for American cities to successfully develop toward the future. As an example, the density of the Peachtree areas of Atlanta has climbed from about 1.5:1 FAR to 15:1. This high-density, mixed-use development that includes office space, hotels, merchandise marts, shopping, and entertainment has evolved without any public assistance. It occurred at a time when such programs were not available and is expanding even today. There were great difficulties in putting Peachtree Center together as all of the land had to be purchased piece by piece and without a single large landholder.

Peachtree Center has made a major contribution to the well-being of Atlanta. It has helped establish Atlanta as the headquarters city for the southeastern part of the United States. Being a headquarters city requires a great deal of office space and the complex offers such space. In a very special enclave, it is possible for law and accounting firms, insurance companies, and others to do their business activity close to one another. Second, the Atlanta Merchandise Mart has introduced Atlanta to becoming the distribution center for the southeast and has helped establish our city's position as a primary market center. This is where retailers come to select goods they will sell in their stores. Third, it has contributed by being the catalyst that created the great convention city Atlanta has become.

Peachtree Street has a transit system that runs beneath the street. There are plazas with two levels of pedestrian spaces where you can talk to your friends, watch passersby, and so forth. There are both outside and inside restaurant spaces. Peachtree Center has high density and yet is a place, a public arena if you will, that offers both intimate and more open opportunities for both relief from and participation in the life of the city street.

The Hyatt Regency Hotel was the first of the Hyatt atrium hotels. The interior atrium creates a major climatically controlled people space. The 70-story Peachtree Plaza hotel, a major convention facility in Atlanta, also is designed with a major interior space people can use. There is a three-level rooftop restaurant at the top of the hotel. A variety of public spaces both inside and outside have been created by the private sector for the general public's use. The new Marriott Hotel will be connected by aerial walkways with the remainder of Peachtree Center to draw the entire complex together. The project provides a variety of new outdoor and indoor spaces. An interior view of the model of the Portman/Marriott hotel shows the drama interior atrium spaces can generate. Construction has begun on this facility and it is expected to open in mid-1985.
The Atlanta Merchandise Mart and its sister facilities, the Atlanta Apparel Mart and our Decorative Arts Center, have helped to revolutionize the marketing of home and office furnishings as well as women's apparel. The Apparel Mart also is designed with a major interior space suitable for fashion shows. The buildings consist of a whole series of showrooms with different floors serving different market elements and categories.

Now, let's expand our story. From Atlanta we move to San Francisco. The section of the city I refer to contains about 40 acres and consisted of a mix of uses, including a produce area and numerous flop houses. It was not a very nice part of the city, to say the least, in the late 1950s. Land was acquired and a major competition was held for the residential portion that was started in the mid-1960s. In 1966, there was a later offering of the parcel. In this case, not only was the land acquired but there was a public decision that the land price would be subsidized to encourage an economically viable development package that provided certain on- and off-site improvements and amenities by the developer. The disposition of the land was scheduled for acquisition over a 13-year period, thus helping the developer by only requiring land acquisition immediately prior to its phased development. The city also built a public park and provided other improvements.

Our firm was selected as the developer. Embarcadero Center is the result with four office towers of about 3 million square feet, 325,000 square feet of retail, and an 800-room Hyatt Regency hotel. This tremendously intense development covers about eight acres of the site. Eight additional acres of open space that could be used day and night by the general public also were developed. It is noteworthy that the original plan prepared by the city for the development of the site proposed a three-level podium for parking at street level. We rejected this notion and placed, at considerable extra expense, all of the parking underground while developing our retail so that it related to the street and brought people from the street into its open spaces and rooftop plazas above.

The buildings have been designed with a similar texture and, in the hotel, with an extraordinarily dramatic interior space. What is important is the public arena outside in the Embarcadero Center as well as inside the hotel. The drama of this space is set off, as it is in all our projects, with the liberal use of public art. We generally spent about one percent of our construction costs for art and believe in its importance as both a contribution to the public as well as its effect in creating and enhancing value for our developments. In excess of $3 million worth of public art graces the Embarcadero Center.

The Embarcadero Center is used everyday, all day, and well into the evenings, even on weekends. It has become a shopping destination and a downtown event. Overall, the shops at Embarcadero Center will generate approximately $300 per square foot in sales, which is about twice the average for a very successful shopping center.

Another example is the Times Square Hotel in New York City, a project which really began 10 years ago. Financial conditions cooled and the project was dropped until Mayor Koch invited us to return in 1977. This 2,000-room hotel is now under construction and is expected to open in mid-1985. The development program is directed toward revitalizing an extremely depressed section of the Times Square area. Many forms of city
assistance were used to attract this development and rid the area of some of its worst pornography shops and peep shows and to stimulate the wholesale renewal of its theatre district.

About half our work is generated in projects overseas. The Far East is a particular area of concentration, and we have projects in Hong Kong, Singapore, Bangkok, Jakarta, Kuala Lumpur, and the People's Republic of China. In Singapore we have designed a development for a 23-acre tract of land that the city reclaimed through its landfill operations. A major portion of the land was offered for development, and we were selected along with a Singapore development company. Our design, which is now under full construction, includes three hotels, a major shopping mall with four department stores, and large open public spaces.

Our proposal was only 50 percent of what had been offered as the highest bid for the land. But, based on our program and architectural presentation and the fact that we were going to create so much public space within the project, we were selected. The buildings are different and unique, yet they fit together into a unified whole through the common use of materials, a respect for scale, an appreciation for texture and rhythm. The three hotels will be operated by three different companies. In addition to the four department stores, there will be 250 shops inside the shopping mall, and the entire complex will be linked to an urban transit system.

After receiving this design and being selected, Singapore's Minister of Development asked if we would conceptualize an urban design for the remainder of the area. We took the land plan, and the various densities and uses that were desired, and merely put form to them to show exactly how the area could be developed. Schools, residential facilities, parks, and a major tower, which the Minister of Development wanted to have in a key location, are incorporated into the plan. Subsequent marketing of the balance of the site has been in accordance with this urban design.

It is important to appreciate the indigenous character of the areas within which we design. Our Bangkok project, known as Thep Thani, is very special for its architecture, its stepped pyramidal form, and other temple shapes, as well as its sense of presentation to the street. It responds beautifully to its host city and local culture. The design is very responsive to ancient Thai architecture in its massing and detail while at the same time being a frankly contemporary and wholly modern facility.

Some of our other projects include the following: Brussels International Trade Mart; Great Park, Atlanta; Emory University Student Center, Atlanta; Emory University Athletic Center, Atlanta; Renaissance Center, Detroit; Westin Bonaventure Hotel, Los Angeles; Blue Cross/Blue Shield Building, Chattanooga; Fort Worth National Bank Headquarters, Fort Worth; Hyatt Regency O'Hare, Chicago; Fung House, Hong Kong; Tao Fung Shan, New Territories, Hong Kong; Kwai Chung (Housing), Hong Kong; Ho Chung Marina, Hong Kong; Parcel 8 Office Building, Singapore; Pavilion Inter-Continental Hotel, Singapore; Shanghai Hotel, Peoples Republic of China; Landmark Plaza Hotel and Garden Apartments, Jakarta, Indonesia; Financial Center Mall, Manila, Philippines; and Nile Center, Cairo, Egypt.
In summary, we have learned that the business of building and rebuilding our cities requires a thoughtful union of the vision inherent in design and the disciplines understood by development. We believe that these two professions have a responsibility to wed their interests toward a common goal. To do otherwise is to encourage cacophonous and inharmonious growth that ultimately will not contribute to the larger view of what a city and its inhabitants can become.

FABRIC CONSTRUCTION CRITERIA FOR A SPACESUIT ELBOW JOINT

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Research on improvements in space suit design is being conducted on design and fabrication of a molded, coated fabric elbow joint capable of operating reliably at 8 psi internal pressure for extended periods of flexure. The overall design of the joint includes (1) selection of heat-settable fiber of sufficient strength, (2) choosing an optimum fabric construction, (3) a fatigue resistant, flexible coating and (4) a molding technique. Work on a fiber choice and the coating material has been reported previously. The specific purpose of this paper is to define the relationships between yarn and weave parameters that lead to an optimum fabric construction for the 8 psi elbow joint.

Determination of Requisite Fabric Properties

Fabric properties deemed important to this application are discussed sequentially. First, minimum fabric strength is set by the operating internal pressure, 8 psi, and proof test pressure, 16 psi. To accommodate other factors, including extended fatigue life, tear resistance, and resistance to spontaneous crack propagation, the minimum strength should be modified to include a factor of safety of four at the normal working pressure. Spontaneous crack propagation occurs from an initiation point only when fabric stress exceeds 50% of the ultimate breaking stress. A catastrophic joint failure can be expected to occur only under high-stress conditions that may be avoided by design for the expected load.

The standard formula for hoop or circumferential tension caused by uniform internal pressure within a thin-walled circular container is

\[
T = \frac{Pd}{2},
\]

where \( T \) is fabric tension in lbs/inch, \( P \) is internal pressure in psi, and \( d \) is tube diameter in inches. For a 5-inch nominal diameter elbow joint operating 8 psi, the fabric load would be 20 lbs per inch of fabric length (9080 grams per inch).

Axial tensile loading is separately constrained by the mechanical linkage system employed in the space suit. Even without this load support, the axial tension per inch circumference is half the hoop tension. Thus, a fabric of uniform properties in transverse directions that withstands hoop tension requirements also will withstand axial
tensile loads. The total axial load on a 5-inch nominal diameter joint is 157 lbs (71250 grams).

Thus, with a factor of safety of four at 8 psi, the ultimate fabric strength should be at least 4 x 20 or 80 lbs per inch width (36320 gms/in.). The reason for the unusual usage of mixed metric and English units will become apparent later.

The next fabric property under consideration is elongation. Tests conducted in 1981 by H. Vyukukal at NASA Ames determined the following pressure versus joint diameter data as a desirable standard for design purposes:

<table>
<thead>
<tr>
<th>Pressure, Psi</th>
<th>Elbow Joint Diameter, Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>5.384</td>
</tr>
<tr>
<td>4</td>
<td>5.402</td>
</tr>
<tr>
<td>6</td>
<td>5.413</td>
</tr>
<tr>
<td>8</td>
<td>5.424</td>
</tr>
<tr>
<td>10</td>
<td>5.435</td>
</tr>
</tbody>
</table>

While being slightly nonlinear, the data follows approximately a straight line of slope 0.09% elongation per each psi in pressure increase. At 8 psi load, the elongation should be 0.7%, or for a 5-inch nominal diameter joint, the total circumferential length increase would be 0.11 inches.

The next fabric property under consideration is yarn spacing. To develop resistance to snagging and good appearance while avoiding excessive boardiness or stiffness due to overpacking yarns into the space allotted, yarn spacing must fall within a fixed range of cover factors. Cover factor is defined as the area covered by yarn in a woven fabric divided by the total area available. In practice, cover factor is multiplied by 28 to eliminate an empirical constant arising from the use of cotton count as a measure of yarn diameter. Cover factors should fall in the range of 22 through 32 to obtain an acceptable fabric. Above 32, adequate urethane coating penetration would be difficult to achieve. Second, yarn shrinkage during the molding/heat setting operation should be considered. Measured shrinkage at the setting temperature of 195° C (383°F) is 15% in a relaxed, unconstrained specimen. Letting K represent the original cover factor of the fabric as woven, K' the cover factor after heat setting, and s the fractional shrinkage, the relationship, K' = K x (1 - s)^-2/3, expresses the change in cover due to heat setting. For 15% shrinkage, the cover increases by about 28%. Thus, to achieve a final cover of 29, for example, the initial cover should be about 23.

The original cover for a fabric of so called "square" construction, i.e., the yarn size and yarn spacing are the same in both primary woven fabric directions, warp and filling, is given by K = N√denier/36.5. N is the number of yarns per inch in either warp or filling direction. Fabric production rate on the loom is inversely proportional to N. Denier is a measure of yarn linear density based upon the mass in grams of a 9000 kilometer length of yarn. Denier is uniformly accepted by fiber producers worldwide as the primary specification for yarn size.

The final fabric property to be covered is weave design. A plain weave is the obvious choice in terms of maximum tensile strength, appearance, and support of the urethane coat. Additionally, weaving a
tubular structure becomes more complicated, particularly at the fabric edges, if a weave design other than a plain weave is used. The plain weave offers a maximum number of yarn crossings and optimum fabric stability during the coating processes.

**Determination of Fabric Construction**

The purpose of this section is to use the data presented in the previous section to arrive at a suitable fabric construction for the elbow joint. Fabric construction is determined by specifying the following parameters:

1. Fiber type and size
2. Yarn size and twist in turns per inch
3. Yarn spacing in warp ends per inch and filling picks per inch
4. Weave design

The yarn selected previously is DuPont Dacron polyester type 56. Types 55 and 26 are similar polyesters and all are readily available in 150-denier yarns with 30 or more filaments per yarn. A high level of producer rotoset is requested so that the yarns can be woven with no twist or no more than one or two turns per inch in the final yarn.

The final yarn size is determined through review of three factors:

a. \[ K = 23 = \frac{N \sqrt{\text{denier}}}{36.5}, \text{ cover factor} \]

b. \[ T_{\text{minimum}} = 9080 \text{ grams/inch} \times 4 \text{ factor of safety} = N \times (\text{denier}) \times 4.25, \text{ strength minimum value} \]

c. 1\% elongation occurs at a specific stress of 1 gram per denier, DuPont Bulletin D-243, therefore for 0.7\% at 8 psi the loading should not exceed 0.7 gram per denier

Taking the last of these first, at 9080 grams/inch load divided by 0.7 gram per denier allowable specific stress, the total yarn denier per inch of fabric width must be at least 12971 denier to limit elongation to 0.7\%. The middle criteria states that the strength objective can be met with 4 x 9080 grams/inch divided by 4.25 grams per denier ultimate specific stress for 8546 total denier per inch. Thus, the elongation factor is overriding the strength requirements with the result that N x denier must equal or exceed 12971. The first requirement that \( K = 23 \) also stands. Therefore, \( N \sqrt{\text{denier}} = 840. \)

Two or three 150-denier base yarns can be plied with one or two turns of twist to produce a 300-denier or 450-denier resultant yarn. The larger yarn yields a higher production rate on the loom proportional to the square root of yarn denier. Excessive twist reduces yarn strength, hence the low level of ply twist. At 450 denier, cover requires that \( N = 40 \) yarns per inch. Total denier per inch would be 40 x 450 = 18000 denier /inch. Yarn strength is 4.25 grams per denier, giving 76500 gmf per inch or 168 lbs per inch fabric strength. The load is 20 lbs per inch, and the factor of safety, 168/20 = 8.4, prior to consideration of the benefit caused by increase in the number of yarns per inch after fabric shrinkage. The elongation should be 0.5\% at 8 psi.

The weave design for a tubular plain weave repeats on four filling picks. The design requires a four-harness cam or dobby loom that, when set up on a straight draft, will have the following harness motion:

- **PICK NO. 1 - LIFT HARNESS NO. 1**
- **PICK NO. 2 - LIFT HARNESS NOS. 1, 2, 3**
- **PICK NO. 3 - LIFT HARNESS NO. 3**
- **PICK NO. 4 - LIFT HARNESS NOS. 1, 3, 4**
The warp ends are drawn sequentially into sequential harnesses, a straight draft. The loom reed that determines warp-end spacing has 19.5 dents (spaces) per inch to allow for loom-width fabric contraction and is drawn four ends per dent (one from each harness). The total yarn density at the reed is approximately 80 ends per inch, accounting for 40 ends per inch in each surface of the flattened tube. Minimum edge distortion is obtained by decreasing the reed draw-in at the outer three dents to 3, 2, and 1 end per dent, respectively. Additionally, filling yarn edge support devices, known in the industry as crowhops, and tension eye pads in the shuttle provide for improved edge uniformity and filling yarn spacing uniformity.

Conclusions
The fabric configuration that offers good appearance with an efficient production rate and exceeds design criteria in strength and low elongation to directly improve fatigue life is as follows:
1. Yarn - 450 total denier DuPont Type 56 Dacron (if plied from 150-denier stock, add 1-2 tpi twist)
2. End and pick spacing - 40 yarns per inch
3. Weave design - tubular plain weave

The governing equations or factors leading to this configuration clearly have some flexibility with respect to yarn size and spacing. This particular configuration offers a factor of safety of eight using conservative figures and would have longer fatigue life than a fabric construction with a lower factor of safety.

1See Appendix B for further discussion of yarn/fabric strength.
2See Appendix A for a description of cover factor.
3See Appendix C for information on yarn-count systems.

APPENDIX A--Cover Factor

Cover factor is defined as the fraction of total available area in the basic repeating unit of a fabric covered by yarn. For woven fabrics, the basic repeating unit consists of one yarn interlacing point, i.e., a yarn crossover. The size of the repeating unit as shown in Figure A-1 is 1/E in length, where E is the number of warp ends per inch, and 1/P in width, where P is the number of filling picks per inch.

Basically, the variables E and P are fixed by the loom at certain constant values for any particular fabric. For example, E, the ends per inch, is set by the number of dents per inch in the loom reed at the instant of heat-up. Typical fabrics show about 5% width contraction after passing through the loom temples, which results in a similar increase in ends per inch. Thus, while not a true constant, the ends per inch are reasonably constant to within a few percent error once the fabric leaves the loom and the value of E is set by loom configuration. Similarly, P, the picks per inch, is set by loom configuration, specifically the pick gear, and is subject to a few percent error. The amount of error can be related back to the cover factor, which this section explains.
The area covered by yarn is the projected area of the yarns obtained from viewing the fabric perpendicular to the fabric plane. Each yarn, warp, and filling, has a diameter $d_E$ and $d_p$, respectively. Their projected areas in the basic repeating unit are $A_E = d_E/E$ and $A_p = dp/P$. 

By definition, the cover factor is: 

$$K = \frac{A_E + A_p - d_E dp}{1/E \times 1/P}$$

The term $d_E dp$ is shown subtracted in this expression because the yarn crossover area has been added twice to the projected area, once each in the $A_E$ and $A_p$ terms.

Empirical research into the relation between yarn diameter and its inverse linear density in the cotton-count yarn numbering system led to adoption, particularly with reference to cover factor, of a relation between yarn diameter, $d$, and cotton count, $N_e$, as follows:

$$d = \frac{1}{28\sqrt{N_e}}$$

The symbol $N_e$ is commonly used for cotton count to distinguish it from $N_m$ the metric count, which is determined in metric units. For the remainder of this section, the symbols $N_E$ and $N_p$ will be used to refer to cotton count of a filling end or warp pick, respectively.

Cover factor as defined thus far is referred to as true cover factor and is expressed as:

$$K = d_E/E + dp/P - d_E dp \times EP$$

With diameter replaced by the empirical relation involving cotton count, the expression becomes:

$$K = \frac{E}{28\sqrt{N_E}} + \frac{P}{28\sqrt{N_p}} - \frac{EP}{28 \times 28\sqrt{N_E} \sqrt{N_p}}$$
In practical use, two simplifications of this equation have been made. First, the last term is neglected, and, second, a new cover factor is defined by multiplying the expression by 28. With these two changes, an expression of the form:

\[ K = \frac{E}{\sqrt{N_E}} + \frac{P}{\sqrt{N_P}} \text{ results.} \]

To point out a symbology in which confusion may arise, for those fabrics in which \( E = P \), a term \( N \) is used to refer to number of yarns per inch in either warp or filling direction. The cotton count is referred to as C.C., resulting in:

\[ K = \frac{2N}{\sqrt{cc}}, \]

or if \( E \neq P \) and the counts differ:

\[ K = \frac{N_E}{\sqrt{cc_E}} + \frac{N_P}{\sqrt{cc_P}} \]

The expressions with either set of symbols (\( E, P, N_E, N_P \)) or (\( N_E, N_P, CC_E, CC_P \)) clearly are the same and are composed of two parts. A specific reference to warp cover factor in fact refers to the term \( K_w = E/\sqrt{N_E} \) and similarly for filling \( K_F = P/\sqrt{N_P} \) such that

\[ K = K_w + K_F \]

In theory, when the true cover factor is 1.0 or the modified version is 28.0, the total available area is covered by yarn, neglecting the effect of the doubly counted yarn crossover area. Fabrics can be made with cover factor exceeding 28, for example a cotton plain-weave duck with total cover of 39 is possible. Below approximately 20, fabrics are very unstable, requiring fillers and binders to constrain the yarns to a fixed geometry. Weaves with fewer interlacing points per weave design repeat, such as a twill or satin, have higher upper and lower limits of weavability. The reason the upper limit exceeds 28 rests with two factors. The yarns are compressible to a projected diameter less than that predicted by the empirical relation and a subtracted term was neglected, i.e., a fabric woven of circular steel wire would very nearly approach 28 as an upper weavability limit since the wire is essentially incompressible with respect to loom forces.

Cotton count and denier are the two most commonly found yarn numbering systems. A polyester fiber has negligible difference in specific gravity compared to cotton for which the yarn diameter empirical relation was determined. If the packing fractions are similar, the expression for cover factor of a polyester yarn whose specific linear density is given, \( D \), is

\[ K = (E \sqrt{D_E} + P \sqrt{D_P}) / 72.9 \]

when \( E = P = N \) and \( D_E = D_P = D \),

\[ K = N \sqrt{D} / 36.5 \]
While cover factor cannot be an absolute measure of fabric compactness due to the assumptions and simplifications arising in its derivation, it provides an excellent first trial reference for producing a new fabric. This is particularly true in producing fabrics of comparable appearance, for example, where economics or other necessity may justify a slightly larger yarn woven at fewer picks per inch.

APPENDIX B—Yarn and Fabric Strength

The measure commonly used in textiles to determine yarn and fabric strength is specific to dimensional measurements of yarns and fabric. Engineering stress in English units is measured in pounds per square inch, psi, the metric SI equivalent being newtons per square meter, N/m². Due to nonuniformity in yarn diameter and, hence, fabric thickness, the textile industry has adopted different measures of these properties. Yarn cross-sectional area can be related directly to direct yarn count or inversely to an indirect yarn count. While yarn counts are in fact measures of linear density or inverse linear density, over long lengths an average volumetric density exists. Therefore, for the fixed length of fixed mass, an average diameter also exists, which can be used in determining a specific stress.

For fabrics, which are treated in the textile industry as two dimensional planar sheets, length along an edge times the effective yarn area per unit length measured by means of yarn count determines the specific fabric stress. Optionally, a simple measure of pounds per inch fabric width is used as a stress or stress-related value. In fact, because of its simplicity, pounds per inch is a widely found unit of fabric stress.

Returning to engineering stress, and assuming that a yarn is essentially a one-dimensional structure, tensile stress in the yarn is tensile load in pounds divided by yarn cross-sectional area in a plane normal to the load, i.e., perpendicular to the yarn axis, or it is tensile load divided by the sum of all fiber cross-sectional areas in the normal plane due to macroscopic voids present in all yarns. The yarn cross-sectional area is difficult to measure due to (1) uncertainty on the location of its outer boundary, being composed of macroscopic fiber elements, (2) irregularity in boundary geometry, being a somewhat randomly determined irregular figure, (3) inconsistency in the boundary shape from section to section in successive slices through the yarn, and (4) nonuniformity in total number of fibers and involved area along the yarn length. Similarly, a count of total fiber cross-sections is subject to uncertainty.

The yarn diameter squared is directly proportional to denier and inversely proportional to cotton count, the two most frequently used yarn counts. Yarn cross-sectional area, if a circular shape is assumed, is directly proportional to diameter squared as well. The two measures of yarn specific stress are cotton count times yarn load in pounds, the cotton-strength product, and yarn load in grams force divided by denier, the tenacity in gms/den. These are the best simple measures available in ordinary textile usage.

Historically, the count-strength product for cotton yarns has been determined by breaking a skein composed of 80 wraps of yarn, one and
one-half yards length per wrap, totalling 120 yards. This value should
be consistent in any one class of yarns, typically ranging from 1700-
2200 for cotton yarns.

For multifilament synthetic yarns, single-end strength converted
to specific stress in grams per denier is most often used. Attempts
to standardize the textile industry on SI units of newtons per tex, where
tex is the approved direct-count measure, are advancing slowly. The
American synthetic fiber/yarn manufacturers use grams per denier to refer
to specific stress and tenacity to refer to the specific stress at the
breaking load. Some important European researchers have adopted tenacity
as a general term for gms/den. or N/tex at any load, breaking tenacity
being the term equivalent to the American usage of the term tenacity.
Polyester and nylon yarns in the low-tenacity range, e.g., textile yarns,
have tenacities of 2-3 gms/den, high textile tenacity commonly refers
to strength in the 4-6 gms/den range, tire cord quality yarn is of 7-10
gms/den and very high-tenacity yarns range from 15-30 gms/den. The
high-strength composites composed of special whiskers or fibers may have
a tenacity up to 50 gms/den.

Fabric strength testing most frequently reports strength in pounds
per inch width. Load specification for a fabric also is given in lbs/in.
The conversion of this figure to a stress value is done on a per yarn
basis ultimately so that the stress can be related back to yarn tenacity.

The fabric specific stress, S, in gms/den is determined by dividing
the load, P, in grams force per unit fabric width by the product of
number of yarns per unit fabric width, N, times the denier per yarn, D.
In uniaxial tests of woven fabric, tenacity approaching that of single­
end yarn tests can be achieved due to the load distribution effect of
the crossing yarn set. This effect is quite apparent in that a uniaxial
tensile test of a fabric containing 40 yarns in the test section, for
example, will give strength at break exceeding a test of 40 yarns grouped
without the crossing yarn set. Thus, the expression given above:

\[ S = \frac{P}{ND} \]

can be chosen to have an ultimate value equal to the yarn tenacity. In
practice, a factor of safety of two to six is included in industrial/
commercial applications of fabrics to allow for fatigue, abrasion, and
other sources of strength loss. That the equation may be subject to
error of 10-15% becomes inconsequential with respect to a 200-500%
factor of safety of design loading to ultimate load capacity.

APPENDIX C—Yarn-Count Systems

The principal function of yarn-count systems is to provide a measure
of yarn linear density. That all yarns, and particularly yarns being
made from natural fibers over the history of yarn-count system develop­
ment, are irregular over a short term basis (inch-to-inch or yard-to­
yard) led to use of long specimen lengths to find an average value of
mass. Long specimen length also allows for mass measurement on devices
with lower resolution (fewer decimal places) and, as a result, lower
cost. The unit of specimen length is a hank. The number of yards or
meters of yarn in a hank is a function of the type yarn being evaluated as well as the system of units being used, e.g., a yard versus a meter.

Two yarn-count systems have evolved: the indirect count systems that are inversely proportional to linear density and the direct count systems that are directly proportional to linear density. Discussion of these two systems follows:

The basic definition of indirect yarn count in English/American units is the number of hanks per pound. The metric count is given as the number of hanks per kilogram. The definition of hank length is given in the following table by count system name.

### TABLE 1. Hank Length in Various Indirect Yarn Count Systems

<table>
<thead>
<tr>
<th>Count System Name</th>
<th>Hank Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>840</td>
</tr>
<tr>
<td>Worsted</td>
<td>560</td>
</tr>
<tr>
<td>Woolen run</td>
<td>1600</td>
</tr>
<tr>
<td>Woolen cut</td>
<td>300</td>
</tr>
<tr>
<td>Linen lea</td>
<td>300</td>
</tr>
<tr>
<td>Asbestos cut</td>
<td>100</td>
</tr>
<tr>
<td>Typp</td>
<td>1000</td>
</tr>
<tr>
<td>Metric</td>
<td>1000</td>
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A single yarn evaluated for count in one system may be converted to the equivalent count of another system by using the relation that yarn count times hank length is a constant. The exception is in metric count conversion where use of a hank length of 496.055 yards allows direct conversion with the remaining English system counts.

The history of indirect counts probably would show that cottage spinners could wrap fixed lengths of yarn, and by counting the number of these skeins required to balance against a one-pound weight, arrive at the count number in a manner requiring very little technical skill. Typically, counts are given in whole numbers, although one decimal place is sometimes used. Typical spun yarn uniformity would not justify a second decimal place, inferring an accuracy that simply doesn't exist. A peculiarity of indirect yarn counts is the addition of apostrophe and letter s after the number, e.g., the range of counts for commonly spun yarns is 5's to 45's. The count in spoken language retains the s, appearing to be a plural number. There may be some value to this oddity in that nowhere else will a number be referred to as a 12's or 36's.

Worldwide, two indirect count systems predominate. These are the cotton count, given in equations as Ne, and metric count, Nm. Continental Europeans of Western and Eastern Europe and the Russians use metric count. The English, American, and Asian textile industries use cotton count, with some crossover in Asia between the two counts.
With international standardization efforts underway that stress recognition of SI units, the accepted standard yarn number is a direct count known as tex. The two common direct counts are denier and tex, denier being the common designation for synthetic fibers and continuous filament yarns (as opposed to the use of indirect count for spun, staple fiber yarns).

Direct counts are determined by finding the number of grams mass per hank, where the tex hank is 1 Km in length and the denier hank is 9 Km in length. While a matter more for history, a direct number termed grex using a 10 Km hank length has existed. Additionally, the jute manufacturers of India used a direct English system count called spyndle wherein the number of pounds per 14,400 yard spyndle of yarn was measured. The standardization to tex for all yarns is making very slow progress.

In reporting yarn numbers in denier, whole numbers are used. A single decimal place is used for fiber denier. Generally, an additional decimal place is added for tex numbers, e.g., a 150-denier polyester yarn is equivalent to 16.7 tex. Note that the "'s" of indirect counts is not used with direct counts.

A BRIEF HISTORY OF THE COMPUTER

W. David Lewis
Hudson Professor of History and Engineering, Auburn University

The use of physical aids in computation probably goes back to the very beginnings of numerical reckonings: the fingers of the human hand quite literally constituted the first digital computer. A variety of other physical objects also facilitated the performance of calculations in antiquity. Piles of sticks or stones, for example, were assembled in the morning and disassembled in the evening by shepherds to tally the goings and returnings of their flocks. Knotted strings also were used to store numerical data, while the "counting board," upon which markers of various types could be shuffled back and forth, was employed by ancient businessmen for the same purpose. The idea of moving beads here and there on strings or wires, or sliding them to and fro in grooves or slots, led to the invention of the abacus, which was known in Graeco-Roman times. It continued to be used in Western society until about the sixteenth century, and still remains popular in the Far East.

Geared mechanisms, first developed in the Graeco-Roman world, led in time to machines capable of performing digital calculations. During medieval and early modern times, clockmakers and astronomers in both Moslem and Christian lands developed a number of devices using gears in connection with moving indicators and calibrated plates to facilitate the determination of dates on which solar and lunar eclipses would occur, to study planetary movements, and to predict when such moveable religious
feasts as Easter would fall. Machines capable of performing basic arithmetical functions began to appear in Europe during the seventeenth century, commencing with the work of the German astronomer, Wilhelm Schickard, who in 1623 announced that he had designed a contrivance that could add, subtract, multiply, and divide automatically. This device, however, was destroyed in a fire. A model of it has been reconstructed from historical documents, but it had no traceable impact on the course of developments in its own time.

Far more important was a mechanical calculator invented in the early 1640s by the French mathematician-philosopher, Blaise Pascal, who desired a more convenient means of performing computations for his father, a tax collector. Pascal's device consisted of a train of eight gear wheels representing units, tens, hundreds, thousands, and so on. When the first gear wheel on the extreme right-hand side of the machine went through a complete revolution of 10 units, it automatically tripped the wheel on its immediate left; when that wheel went through a similar revolution, it in turn tripped the wheel to its left, and so on down the line. Capable only of addition and subtraction, this invention was not widely adopted and failed to produce the financial returns for which Pascal had hoped, but it did come to the attention of such important mathematicians as Rene Descartes and Gottfried Wilhelm Leibniz, the latter of whom improved it by designing a stepped-cylinder multiplier constructed in 1694.

By 1774, another inventor, Philipp Mattheaus Hahn, had produced a machine effectively capable of performing addition, subtraction, multiplication, and division. Until then, engineering difficulties involved in the fabrication of such devices had prevented them from functioning with complete accuracy. The commercial development of calculating mechanisms got underway in the nineteenth century with the appearance of the Thomas Arithmometer, invented in 1820 by an Alsatian, Thomas de Colmar. By the 1850s and 1860s, an improved version of this machine was being marketed by his son, Thomas de Bojano.

Beginning in the early eighteenth century, a series of innovations took place in the French Textile industry that would in time have a significant impact on the evolution of calculating devices capable of functions going far beyond those performed by the mechanisms just mentioned. These innovations centered around the development of the draw loom, which used hooks and needles, controlled by cords pulled in sequence by workers known as "draw-boys," to weave complicated patterns in cloth. Through the efforts of several inventors, culminating in the work of Joseph Marie Jacquard, the draw-boys were ultimately replaced by prearranged sequences of perforated cards that permitted certain hooks and needles to pass through while blocking others. In addition to driving down the cost of fine woven fabrics, this new principle afforded a means of feeding numerical information into a calculating machine. This possibility was first realized in the early nineteenth century by the British mathematician, Charles Babbage.

Born in 1792 and manifesting mathematical genius at an early age, Babbage spent much of his career creating the first reliable actuarial tables for life insurance purposes, designing speedometers and dynamosimeters for use on railroads, and devising a system of uniform rates for the British postal system. His desire to relieve the drudgery of
the protracted calculations required by such projects led him to conceive of computational machines far more complex than those developed by such persons as Pascal, Leibniz, and Hahn. With intermittent financial support from the British government, he attempted to develop, but failed to complete, two devices known respectively as the Difference Engine and the Analytical Engine. The second and more advanced of these, which received coded instructions fed in by means of punched cards, was to carry out complicated sequences of mathematical operations requiring the use of data already stored in an internal "memory" and the comparison and selection of alternative courses of action, providing both intermediate and final results in printed form.

A working model of Babbage's Difference Engine was ultimately produced by his Swedish admirer, Pehr Georg Scheutz, but essentially his devices, however brilliantly conceived, were technological dead ends because of the sheer limitations of the purely mechanical components—cylinders, racks, rods, and gear wheels—they employed. For the rapid execution of mathematical tasks of the complexity that Babbage's engines were designed to carry out, a different basis was necessary: electricity, which moves at the speed of light. Although numerous applications of electricity had been made throughout the nineteenth century, particularly in such fields as communication and illumination, it was not until 1884 that a device appeared that used it for numerical data processing. This was developed for the United States Census Bureau by a young American engineer, Herman Hollerith.

Faced with the problem of processing and analyzing increasingly vast amounts of statistical data, which by the 1880s were seriously impeding the preparation of census returns, Hollerith hit upon the idea of encoding numerical information on perforated rolls of paper and, later, punched cards, just as Babbage had done before him. In Hollerith's case, however, the perforated material, ultimately taking the form of cards that could be punched in nearly 300 different locations to represent various types of personal and geographical data, was passed between metal pins and containers filled with mercury, permitting a flow of electrical current whenever a hole was encountered. A series of meters registered the accumulation of successive individual discharges, facilitating the rapid tabulation and analysis of encoded data. The use of this system in connection with the 1890 Census resulted in a substantial saving of time and in significantly improved accuracy.

Encouraged by his success, Hollerith founded a corporation known as the Tabulating Machine Company in 1896. After a series of mergers and name changes, this eventually became a key component of today's electronic giant, International Business Machines (IBM), established in 1924. Meanwhile, the Census Bureau had hired a new statistical engineer, James Powers. His improvements on Hollerith's original system ultimately led to the formation of the Powers Accounting Machine Company; in time this became part of the Remington Rand Corporation (now known as Sperry Rand), destined to market the world's first commercial electronic computer, UNIVAC, in 1951. Neither Hollerith's nor Powers' equipment, however, could perform the extremely complex mathematical functions that Babbage had envisioned for such devices as the Analytical Engine. The digital calculating machines manufactured by private firms in the early twentieth
century, whether electrical or mechanical in their operations, could handle only routine arithmetical problems.

An alternative approach to the rapid performance of certain mathematical calculations lay in the use of analog devices, based on the principle of relative lengths and distances. A significant pioneer in this line of effort was the Scottish mathematician, John Napier, the discoverer of logarithms. Early in the seventeenth century he invented a set of calibrated rods, known as "Napier's Bones," which could be placed against one another in such a way as to facilitate logarithmic computations. These were subsequently elaborated into the slide rule by such persons as Edmund Gunter, William Oughtred, Richard Delamain, and Robert Bissaker.

Beginning in 1814 with the work of the German engineer, J. H. Hermann, and continuing throughout the nineteenth century with the contributions of such scientists as James Clerk Maxwell, William Thomson (Lord Kelvin), and Albert A. Michelson, a variety of other analog devices were developed. Through the representation of numbers as physical quantities, such as length of a curve or line traced on paper by a moving indicator, these devices could determine specific variables in equations connected with the prediction of tides or the analysis of harmonic frequencies.

Though subject to tiny errors that could become cumulatively significant, these mechanisms led in the twentieth century to the development of further analog equipment that, by representing numbers as quantities of electrical current or by other physical means, could solve within an acceptable margin of error a number of problems involved in such fields as electrical engineering and ballistics. A Differential Analyzer developed by Vannevar Bush and Harold Hazen in the United States during the 1920s was a particularly noteworthy accomplishment along these lines.

Only a digital computer, however, could provide accurate solutions for a comprehensive range of mathematical problems requiring a high degree of flexibility in the manipulation of data. In attempting to overcome the limitations of the digital calculating machines that had been developed by the early twentieth century, scientists and engineers began to use magnetic relay switches driven by electricity as fundamental counting units. This approach was taken from the mid-1930s onward by Konrad Zuse in Germany and by such persons as George Stibitz and Howard Aiken in the United States. Zuse failed to secure adequate support for the development of his ideas, but Stibitz and Aiken ultimately produced successful devices with the aid of Bell Telephone Laboratories, IBM, and the United States armed forces. Particularly important was Aiken's machine, installed at Harvard University in 1944 and given the name Mark I. Using approximately 3,000 relay switches and about 760,000 electrical components of various sorts, it performed sequences of mathematical computations in accordance with instructions fed into it by means of punched tapes. It was completed in time to perform valuable military service in World War II by computing tables of ballistical data, and did a variety of other tasks for approximately a decade before it was retired to the Smithsonian Institution.

Both Aiken's and Stibitz's machines suffered from the relative slowness of their operations, stemming from the fact that the relay switches they employed were partly mechanical in their functioning. Far more significant for the future was the concept of a fully electronic
computer using vacuum tubes instead of relay switches, for such a device
could take maximum advantage of the speed at which electricity travels.
In Great Britain this idea became operational during World War II in a
specialized code-cracking machine known as Colossus.

The first general purpose computer employing vacuum tubes as its
fundamental counting units was created in the United States during the
same period at the University of Pennsylvania's Moore School of Electrical
Engineering with the support of the U. S. Army Ordnance Department.
Built by a team of scientists and engineers headed by John W. Mauchly
and J. Presper Eckert, it differed from Aiken's Mark I not only in using
vacuum tubes but in employing a binary (as opposed to a decimal) system
of mathematics first developed in the nineteenth century by the British
algebraist, George Boole, and suggested to Mauchly by John V. Atanasoff,
a professor at Iowa State University. Containing 19,000 vacuum tubes
and weighing 30 tons, the resulting computer, known as ENIAC (Electronic
Numerical Integrator and Calculator), was 1,700 times faster than Aiken's
machine and heralded the arrival of the modern phase of high-speed
digital computation.

Despite its great speed, ENIAC, which first went into operation
in 1946, had an inherent limitation in that it had to be fed instruc-
tions one at a time by means of punched tape or by circuit boards that
had to be rewired for each new problem. This difficulty was overcome
by means of the idea, first advanced by the Hungarian-American mathe-
matician, John von Neumann, of storing different sets of instructions,
or "programs" as they came to be called, in a computer's own internal
memory. The first operational machine possessing this capability was
developed at Cambridge University in England by a team of scientists
and engineers headed by Maurice V. Wilkes and was known as EDSAC (Elec-
tronic Delay Storage Automatic Calculator); it was first used in 1949.
Its design, however, was based on that of an American counterpart known
as EDVAC (Electronic Discrete Variable Automatic Computer), begun in
1946 but not completed until 1950.

Meanwhile, Eckert and Mauchly had already established a business
firm to exploit the knowledge and experience they had gained in the
construction of ENIAC. Their company was purchased by Remington Rand,
which in 1951 introduced the world's first commercial electronic digital
computer. Known as UNIVAC (Universal Automatic Computer), it was sold
to the United States Census Bureau. Soon other customers, mostly very
large corporations, were acquiring computers for business and other uses.

Because they all used vacuum tubes as counting units, ENIAC, EDSAC,
EDVAC, and UNIVAC comprised what is today known as the "first generation"
of modern digital computers. Despite their speed and increasing flexi-
bility, they suffered from a number of limitations connected with the
large amounts of space they took up, the great amounts of heat generated
by the numerous vacuum tubes, and their need for frequent maintenance
caused by the burning out of individual tubes that had to be located
and replaced.

It was therefore a giant step forward when, during the late 1940s
a team of researchers at Bell Telephone Laboratories headed by William
Shockley, John Bardeen, and Walter H. Brattain developed a new electronic
device called the "transistor" because of its ability to transfer an
electrical signal across a material, most notably silicon, technically
classed as a resistor. Subsequent research and development permitted the new device to amplify a signal, thereby enabling a transistor to duplicate the functions of a vacuum tube. Soon tiny chips of silicon etched with such impurities as arsenic or boron were replacing vacuum tubes in radios and other electrical equipment, taking up much less space, needing no time to warm up, and posing fewer maintenance problems because of their superior dependability.

Beginning in 1958, computers using transistors as their basic counting units began to appear on the market, comprising a "second generation" that, in addition to the advantages just named, could be produced and acquired at considerably less cost than their earlier counterparts, thereby enabling more and more customers to afford them. By 1962, it was estimated that more than 16,000 computers were in use in the United States alone, and a revolution in business practice was well underway. Despite the pioneering role that Remington Rand had taken in the production of UNIVAC, IBM had by this time taken a commanding lead among American manufacturers in computer sales, capitalizing on a growing reputation for customer service. By 1975, over 75,000 computers were in use throughout the United States.

The trend toward miniaturization that began with the introduction of the transistor continued, in 1957, with the appearance of the integrated circuit, which combined a number of transistors and other components in one single silicon chip. Although this idea initially may have been articulated at the Royal Radar Establishment in England, its technical realization was achieved in the United States through the work of Robert Noyce of Fairchild Semiconductor and Jack Kilby of Texas Instruments. As the mass production of integrated circuits got underway, prices fell, larger and larger numbers of components could be built into a single chip, and a "third generation" of computers appeared, taking up even less space than those of the "second generation," costing less to produce and sell, and having significantly greater performance capabilities. By 1970, for example, it had become possible to integrate 1,024 memory bits into a single integrated circuit, vastly enhancing the amount of information that could be stored and manipulated by digital computers.

But the process of improvement did not end here, for the work of M. E. Hoff at Intel Corporation in 1971 led to the appearance of an even tinier and more versatile invention, the microprocessor, combining all of the functions of a computer's central processing unit in one silicon chip. Within a few years, its use had led to the creation of a "fourth generation" of computers, much smaller and less expensive than those of the "third," yet far superior in performance and data storage capability. By the end of the decade, the number of memory bits per circuit had jumped to more than 16,000, yet the cost of computers had dropped by about 3,000 percent within 17 years. By the early 1980s, it was possible to purchase for a comparatively nominal sum--one model was selling for less than $100--a computer with greater versatility, storage capacity, and performance potential than that of the huge and extremely costly ones that had appeared early in the "first generation" less than four decades earlier, and carry it about in one's hand.

In a brief essay limited to a capsule account of the evolution of the computer, space is lacking in which to analyze the effect this remarkable device has had, and will continue to have, on the world in
which we live. It is obvious, however, that within the space of a little more than 30 years after the introduction of the first commercially produced model, UNIVAC, computers have become ubiquitous in contemporary society and virtually every aspect of our political, economic, and social life has been affected in one way or another by their presence. The computer is at one and the same time perhaps the foremost symbol and the most potent source of technological change in the world today. It is likely that we have only begun to witness the contributions its steadily increasing applications will make and the problems they will cause.

References:


MARRIAGE OF RETAIL SYSTEMS: HUMAN AND TECHNOLOGICAL

Gwen Marie Gardner
General Instruments Corporation

The computer is a tool of immense potential. In time, it will like the wheel and the automobile, change our society beyond recognition. To determine the results of such a change, our society requires that each industry identify its computer needs and communicate them to data processing professionals. You, as future experts in your industry, possess the power to shape your success through professional interface with the world of computers.
At the most basic level, there are only three things a person can do with a computer:
1. Put information into it.
2. Manipulate the information.
3. Take information out.

But the heart of this kind of effort addresses two very important survival needs in business: (1) the need to make decisions and (2) the need to inform others.

Every job entails some kind of decision-making or selection between alternative actions. A computer can complement these processes, but there is a limit to how much decision-making can and should be computerized. And then, of course, another pertinent point is who should make the non-computerized decisions.

Let's attend to the first point. How much decision-making can and should be computerized? To answer this question, you need to know all the parts (tasks) of your business. A "data processing oriented" diagram of a top 100 national retail organization follows. It is not my intent to analyze this diagram, but to provide a tool for you to use in your efforts to understand the decision-making network in a retail system. Your interest area as clothing and textiles professionals may fall in the area marked Merchandise Processing System; specifically, open-to-buy, distribution and transfers, price changes, stock/sales status reports. How can a computer help you in these areas?

Open-to-Buy
A computer can be programmed to understand seasonal considerations, sales history, and departmental weights to be used in analyzing and determining open-to-buy figures.

The computer can provide a professionally designed report that allows daily accumulation and adjustment of open-to-buy figures by department, class, size, or any other fine-merchandise category. These day-to-day activities can be recorded and measured against a company plan. Thus, it becomes apparent whether or not progress is being made or if a merchandise type is failing and which particular vendor supplies the merchandise.

In summary, as a professional, you can make decisions based on planned purchases, sales history, and current merchandise status.

Merchandise Control
The objective of any merchandising professional is to place goods in the locations where the supply can meet the demand—with a favorable profit, of course. This is usually achieved through well thought out techniques of distribution and transfer. A computer can provide records and/or reports of goods received, goods to be received, and current on-hand quantities. That's just a start. To make good decisions in this area, the professional needs to know current stock levels, previous site distributions, how quickly the stock moved, seasonal information, and current socio-economic considerations. Again, this data can be provided by a computer. Additionally, to keep in step with the quick, exciting nature of retailing, with a few strokes on a CRT keyboard, merchandise can be ordered, sent, transferred, and registered via computer technology.
The data processing field has always been driven by technology. Therefore, let's look at the present and future impact of these technologies on the use of data processing as a business tool.

First, let's look at hardware. Hardware always has been considered something that you can touch and see as compared to software, the programs used within the hardware. The cost performance of hardware has steadily improved over the years to open up new functional areas for using data processing. Originally, the cost of hardware was so high that it could only be used to displace significant clerical activities.

Today, with microprocessors available, the cost of having a personal computer is within the reach of most home budgets—let alone business budgets.

This same technology has opened up the entire field of robotics. Robotics is really no more than the old electromechanical automation of the '50s except that the cost has been reduced so dramatically that many electromechanical functions can now be automated economically. The same microprocessors are being proliferated throughout industry as process control computers, instrumentation devices, and monitoring devices. The hardware technology has far outpaced the ability of people to use it.

The term software is used for two types of computer programs. In one case, the programs are used to operate the computer hardware—central processor, tape drives, disk drives, printers, video displays, etc. The other type of software is application programs. I will discuss application programs later. The cost of software is increasing in contrast with the cost of hardware decreasing. Although software is the key to using hardware, it has become a bigger and bigger part of the total data processing cost.

Over the years, most businesses have realized that they are not really unique and do not have to have computer programs designed specifically for them. Businesses as well as service organizations perform functions that are very much the same from one business to another and from one service organization to another. This has made it possible for companies to develop and market application packages that will perform these needed functions. Data processing organizations have overcome the "not invented here" syndrome. We will see more and more purchased packages being used in the future. The data processing organization that does not have the philosophy of buying a package, if at all possible, is missing the point.

An understanding of the techniques for creating computer programs has led to code generators and application generators. An application generator is able to take descriptive narratives in the King's English and convert them into computer code. These application generators are the answer to the increased people cost and people resource requirements that have been the greatest deterrents to the use of computers in the business world. Application generators will become a new way of life.
Because of the advertising media, everyone has heard of word processing, electronic mail, and teleconferencing; and most everyone has heard about the "work station." In the office of the future, all of these will be realities even though they are hard to find today. When they are found, they are normally separate tasks rather than being a total integration of the data processing field in the office. The technologies to do office automation are available today. The technologies have not been turned into practical implementation pieces of hardware and/or software so they fit together and perform all of the functions needed to realize office automation.

As mentioned before, the price of microprocessors is so low that any home can have a personal computer. These personal computers will be used in business and in service organizations. If you think they will not, you are kidding yourself. Therefore, their use must be controlled so they become a tool rather than a toy. The challenge immediately ahead is to develop the controls for the procurement and use of personal computers.

Today, the data processing function in any organization is being elevated in recognition of its significant impact on the performance of that organization. Heads of data processing report to presidents and CEOs. Data processing persons are involved in the business planning cycle. Data processing professionals are business oriented rather than just technicians. They are professionals versus artists. They will continue to grow in stature so long as they recognize their purpose is to serve business functions rather than serve the data processing function.

Ruth L. Galbraith, Panelist  
Dean, School of Home Economics, Auburn University

The higher education enrollment trends from the past decade indicate that students are choosing majors that offer promise of employment after graduation, and especially employment at high entry-level salaries. As a result, engineering, business, and computer-related departments are swamped with students nationwide, while enrollments in education and other human service majors have declined. Although choice of college major is highly cyclical, the present trend toward technology and business-related career choices does not show any indication it has reached its peak. Consequently, it is important for us as textiles and clothing educators to think about present and future career options open to our students and to plan curricula that will incorporate the business and technological knowledge needed for successful performance in the labor force if we are to maintain viable clothing and textiles programs.

Technological knowledge related to textiles and clothing is expanding rapidly and the textile, apparel, and merchandising industries are becoming increasingly sophisticated in their use of all technology, not just computer-based technology. Thus, there is more and more for students to learn—but no more time if we are to maintain our baccalaureate degree requirements at four years. This means we must select carefully those things that students must know for inclusion within our curricula. Perhaps we can be innovative in our use of computers to store information so it can be retrieved easily rather than requiring students to learn.
quite so much in the way of factual data. It may become more important
to teach them how to find information when they need it and then how to
use it.

Since this is an increasingly technological world, it is important
that our students have a sound technological base. However, I do believe
that we also must retain a balance of good, sound liberal education
courses as the basis for all our curricula. We are educating people
first and home economists interested in textiles and clothing second.
This is a decision that is often unpopular with students as they try to
cram in all those courses they think they need to obtain an entry-level
position. However, if we deviate too far from a good balance among
liberal education, technological, and other professional courses, we
are apt to find ourselves training entry-level technicians with no
possibility of upward mobility. We must give our students the basic
thinking and communication skills that will allow them to advance in
their chosen careers as well as the technical knowledge that will open
the door to their first position.

Emily Quinn Pou, Panelist
Dean, College of Home Economics, University of Georgia

It is most commendable that your program committee and membership
have developed the topic, "New Directions in Technology," for your
annual meeting. Presentors have certainly given us the perspective
and challenge of the evolution brought about by computers and the
revolution we will soon be seeing in higher education. On most of our
campuses we are attempting to move as rapidly as possible from "computer
awareness" to "computer literacy."

It is imperative that faculty and students have opportunities for
training to become literate and access to the equipment to achieve the
proficiency needed in instruction and research programs.

We will need to examine computers as one among many tools we have
in higher education. While not being intimidated by computers, neither
can we regard them as the means to solving all of education's problems.
Indeed, the meaning of "computer-assisted instruction" may be interpreted
as just that. The computer is among a number of instructional aids.

As we are propelled into the computer age in higher education, we
have opportunities for increased creativity and effectiveness in our
instruction, research, and service programs.

Velda Rankin, Panelist
National Program Leader and Clothing and Textiles Specialist
Extension Service, U.S. Department of Agriculture

It would be difficult to be part of this conference without feeling
privileged to be living in this time of firsts. There is an enormous
excitement in knowing that much of the new technology is no longer in
the priesthood of specialists and now belongs to the people. Experts
project that 1,300,000 micro-computers will be in homes by 1983. It
is hard to estimate how much these electronic filing cabinets will
change our lives.
Jeol Makower reminds us that the computer has escaped from its beginning cumbersome form and is invading the secretarial pool, the executive suite, the classroom, and the home. It travels in briefcases, speaks English, keeps our records, and is becoming as ambitious as paper clips in the world of educators.

Children are growing increasingly comfortable with this machine that has the power to put limitless amounts of knowledge at their disposal. Will there be a time when classrooms will become obsolete and children will be educated in the home? How will educators cope with testing and out-of-class assignments when a machine can search databases throughout the world and provide the text of printed documents?

Hubbard and Richardson point out that new technology gives us the potential to create an electronic democracy in which a two-way flow of information educates people, and at the same time delivers their desires to leaders. A historical review of holistic systems reveals they are characterized by greater consciousness and freedom.

The Bureau of Labor Statistics predicts that four out of every eight new jobs through the 1990s will be in computer-related fields. In the 1980s, McCall's Pattern Company has joined forces with Coast Telecourses of California to produce a one semester telecourse on wardrobe management and clothing construction. The Sew Video Show, cablecast by Satellite Program Network, will reach 1,500 communities in 45 states with 5 million subscribing households; and Sewing by Satellite sponsored by the American Home Sewing Association, the Extension Service, and AHEA is coming soon. Computers have a tremendous impact on the growing cottage industry, and more and more office workers are sharing their desks with a computer.

Anyone who needs convincing that the new technology can do many things better, faster, and cheaper than man should talk to the president of Automated Office Systems. He states that before a spilled cup of coffee can reach the floor, a large computer can debit 2,000 checks to 300 different bank accounts, analyze the electrocardiograms of 100 patients, score 150,000 answers on 3,000 examinations while concurrently analyzing the effectiveness of questions, and process the payroll for 1,000 employees.

Do you feel you are about to become obsolete? Remember, computers can become only as powerful and useful as humans want them to be. We have learned today that computers and calculators are not new to man. In addition to the early tabulation methods described by Dr. Lewis, International Data Corporation states that most people live with 2 to 10 computers concealed in heating systems, stereos, and cars. At this moment there are approximately 100,000 instructions per U.S. citizen being obeyed by computers every second.

What does the future hold for unsophisticated users?—Possibly public computer work stations, portable terminals that can be used from airplanes, and easy chairs with controls in the arms accompanied by wall-sized screens. Much of the work done in educational institutions and offices may be transferred to the home where one can interact with the information source and with other users.

During my flight to Arizona this week, an article in The American Way attracted my attention. The electronic network was affectionately referred to as "electronic mother." Some ponderable questions were raised in the article, including:
• How can electronic mail and other communications be kept private if there is no envelope to seal?
• Will daily transactions become faceless and our socializing be carried on by computer?
• If information networks allow people to work, play, and conduct personal business without leaving home, will they become introverts and recluses?
• Will people become as dependent on the home computer as they have on television and the automobile, the two other profoundly influential inventions of the twentieth century?
• Who should pay to bring new systems into the home—the information source, transmitter, advisor, student, or consumer?

We should remember there is more to computing than buying a system and plugging it in. First, there is an incredible lack of compatibility in software. Not all machines talk to each other, and back-alley manufacturers are flooding the market with counterfeit, inferior machines. We must be willing to be a beginner. A new language must be learned, and many at-home workers must find a means for social participation to replace the challenge and feedback gained from associates.

Persons have not been replaced in their responsibility for guiding the interaction between themselves and this technology with awesome capabilities. They have, and will be, freed to accomplish greater achievements; to live in a world linked by teletext and videotex; a world governed by information flow; a world revolutionized in the ways its people live and are educated.

THE COST OF DE-REGULATION

Patricia A. Helms
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This title may seem out of step with the current emphasis on de-regulation. Regulation has been blamed for ever increasing prices for most consumer products. News coverage of the financial problems of Johns Manville and the recent article by Dickerson (1982) and her colleagues point out regulating or banning products can be costly to industry and those costs are usually passed on to the consumer. Today our government and economists question if consumers, business, or the economy can assume the costs of regulation. It is the purpose of this paper to consider the idea that we may not be able to afford de-regulation.

Economic advisor Murray Weidenbaum estimated the cost of regulation at $120 billion a year. George Bush described regulation as a snake with too many heads. You may agree that looking at costs without looking at the benefits is a very one-sided view of regulation. When asked about the benefits of regulation, Weidenbaum and David Stockman admitted they knew of no good benefit analysis (Green, 1981).
Like our political leaders, many of us do not have information that can support regulation based on good cost/benefit data. Unfortunately the news media are not helpful in providing this information to us. Frank Svoboda of the Washington Post, speaking at the 1982 Future of Consumerism Conference, stated flatly that newspapers will never congratulate an agency for doing a good job. The role of the news industry is to inform the public when agencies are not doing their job. One-sided reporting gives both the professional and the consumer a one-sided view of regulation. We have to make an extra effort to search for information on the accomplishments of regulation. Dardis' work published in Textile Chemist and Colorist gives good cost/benefit data for the Mandatory Children's Sleepwear Standard. As expensive as this legislation was, the benefits of preventing children from serious burn injuries were well worth it (Schmitt, 1975). Later work by Dardis on the proposed upholstered furniture cigarette ignition standard indicated it was not worth the cost of regulating. Every agency has a mandate to study the economic impact of a regulation. These studies are part of the public record, but must be requested. If you are involved in research that pertains to a regulated product, you can request economic data as well as accident incidence data.

Critics of federal or state consumer protection call it unnecessary meddling in business. The article published by Ethridge of the University of Illinois points out that industry has from the beginning considered consumer protection unnecessary but never hesitated to call for government intervention on its behalf (Ethridge, 1982). If we agree that the role of government is to protect the free-enterprise system, then we must assume government must provide protection against unfair competition, ensure consumers have accurate information to make intelligent decisions, and protect the public against products that endanger health. The Federal Trade Commission and the Small Business Administration try to provide information to maintain competition. Fair packaging, warranty regulations, and credit protection provide for consumer information. The Pure Food and Drug Act and Meat Inspection Act followed public outcries for federal consumer protection.

If we look at the estimated benefits of five safety agencies including O.S.H.A., N.H.T.S.A., F.D.A., E.P.A., and C.P.S.C. in 1978, the dollar value is $37.1 billion. Projections for 1985 were $94.1 billion. Comparing these benefit figures to the $31.4 billion cost estimated for these five agencies made by Weidenbaum's Office in 1978, it seems consumer protection has been well worth the money (Green, 1981).

Prior to the 1950s, most textile legislation and trade rules were developed to handle false advertising of wool and other fibers. The sheep industry wanted the textile industry regulated to protect its market for new wool. Even the confidentiality of RN and WPL numbers prohibited the consumer from seeking redress from the manufacturer. The shocking burn injuries from cowboy chaps and torch sweaters initiated the first safety legislation. The 1953 CSC 191 is a fascinating study of standards. It did accomplish one thing by eliminating the known problem garments from the market. But did you know that the 3.5 second burn rate was decided because one major company could not pass the recommended 4.0 second standard! And did you know that newspaper and toilet paper will pass this standard!
While the executive and legislative branches of our government were making major commitments to safety, the judicial system also made a very important decision by recognizing the doctrine of strict liability. Over 100,000 state court product liability cases were reported in 1981 and over 9,000 were filed in federal court (Product Safety, 1982). Product liability cases are expensive. Legal fees, court settlements, and the social and psychological costs to the accident victim are expensive. Some examples of textile burn cases reported by Liberty Mutual Insurance (1973) include the following:

1. A 16-year-old girl was seriously burned when her pajamas ignited on contact with the stove. Suit for the sum of $1,200,000 was filed against the retail store.

2. A New York woman was burned when her sleeping gown came in contact with the stove. Suit seeking $550,000 in damages was filed against the retailer, manufacturer, and two fabric suppliers.

I assisted one of our University engineers with a case in which a motor home was in an accident and caught fire. The father, mother, and two children escaped with minor singeing of the hair and clothing. The grandmother was wearing a heavy acrylic sweater that ignited, and her burns caused her death. What made that sweater so different that even rolling on the ground and attempts by the family to put out the flames were useless? Was it a hazardously flammable garment? Testing indicated it passed the CSC 191 standard, but the court ruled the sweater hazardously flammable and the cause of death. I am not an advocate of government regulation. Nor can I support a completely voluntary system of safety standards. And even the well meaning and hard working consumer advocate cannot police every industry. But working together as a team (each with its own point of view) could save lives and money. Cost/benefit analysis is an imperfect science, but its potential is worth the time and effort. Whether costs are created by the courts with million-dollar settlements, or government with million-dollar record-keeping and testing programs, or the burned child with million-dollar medical and rehabilitative costs, these costs will be paid by the consumer. As long as 30,000 deaths and 20 million injuries continue to be a price too high to pay by this society, regulation will be necessary.

Regulatory process, whether it is done by government or industry, will require the expense of collecting accident data and engineering information, test equipment development, and recordkeeping. Industry spends a great deal of money participating in I.S.O., A.S.T.M., and A.N.S.I. committees. The consumer and the industry bear this cost. Does cooperating with government cost more? Would a standard that could eliminate or substantially lower product liability suits be too costly to business? Needless burns increase medical costs, automobile accidents increase insurance rates, fire causes an astronomical toll in property damage and taxpayers' money for fire fighters.

Regulation is expensive, but not regulating could be more costly. As consumers, taxpayers, and professionals, we must avail ourselves of all information possible, including costs and benefits, before we can say regulation is too expensive. We also must use the same standards of cost/benefit analysis for alternatives to federal regulation whether it be consumer education, liability insurance, or a national health plan to provide economic help to the injured consumer similar to workmen's
compensation. Whichever direction consumer protection takes, the consumer will pay. Society and government need to find the most cost-effective method of providing the protection the consumer needs.

My interest in the cost/benefit of consumer protection, the process of standardization, and the feasibility of voluntary standards led me to design a sabbatical proposal for a one-year leave to work with the Consumer Product Safety Commission. The one year was cut to six months because of agency budget cuts in 1981. That six months was a very rewarding experience and I recommend it to all of you. Federal Trade Commission, E.P.A., C.P.S.C., Small Business Administration, U.S.D.A., and Office of Consumer Affairs all could benefit from the talents in this organization. Decreased staffing resulting from severe budget cuts has eliminated many projects and slowed many to a standstill; your help could keep them going.

After six months of investigating my professional background and 25 interviews with C.P.S.C. staffs, my leave was approved and my assignment made with the Office of Program Management. I requested not to be assigned to the Directorate of Textile and Mechanical Engineering. There were three reasons for my not wanting to be assigned to engineering. One reason was my preconceived opinions may have limited my effectiveness and the effectiveness of the agency. The second reason was I wanted to broaden my subject-matter interests due to the approval of the new University Consumer Affairs Degree by our Board of Regents. I am the only technically trained faculty member included on program faculty. My work with the students in this program could not be limited only to textile products. Since the state was paying my salary, I felt a responsibility to learn as much as I could that would help the citizens of my state. Previous work with C.P.S.C.'s Boston Office, Rhode Island hospitals, and our State Fire Marshal's Office did not indicate textile flammability as a priority. Our state's problem was the safety of energy conservation related products. So I began work on the urea-formaldehyde foam insulation, indoor air quality, wood-burning stoves, and chain saw teams.

While at the agency I took time to attend staff and commission meetings concerned with the safety of textile finishes, upholstery furniture, and clothing. In addition to my work with C.P.S.C., I was contacted by the Federal Trade Commission to share my opinions under their jurisdiction.

From 1980-1981, all regulatory agencies, particularly those with consumer protection laws, were scrutinized by Congress. Budgets were cut and personnel ceilings were set. It is interesting that C.P.S.C., smaller than any of the other agencies I have mentioned, could cause so much controversy. C.P.S.C.'s total 1981 budget was equal to one day of the Defense Department budget. It is an agency that took a 25 percent budget cut when other agencies were asked to take an 8 percent cut. It is an agency that through regulation caused a 72 percent decrease in child deaths from drug poisoning and 63 percent decrease in child deaths due to poisoning by household products.

The major impact of budget cuts to the textile consumer is a halt in future improvements or developments of any additional standards. The Federal Trade Commission had considered recommending to Congress the repeal of the Textile Fiber Products Identification Act. To date I
have not read of a formal proposal of repeal. The three years of work to improve the Permanent Care Labeling Rule was discontinued and the ruling making it mandatory for manufacturers to provide care labels for yard goods was modified.

The Consumer Product Safety Commission is studying the consumer health risks of formaldehyde and some dyestuffs. The Commission is closely monitoring the voluntary efforts of the Upholstered Furniture Action Council.

Ignition of flammable fabrics continues to cause 26 percent of residential fires and 52 percent of fire deaths. Upholstered furniture, mattresses, and bedding are the greatest contributors. The elderly continue to suffer more injuries and deaths due to clothing burns. Daywear causes 74 percent of the burn injuries to those 5-44 years of age. Nightwear is the major problem (47 percent) for those 45 or older (C.P.S.C., 1981). Work needs to be done to improve C8C 191 or study the feasibility of the mushroom test as an alternative. There is no indication that any agency or industry is working on this problem. Would a new regulation be costly? Yes, but benefits could outweigh those costs. To really make a wise decision we have to at least look at the issues. Government's inactivity will only open the courts to more product liability suits. Consumers of the products manufactured by companies involved in product liability suits pay legal fees and large settlements to burn victims and their families. One thousand, million dollar burn cases could pay the price of a billion dollar standard and avoid the pain and suffering of the 1,000 burn victims.

My work with trade associations at C.P.S.C. indicated we will continue to develop new technologies and products that are dangerous and unreliable, that society will expect any company who enters commerce to rid its product of any potentially harmful defects, and there will be minority businesses that will continue to operate dishonestly or others who have occasional lapses.

If the Tylenol situation is any indication of public expectations for protection, it appears government regulation will be necessary. Will there be good cost/benefit analysis done on the safety packaging of drugs? Probably not. We seem to be willing to pay any price. And the losses to Johnson & Johnson will certainly motivate the industry toward voluntary regulation. But if we put the seven deaths by Tylenol in perspective to the 400 deaths due to clothing burns, why is textile regulation so much of a problem?

Some innovative method of reducing risks must become part of the free market system. Panic legislation after many injuries or deaths have already occurred is like closing the gate after the horse is out. De-regulation is not the answer; cost effective regulation is.

References:


When I first came to New York over two years ago, I was faced with the seemingly impossible task of finding employment. I was ambitious, enthusiastic, and ready to conquer the world, but thousands of other graduates were equally as determined to "make it in the Big Apple."

After a month of "pounding the pavement" from nine to five, I accepted the position of showroom coordinator at Koret. By this time, I was offered five other jobs, but intuitively felt that Koret was the best place to begin my career. The people were friendly, the benefits were excellent, there was room for advancement, and my future seemed promising.

Koret started in 1938, when Joseph Koret and his wife began making sweaters and skirts. Since then, it has grown to a $150 million annual volume company. In 1979, Koret became a division of Levi Womenwear. Koret produces five yearly line releases of moderately-priced, high-quality, misses, large size, and petite sportswear.

My position as showroom coordinator demands adaptability and versatility. Each day is different and filled with new learning experiences. One of the creative aspects of my job includes working with the fashion editors of magazines that reach our consumer, such as Woman's Day, Ladies' Home Journal, McCall's, Family Circle, and Good Housekeeping, to obtain editorial coverage of our line. We put looks together that fit the time frame and concept of a particular featured story. I also work with buyers and top management of department stores throughout the country, such as Burdines, Jordan Marsh, Garfinckels, Marshall Field, Kaufmann's, Dillards, and Gimbel's. In selling, it is very important to be creative during the line presentation, since the merchandise must captivate the buyer's attention and create a reason to buy.
My education in clothing and textiles was very helpful in preparing me for a career in the fashion industry. Textile science courses gave me added knowledge of structures and properties of fibers and fabric construction, which is especially useful in explaining the performance characteristics of our garments. For example, we revolutionized the industry with the invention of the permanent-press process, Koratron, which is a post-cured process we've been using for the past 19 years. Garment design and construction courses gave me valuable training in understanding production and in recognizing quality and fit in our garments.

The internship program complemented my college background and gave an inside look at the fashion business. Although I worked without pay at Bobbie Brooks, the showroom sales experience was invaluable to my future in the apparel industry. My job at Macy's gave me the opportunity to broaden my retail background by assisting customers in the world's largest store. The summer I spent in New York is one of the most memorable and enlightening experiences of my life and helped me decide to seek a career in the fashion capital.

Reflecting on my college curriculum, I would say that although I was prepared to face the work force, in many ways, college did not emphasize certain realities of business life. Perhaps, if courses were offered in business etiquette, office politics, assertiveness training, and corporate success for women, more students would be alerted to common business procedures and learn ways to succeed. Also, courses that sharpen personality, writing, and presentation skills are important to success in any industry.

Over the past two years, I have received a strong base for building my fashion career. Koret has given me the opportunity to realize my potential in sales and I am grateful to the company for encouraging creativity and recognizing achievement.

Linda M. Hardwick, Panelist
Employer Relations Representative, U.S. Employment Service

Since 1976 I have been employed by the Industrial Relations Department of the State of Alabama as an Employer Relations Representative. On occasion I have been asked how I got my position with a background in home economics and not a degree in communications, public relations, or journalism. Realizing that the masses still stereotype home economics graduates as holding cooking or sewing careers, I have assured inquirers that I was a "natural" for the position. Not only did I receive a broad base of liberal arts and business courses, but I took home economics courses that gave insight to understanding human beings.

Working my way through school had given me plenty of work experience in various fields (clerical, telephone receptionist, baby-sitting services, food service, etc.). I took advantage of getting involved with community affairs, and church and political activities to round out my background. Taking the initiative and getting involved in college activities (newspaper staff, Fashion, Inc., Civinettes, beauty pageants) has proved to be part of a series of stepping stones to
achieving this creative career. Upon graduation, I trained for a few years in retail sales and this helped give me the ability to "sell" the Employment Service.

Typically, a public relations job operates against deadlines and demands a high energy level. If anything, my home economics degree taught me to be punctual in delivering work assignments and it developed my creativity.

My job requires flexibility in dealing with the public. I face many different attitudes and concerns of employers as well as job-seeking applicants. Daily, I apply my talents and skills in many different areas. Due to federal cutbacks in the last few weeks, I have been interviewing job applicants on a full-time basis. I feel I am much more flexible than a history, science, or even a business major. In today's economy these applicants are often hard-pressed to find jobs. According to the Occupational Outlook Handbook, (1980-81 edition), by the year 1990 nearly one third of the population will be between the ages of 25-44. The use of new technology is creating and eliminating hundreds of thousands of jobs. Technological innovations still do not replace personal contact. Probably more people lose their jobs because they cannot function among co-workers than because they cannot perform their jobs. I feel as a home economist I have been broadened to my surroundings. Too many graduates are walking around with blinders on. A well-rounded student is usually an employed graduate.

Susan B. Hester, Panelist
International Trade Specialist, U.S. Department of Commerce

I am pleased to be here today to share with you information about career opportunities in international trade of textiles and apparel. I will tell you about positions I have held, as well as other jobs in the federal government that might be of interest to you. International trade is an exciting field and one that promises to be filled with challenging opportunities in the future.

I have been employed for almost two years in the International Trade Administration, which is an agency in the Department of Commerce. Within ITA, the international trade of textiles and apparel is the business of the Office of Textiles and Apparel. Three divisions make up this office.

The first division is the Industry Assessment Division. People employed in this division collect data on the domestic textile and apparel industries. An example of the numerous reports that they publish is the chapter in the annual U.S. Industrial Outlook on the textile and apparel sectors.

The Market Expansion Division promotes textile and apparel exports. This is accomplished through such activities as market research, export seminars, foreign in-store promotions, foreign buyers program, and selling missions and trade shows to South America, Europe, and the Far East. This division also chairs a committee for the elimination of textile export barriers imposed by other countries on U.S. goods.
The third division is the International Agreements and Monitoring Division. As the name suggests its function is to monitor our international textile and apparel agreements. These agreements, 25 bilaterals at the present time, were negotiated under the General Agreement on Trade and Tariffs as part of the Multifiber Arrangement. Country analysts in this division monitor trade with individual countries, prepare briefing materials to support negotiations, and participate in negotiations with representatives of foreign countries.

Another office that presently employs three graduates of textile and apparel programs is the Textiles, Leather Products, and Apparel Division at the International Trade Commission. Industry analysts publish status reports on international trade in these products, as well as aid the investigative staff at ITC. This may include doing research to substantiate claims of the domestic industry in cases of dumping by foreign countries.

The functions of these two offices are varied, but some common skills can be identified. Careful choices for course of study can enhance a student's chances of working in international trade. In the textile and clothing department I would encourage you to learn as much about the industry as possible from the textiles themselves through production and retailing. Courses like marketing in the business department are important, as well as economics and statistics, even in an undergraduate program. At the graduate level, courses in research methodology would be helpful. I have found that my background in textiles and apparel has been an important asset in my job because most people begin working at ITA with no special knowledge of the industry or products. Those of us who know our industry realize how unique it is in many ways. This background information gave me a real step up and the possibility for making immediate and significant contributions in my office.

There are several ways to investigate the possibility of working in international trade. Summer positions and cooperative work-study programs are available depending on budget constraints. Another possibility is an unpaid internship in Washington. During the course of a semester, a student can earn academic credit, learn what the job involves, and establish contacts that may lead to a full-time job after graduation.

Linda Kimmel, Panelist
Textile Engineering Graduate Student
Georgia Institute of Technology

The unique field of protective garment design consolidates my academic training, my graduate research, and my professional experiences. My apparel education led to employment with a company that designed protective equipment. Among my projects there, those associated with the space program held my particular fascination, although I also was involved in the development of medical, industrial, and recreational garments.

My interest in protective apparel dates back to my undergraduate study of textile and apparel design at Cornell University (B.S. 1974). The program is part of the Department of Design and Environmental
Analysis within the School of Human Ecology. The curriculum puts a unique emphasis on the integration of technical, human, and social factors in the design process, but a course in functional garment design was instrumental in formulating my career aspirations. Participation in an effort to redesign the uniforms of the ice-hockey team reinforced this interest.

Upon graduation, I began employment as a patternmaker for a company that specialized in the design and development of protective apparel. This was a natural extension of my undergraduate education, although my activities broadened with promotions to design and then project engineer. These included the design, selection of materials and processes, as well as the supervision of testing, prototype assembly, and final production.

My most significant contributions as a design engineer were related to the development of two major components of the space suits, the Liquid Cooling Ventilation Garment and the Thermal Micrometeoroid Garment. Traditionally, an engineer is envisioned as someone who designs or builds rigid structures or mechanisms, but more basically, an engineer is a skilled problem solver in any discipline. The engineering method begins with the identification of a problem and the desired objectives. Design requirements and constraints are specified, and the problem is broken down into parts for analysis. The crucial factor rests with the proper identification and interpretation of relevant data. At this stage, partial solutions are conceptualized and combined, sometimes requiring trade-offs between conflicting requirements. The compromise of some degree of physical protection in deference to weight limitations is a common example. Specifically, sufficient thickness of the proper fabric may protect beautifully, but excess weight or bulk may prohibit required mobility. Finally, the evaluation of mock-up components or prototype assemblies plays an important role in achieving optimal form, fit, and function as part of the design process. Successful engineering requires creativity and perseverance, and pivots around developing good judgment based on knowledge and developed by experience.

The essential factor in a successful, creative career is inherently tied to education. Schools must make a determined effort to expose students to career options as early as possible. Thereafter, education within one's selected field must be technical enough to provide the tools to facilitate continued personal and professional growth. Relative to my own experiences, my undergraduate education identified my career interest, and my professional experiences prompted my return to school for the technical expertise that I lacked. I am presently enrolled at Georgia Tech, pursuing a Master's degree in Textile Engineering. My greatest pride associated with my schoolwork has been the ability to relate my broadening knowledge with the activities of a functioning engineer. In fact, my thesis research involves the Thermal Micrometeoroid Garment that I worked on earlier. After completing my degree, I hope to return to industry as a more proficient professional, and I would encourage others to consider the field.
Marie Williams, Panelist
Production Manager, Rafshoon Shivers Vargas Tolpin
Atlanta, Georgia

With today's poor economy and shortage of jobs for qualified applicants, I am glad that the topic of "Creative Careers" is being addressed by our educators. Students often view college as a place to be trained for a specific job or profession. This tunnel vision prevents students from realizing that college actually teaches them to learn, to assimilate and analyze information, and to apply it to the problems that life presents.

As a student I was told that my skills were transferable, and I even had to write a paper on this topic! I don't think I fully believed this until I was faced with the problem of not immediately finding a job in my field.

Before I explain how I have used my degree in a different field, I would like to give you some background information on advertising and my position as production manager in a major Atlanta agency.

Advertising is the glamour and creative slogans we see and hear, and more. It is high pressure, hard work, long hours, and the ability to work with creative egos and temperamental clients. My position is a "behind the scenes" one that solves the technical problem of how an idea can be produced. I am responsible for the purchase and "quality control" of services such as photography, art, typesetting and printing, and for the flow of the production process both internally and outside the agency. One of my primary concerns is formulating and maintaining a budget, which is perhaps the single most important factor in determining how an idea will be executed. This is critically important both for the client's satisfaction and the agency's profitability. Needless to say, some of the fundamentals I learned in my retail buying and math classes have been especially helpful in making good buying decisions.

My entrance into advertising was not planned. After college I had hoped to get a position with a training program in a retail store. By chance, a friend introduced me to the president of a small agency. What started as a "Girl Friday" position allowed me to learn a profession "on the job," and it is a field which has been continually satisfying ever since.

I already have mentioned some of the skills that I have been able to transfer into an agency setting, and there are many others. But the area where I have seen the greatest transferral has been my basic knowledge of textile fibers. The way I have used this knowledge is with the paper on which advertisements, brochures, and other sales materials are printed. Just as paper in products such as paper towels, paper diapers, and even paper dresses in both fashion and medical settings has replaced fabric, I have applied the use of paper to communicate an advertising message to a different end use. And these end uses vary according to the function of the piece, its lifespan, the printing processes to which it will be subjected, budget and time, just as end uses vary for fabric. A thorough knowledge of paper is especially important to me for two reasons: First, paper can account for as much as 50 percent of a printing budget; second, the majority of work RSVT does for its clients is in the print medium.
To become knowledgeable about paper I first had to realize that the origin and production of paper is the same as that of fibers and fabrics. Most paper is derived from cellulose fibers of wood. The remainder is from other natural sources such as hemp and bamboo, and man-made sources such as olefin. The process of papermaking is like that of nonwoven fabric in that once the fibers are isolated by mechanical or chemical means, they are bleached, beaten, refined and sized, and made into paper through a wetting, pressing, and drying process. Finishing operations, such as calendaring, coating, and embossing, may be performed to give the fibers and paper different characteristics just as one piece of polyester fabric may look and perform differently from another. Incidentally, some of the names given to paper finishes are linen, felt, and tweed.

This synonymous terminology of the two fields may be clearer with a brief description of the language and testing used for paper properties. First of all, the fibers used and their uniformity in the papermaking process affect the paper’s aesthetic appeal and its printability. Second, paper is made in specific sizes that must be considered to avoid waste; it has grain, and even a right and wrong side, and it is made in varying weights and bulks that are suited to specific end uses. Lastly, paper has such inherent properties as porosity, moisture content, dimensional stability, pick resistance, water resistance, absorbancy, tensile strength, tear resistance, and bursting strength. All of these directly affect the choice of paper for a specific use and have an impact on the cost.

An example of the technological advances being made in paper will demonstrate how the properties I have named are considered in improving end use. A paper called Tyvek has been developed to supplement the needs of users of manila mailing envelopes, and is used by Federal Express and other overnight shipping companies. It is spun-bonded olefin, and it has extremely high tear resistance, tensile strength, bursting strength, and water resistance. It is lighter in weight than paper.

Examples of the similarity of fabric and paper properties and uses are endless, but let me close by saying that clothing and textile studies prepare students for many career options if the students are creative and innovative in their thinking. It is, however, students' responsibility to learn something about the new field and show their prospective employers how these skills can be used. After all, learning the operation of a printing press is not any different than learning the operation of a sewing machine.
Air Permeability of Textile Fabrics: A Comparison of Measured and Statistically Predicted Values

Helen H. Epps, University of Georgia

Air permeability is an important factor in the behavior of textile structures in comfort and energy-related applications. The air permeability of a textile fabric is determined by the rate of air flow through the fabric at standardized pressure levels. Open, highly porous textile structures are often too permeable to be assessed using conventional instrumentation and methods. Previous researchers have suggested that the air permeability of fabrics that permit a high rate of air flow could be assessed from measurements of multiple layers of fabrics; the permeability of a single layer of fabric could be estimated by extrapolation from a logarithmic plot of the multiple-layer measurements.

The purpose of this research was to evaluate the validity of the indirect method of assessing air permeability of a single layer of fabric by extrapolation from multiple-layer data.

Fabrics representing various yarn counts, thicknesses, and weights were evaluated using a Gurley air permeometer. Air permeability values (ft³/min/ft²) were obtained from measurement of successive numbers of fabric layers, ranging from the fewest number of layers from which a reading could be obtained to the maximum number of layers that could be accommodated between the clamps of the instrument.

Plots of air permeability versus number of fabric layers indicated a curvilinear relationship between the two factors for each of the fabrics tested. A Statistical Analysis System (SAS) nonlinear regression procedure was used to generate statistical models for predicting air permeability. For each of the fabrics studied, several regression models were generated by altering the number of data points used in each statistical analysis.

The precision of this technique for estimating single-layer air permeability was evaluated by comparison of estimates derived from separate models that were developed from different data points. Accuracy of the method was assessed by comparison of predicted values with actual measurements of air permeability of single layers of the fabrics that could be measured directly.

Considerable variation was observed in the air permeability predictions generated by the regression models, depending on the number of layers of fabric used in the analysis. Variation also was found between predicted and measured values of air permeability. The relative appropriateness of this technique for determining air permeability of a variety of fabrics was evaluated.

The Distribution of Residual Oily Soil on Fabrics after Laundering

S. K. Obendorf, Cornell University

The reduction of wash water temperatures to conserve energy and the changes in detergent formulations in response to environmental concerns
have intensified the already difficult consumer problem of soil removal by laundering. In this investigation, the distribution of residual oily soil (triolein) on fibrous substrates was determined for woven fabrics of acrylic, polyester, nylon, cotton, and polyester/cotton that were laundered at 38°C with a heavy-duty, unbuilt liquid detergent. In addition, the effect of wash temperature on the extent of oily soil penetration (synthetic sebum) was studied for the polyester/cotton resin treated fabric using wash temperatures of 4, 27, 38, and 49°C and three different detergents. In each case, the total amounts of residual oil were determined by radio-tracer analysis and the distribution of the oil was evaluated by back-scattered electron images and electron beam X-ray microanalyses.

For fibers of all chemical types, high concentrations of triolein were observed in the interfiber capillaries of the yarns and on the fiber surfaces after laundering at 38°C with a heavy-duty, unbuilt detergent. Oil appeared in beads on the surface of acrylic and nylon fibers and on polyester fibers from the polyester/cotton blend that had a durable press finish. The unfinished polyester fibers had a uniform coating around the fiber surfaces. Less total residual triolein was observed on the nylon fabrics than on the fabrics containing other synthetic fibers. The distribution of oil, however, was similar for all the synthetic fabrics with little or no triolein in the interior of the synthetic fibers. Cotton fibers had large deposits of triolein in the crenulated surfaces and in the lumen, as well as in the interfiber spaces.

At all wash temperatures, the two built powdered detergents removed a larger amount of oleic acid than the heavy-duty, unbuilt liquid detergent. Higher wash temperatures increased the removal of oleic acid from the polyester/cotton fabrics for all detergents. The largest change in oil removal with increase in wash temperature was observed for the heavy-duty liquid detergent, which also had the higher total residual oleic acid. The areas within the yarn that had large reductions in oil concentrations with increased wash temperature were the crenulations of the cotton fibers and the small interfiber spaces between closely spaced polyester and/or cotton fibers. These decreases in concentration of oil in capillaries within the yarn structure with increase in wash temperature were larger for the heavy-duty, unbuilt liquid than for either of the built powdered detergents.

Nondegradative Bleaching of Historical Textiles

Sarah L. Cowan, M. D. Hurwitz, C. O. Gahagan
University of North Carolina at Greensboro

A common problem in the restoration of historical cellulosic fabrics is the removal of the yellowing that has occurred due to oxidation degradation. Exposure to ultraviolet light, air, and heat augments the yellowing of cellulose. An associated problem encountered in the restoration of historical textiles is the disintegration of an apparently coherent fabric when laundered. The development of nondegradative methods for the restoration of historical textiles is of great interest.

A pilot study was conducted to define the problem parameters and to determine a possible role of reductive bleaching in the successful restoration of degraded cellulosic fabrics. Test results showed that sodium
borohydride was as effective a bleach as hypochlorite and superior to sodium perborate in the bleaching of yellowed (by heat aging) cellulose textiles. These results were reported in New Orleans at the American Chemical Society Southeast/Southwestern Regional Symposium in December 1980.

Based on the pilot test results two 100 percent cotton petticoats were evaluated using hypochlorite, peroxide, sodium perborate, and sodium borohydride as the bleaching agents. Both petticoats, originally white, are known to be at least 100 years old and were discolored (i.e., yellowed) with age. Standard bleaching procedures were used with the hypochlorite, perborate, and peroxide bleaches. The sodium borohydride bleaching used the procedure that showed promise in the pilot study.

Tear and tensile strength, fluidity, and light reflectance determinations were made on all the bleached fabrics as well as on control samples that had only been wetted out with water and allowed to dry.

The data presently are being analyzed statistically to identify superior (i.e., nondegradative) bleaching procedures for use on historical cellulosic fabrics, if they exist within the parameters of this experimental research study.

**Clothes Make the Boy, 1860-1910**

Jo Barraclough Paoletti, University of Maryland

Between 1880 and 1910, important changes occurred in the ideal masculine image. The gentleman of leisure was replaced by the self-made man as a popular American hero. Similarly, the business suit replaced styles such as the morning suit as the uniform of American men. Male interest in dress was increasingly confined to considerations of practicality and economy, and the use of dress as a means of individual expression was discouraged.

This study concerns the clothing worn by boys from 1860 to 1910, a time span chosen to include the boyhood of the men of 1880-1910 and that of their sons. The principal objective was a comparison of men's and boys' costume during a period of considerable change in the definition of the ideal masculine image. Sources included contemporary works on children's clothing and child-rearing practices. Of particular importance was a content analysis of over 200 illustrations of boys' clothing from five leading magazines of the period.

It was found that boys' styles changed in response to innovations in both men's and women's dress, possibly with a stronger link to the latter. Besides obvious similarities in silhouette, sleeve style, and trim, both boys' and women's clothing evolved simultaneously toward more casual, unstructured styles. This was particularly evident in fashions for boys still in skirts, since these styles were closely related to women's fashions.

In addition, it appears that around 1890 there began an increase in concern about boys and their special needs for "masculine" activities and training. This was expressed not only in the number of articles and books devoted to boys' education, but also in the lowering of the usual age of transition from skirts to pants (from about 5 or 6 years to about 3 or 4). The age at which boys exchanged short trousers for long ones remained the
same (about 12 or 13), supporting the thesis that the motivation for changing the age of "breeching" was sex differentiation, not simply earlier maturation. The Little Lord Fauntleroy craze of the 1880s appears to have been more important as a negative reference point after its time than as a fashion trend. It was possible to find far more criticism of the velvet suits and lace collars associated with that popular book and play than to find actual examples of the style, even at its height. One particular costume, the sailor suit, was so important and so long-lived that it was as much the uniform of the American boy as the business suit was the uniform of his father. One important distinction between them was the greater variation in sailor suit styles, reflecting the closer relationship between boys' and women's styles.

Far from being a minor chapter in the history of costume, boys' clothing of this period appears to have been rich and complex. Combining elements of both men's and women's costume, yet expressing the singular role of the boy as future master but present "pet," boys' fashions offer a unique insight into the domestic life of the period.

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**Fashion Opinion Leadership, Perceptual Style, and Clothing Preferences: An Exploratory Study**

Flora E. Cunningham, Rutgers University

Do consumers make their clothing decisions based upon fashionability or aesthetics? This study was designed to explore some facets of this broad question. The purpose of the study was to investigate relationships among fashion opinion leadership, perceptual style, and clothing preferences. The following four hypotheses were formulated. There is no significant relationship between (1) fashion opinion leadership and perceptual style, (2) fashion opinion leadership and clothing preferences based on either fashionability or aesthetic composition, (3) perceptual style and clothing preferences based on either fashionability or aesthetic composition, (4) age or class and fashion opinion leadership, perceptual style, or clothing preferences.

The study was conducted with a sample of 36 female undergraduates. Two opinion leadership instruments were administered (Silk, 1971; Schrank and Gilmore, 1973), a short form of Witkin's Embedded Figures Test (Jackson, 1956) was given, and a clothing preference measure developed by the researcher was administered.

The Embedded Figures Test is a visual measure of perceptual style of field dependence versus field independence. The clothing preference measure consists of four clothing photographs shown to each respondent in a series of six paired comparisons—each photo with every other photo. Photos differed in fashionability and aesthetics: one vertical (one-color) new fashion, one vertical generally accepted style, one horizontal (two-color) new fashion, and one horizontal generally accepted style. Photos to be used in the study were selected from a group of 30 by a panel of senior design students.

Initial data analysis showed the results of Pearson correlations for each hypothesis. The .05 level was selected as the level of significance.
(1) Total scores on leadership and perception were not related. However, two figures were significantly related to fashion leadership and two others approached significance. When median scores were identified and groups subdivided, the sample contained: 40 percent field independent fashion leaders, 40 percent field dependent fashion followers, 12 percent field independent fashion followers and 8 percent field dependent fashion leaders. Results show fashion leadership related to field independence.

(2) Two paired comparisons show fashion leadership significantly related to preference for a new fashion. One comparison shows fashion leadership related to preference for the horizontal design. Results show fashion leadership more likely related to fashionability than to aesthetic preference.

(3) There were significant relationships for all paired comparisons between aesthetic preference and perceptual style. Where results were significant, field independence was associated with a preference for the horizontal designs. Results show perceptual style is related to aesthetic preference but not to fashionability.

(4) Except for isolated instances, no significant relationships were found between age or class and fashion opinion leadership, perceptual style, or clothing preferences.

In summary, these findings show that fashion leadership is related to field independence and to fashionability of clothing preference, and perceptual style is related to aesthetics of clothing preference. Research needs to be extended to a larger sample and subjected to further statistical analysis to determine interaction of effects.

The Usefulness of Ultraviolet-Visible Spectroscopy and Fourier Transform Infrared Spectroscopy in the Documentation of a 19th-Century Bodice and Skirt

Kathryn A. Jakes and Lucy R. Sibley, University of Georgia

The purpose of this research was to apply small sample attenuated total reflectance techniques combined with Fourier Transform Infrared Spectroscopy (FTIR) and small sample diffuse reflectance techniques in Ultraviolet-Visible Spectroscopy (UV-Vis) to aid in the documentation of a bodice and skirt (1870-55-24a and 24b) donated to the Historic Costume and Textile Collection of the University of Georgia.

A bodice and skirt made of pale green wool, (#1870-55-24a and 24b) and a number of other garments, some of which were also a similar pale green wool, were donated by the same donor who claimed all had been worn by the same person. The garments were studied by conventional methods to determine whether the bodice and skirt in fact belonged to a single outfit. Visual observation revealed similar hand embroidery on the two garments, but different fading and yellowing patterns on the two pieces made them look very dissimilar. Although there was evidence of remodeling, measurements revealed that the garments had the same size waistline.

Microscopic evaluation of fibers from both garments showed wool fibers of similar dimension. Since these observations were insufficient in verifying that the bodice and skirt belonged to the same outfit, instrumental methods of chemical analysis adapted for small size samples
were investigated for the information that they could provide. If it could be shown that the dye and fiber were chemically the same in the bodice and skirt, then one could assume with greater assurance that the two belonged together. UV-visible spectral analysis of a small (≈ 1/4" square) sample of each garment was performed using a diffuse reflectance sphere accessory on a Cary 210 Ultraviolet-Visible Spectrophotometer. The same samples were studied employing an attenuated total reflectance accessory on a Nicolet MX-S Fourier Transform Infrared Spectrometer. A third fabric sample was chosen from an additional pale green woolen shirt (1870-55-23), donated at the same time by the same person, which was obviously not part of a set with the bodice (1870-55-24a) though of similar color, weight, fiber content, and fabric construction.

The research showed that typical observational techniques employed to document historic garments could be supplemented with instrumental techniques of chemical analysis. UV-Visible and Fourier Transform Infrared Spectroscopic techniques, adapted for study of small textile samples, revealed similar spectra for the bodice and skirt (1870-55-24a and 24b), but different spectra for the third sample from the garment numbered 1870-55-23. Of course, the infrared spectra of all three displayed the characteristic absorption bands of wool fibers. Since the spectra of the bodice and skirt 1870-55-24a and 24b coincided exactly, it could be concluded that they were chemically the same, i.e., they contained the same dye and fiber.

Since its spectra were so different, the third sample had to be chemically different from the other garments. This information led one to conclude, with more confidence than the visual observation alone provided, that the bodice and skirt (1870-55-24a and 24b) were part of the same outfit. An alternate reason for the differential fading exhibited by the garments must be proposed and is currently being investigated.

A Demographic and Psychographic Assessment of a Specialty Store's Customers and Noncustomers

Dayle Ingerick Thorpe, Wesleyan College, Georgia
Carol Avery, Florida State University

The overall purpose of the study was to identify the demographic and psychographic profiles of the customers and noncustomers of a specialty store. Two research objectives were developed: the analysis objective was to determine the characteristics of the customers of a specialty store to define the market segment, or target market, for which the store had appeal; the classification objective was to determine which combination of these characteristics could be used to discriminate customers from non-customers.

A revised and pretested version of an instrument prepared by Walter K. Levy Associates, a retail marketing consulting firm, was employed for the research. The instrument, printed in booklet form, was designed to elicit data concerning (1) shopper viewpoints, (2) store image, (3) shopping behavior, (4) media preference and usage, and (5) demographic background. The questionnaires were mailed to a random sample of 600 customers drawn from the store's mailing list and a random sample of 600 noncustomers living in four selected zip code areas near the store. To improve the}

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response rate, each mailing included a new half dollar and a cover letter requesting a response within seven days. Of the 760 questionnaires that were returned, 459 were usable—273 from customers and 186 from noncustomers. Frequency analysis was used to describe the total sample, Kendall correlation coefficients to select variables for the discriminant analysis, and stepwise multiple discriminate analysis to study the relationships among the variables and to select those variables that forced the two groups, customers and noncustomers, to be as statistically distinct as possible.

The procedures met the objectives of the study. The set of 24 discriminating variables selected by the analyses described the characteristics of the customers and noncustomers and was highly accurate in predicting group membership of these respondents. In the pseudo-jackknifed classification procedure, the 24 variables successfully classified 85 percent of the 459 respondents.

The customers were found to be older and less conservative than the noncustomers. They were involved in more social clubs and watched more afternoon television. They used their store charge cards more often, tended to shop at another local specialty store, and were willing to travel farther than noncustomers. The customers viewed the specialty store as having high quality merchandise, the best sales help, the most personalized sales service, and the best departments for women's shoes, fashion accessories, and sportswear. They also considered the store to be less expensive and to have more exciting advertising than did noncustomers. The noncustomers viewed Sears and Penney's as having a contemporary viewpoint, a good selection in their size range, and as being the best store for women's apparel. They shopped at two other specialty stores more often than customers and thought that one of the local department stores had the best selection of women's shoes.

The study provided the specialty store with a better understanding of its customers and of the store characteristics that appeal to those customers. It also provided a relatively accurate way to predict if a given individual is a potential customer. Both of these factors will help the store management to plan its purchasing and design its advertising to meet the needs of its current and potential customers. The study also confirmed the importance of studying psychographic variables when defining market segments.

Men's Fashion Store Image Perceived by Purchasers and Nonpurchasers, and Various Social Class Groups of Men Consumers

Barbara E. Densmore and Shwu-Yuann Chern
Virginia Polytechnic Institute and State University

The purposes of this study were to (1) apply factor analysis and multiple regression to a measure of store image to aid in data interpretation and assess which factors were most salient in predicting consumers' attitudes toward a particular store, (2) investigate whether differences existed between purchasers and nonpurchasers, and (3) determine whether social class variations of the individuals were related to image responses.

Semantic differential scales composed of 23 bipolar word pairs previously developed for assessing retail store image were completed by
male consumers in relation to three specialty clothing stores in a university community. The stores were chosen because they tended to sell relatively homogeneous products. Two stores carried both men's and women's apparel and one carried men's clothing only. Area sampling was used to obtain respondents representative of the population. The sample included 124 students, 45 faculty members, and 60 other men.

Factor analysis of the semantic differential scales resulted in five factors for each store that accounted for about 65 percent of the total variance. Factors of appearance, service, price, and merchandise arrangement were common to all stores. The fifth factor was different for each store and included fashion leadership, merchandise selection, and cleanliness of the store.

Factor scores were calculated for each image factor and were employed in regression analysis to assess which were most salient in predicting consumers' attitudes toward a particular store. The independent variables were the individual factor scores and the dependent variable was the overall attitude toward the store as rated by the respondent. Although there were differences among the three stores in the relative contributions of the image factors to the prediction of the overall attitude toward the store, service and price were common to all. Consumers with a more positive image of a store's service and price traits had a more favorable attitude toward the store.

Analysis of the data indicated that the stores were perceived differently, and that purchasers had more favorable images of the stores than did nonpurchasers. Social class variations of the sample did not affect consumers' perceived store images for this study.

The Influence of Dress on Hiring Recommendations Received by Women Applying for Management Positions

Sandra Forsythe, The University of Georgia

This research investigated the relationship between Yangness (masculinity) of costume worn by a female applicant for a management position and the hiring recommendations received by the applicant. Yin-Yang terminology was used to build a framework that applied equally well in describing the overall impression of appearance in both individuals and costume.

Symbolic interaction theory provided a conceptual framework for this study. Clothing is a significant part of the perceptual field within which one is located and affects how one is perceived by others. In employment interviews most variables—experience, education, etc.—are controlled; however, the applicant's dress is one variable that is relatively easy to manipulate. If the applicant understands the nature of the observer's responses to particular stimulus characteristics, then she can effectively use clothing to help communicate the message that is in her interest to convey.

The independent variable was the mode of dress of females applying for management positions and the dependent variable was the hiring recommendations received by the applicants. Four costumes representing four distinct levels of Yangness were used. Four applicants were videotaped
in each of the four costumes for a total of 16 videotapes. Each subject viewed each of the four applicants and each of the four costumes only once, for a total of four of the 16 possible combinations of applicant and costume. This resulted in an incomplete block design. Two blocking variables, person and sequence of showing, were used simultaneously to isolate the variation associated with person and showing sequence. Twelve showing sequences (four videotapes in each showing) were generated by using three-fourths of an orthogonal set of Latin Squares (Cochran and Cox, 1957) resulting in a partially balanced incomplete block design.

Seventy-seven personnel administrators evaluated the videotapes and made hiring recommendations for each applicant. Unequal cell frequencies caused the different classes of effects to be non-orthogonal, thus preventing the different effects from being separated directly. In order to isolate these effects, it was necessary to consider all effects simultaneously. Least squares analysis of variance was used to isolate the effect of clothing. Least squares means and standard errors were used to evaluate the sensitivity of this design in determining the effects of costume independently of other effects. Inspection of the standard errors showed this design closely approximated a balanced design and, therefore, approximated the sensitivity to costume effect that would be obtained by a balanced design.

The results showed costume had both a positive and significant effect on the hiring recommendations received by each applicant. Increased Yangness of costume generally resulted in more favorable hiring recommendations. The findings led to the conclusion that a female applicant's mode of dress does provide an avenue to maximize the favorability of the hiring recommendations she receives.

Selected Body Measurements of Women Aged Sixty-Five and Older

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Jessie Warden, Florida State University

This exploratory study was undertaken to determine if elderly ambulatory women aged 65 and older are adequately represented in the present system of garment sizing. The objectives were to:

1. Make a comparison of selected body measurements of women aged 65 and older with the body measurements used by O'Brien and Shelton (1941) on which Voluntary Product Standard PS 42-70 (1971) is based.
2. Determine whether or not the body measurements used by O'Brien and Shelton (1941) are appropriate for the sample of women aged 65 and older.
3. Examine the intercorrelations of height, weight, horizontal (girth and arc) and vertical measurements (length) of the sample of women aged 65 and older.
4. Recommend a sizing system appropriate for the sample of women aged 65 and older.

Two-hundred and five women (114 white and 91 black) volunteered from five senior citizens' activities centers in Tallahassee, Florida. Their ages ranged from 65 to 96 with a mean age of 73.912. A post hoc appraisal
of the sample was conducted to determine how similar or dissimilar the sample was from the general population projections of women aged 65 and older in Florida. Although the sample made no claim to representativeness, similarities were evident. For the 75 plus age category, the population percentages of the present study were identical with the 1985 population projections for Florida. Thirty-three body measurements (height, weight, vertical-length, horizontal-girth and arc) were taken on each subject and statistically analyzed at the .05 level of significance using descriptive statistics, t-tests, Pearson Product Moment Correlations (r), factor analysis, partial correlations, and multiple regression analysis.

Of the 33 body measurements compared, 25 were significantly different between the two studies. The average body weight and most of the horizontal measurements (bust, waist, abdominal extension, and hip) were significantly larger for the elderly women in this study than for the sample population of women aged 18 to 80 in O'Brien and Shelton's study (1941). The elderly women in this inquiry could be described as "short and stout," with more variability in the girth than in the vertical measurements. The correlation coefficients for the horizontal body measurements were highly correlated with each other. Weight had high correlations with all of the horizontal measurements. The correlation coefficients for the vertical body measurements were considerably lower.

The average woman weighed 154 pounds, 20.52 pounds more than the subjects in O'Brien and Shelton's study (55). This substantiates previous research findings that indicate an increase in weight and most horizontal (trunk) measurements with age.

The dissimilarity of body measurements between the two sample groups led to the development of sizing systems appropriate for the older women represented in this investigation. Statistical analysis yielded selected body measurements found to be key indices for reliably predicting other body measurements. From these indices, five alternative sizing systems were developed: height/weight, height/bust, weight/waist height, bust/waist height, and abdominal extension/waist height. Indices from both the horizontal and vertical measurements were selected for each sizing system.

Body Expansion As Affected by Garments: An Exploratory Study

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Virginia Polytechnic Institute and State Univeristy
Robert F. Johnson, University of Minnesota

This study was stimulated by references in flammability literature to the hazard posed by garments that effectively expand the body dimensions. Evidence that supports this has been found in actual clothing fires. Garment dimensional requirements incorporated in existing and proposed flammability standards are, in part, based on this premise. Body expansion by garments has been shown diagrammatically in relation to product design. However, no instance of quantitative measurement of expansion by entire garments is known, nor is an analysis of fabric and garment features associated with the degree of expansion. As the study
has progressed, it has become apparent that such research would be of interest to other researchers, particularly those in clothing and textiles.

The objectives of the study were to (1) quantitatively measure the body expansion by garments and (2) determine fabric and garment characteristics associated with the measured body expansion. The sample was comprised of 27 varying styles of women's nightgowns purchased at retail.

To meet the first objective, each of the 27 gowns was measured for body expansion. Photographs, 8"x10", were taken of a model standing in front of a grid, dressed only in a standard garment to maintain body shape and in each gown (four views in each case). Planimetric area measurements for all four views of the model in the standard garment and in each gown were summed separately. The percentage difference between the area sum for each gown and that for the standard garment was calculated. This yielded a measure of the percentage area expansion of the body by each gown. These expansions ranged from 10-52 percent, with 12 of the 27 gowns resulting in 30-40 percent expansion.

Regarding the second objective, several fabric and garment characteristics were identified as potentially associated with the degree of expansion. They included fabric drape, measured on the F.R.L.™ Drapemeter, fabric weight, and seam stiffness. Seam stiffness was measured through a modification of the fabric stiffness cantilever test in ASTM D 1388-64. Garment characteristics included garment weight, number of vertical seams below waistline and in sleeves, sleeve and garment length, garment circumferential measurements at several key locations, and a garment fit measure derived by summation of the differences between corresponding circumferential measurements of the gowns and the model at several locations.

Statistical analysis will be done to analyze the association between the body expansion by the garments and the above characteristics. The dependent variable, the percentage area expansion, will be regressed on the independent variables, the fabric and garment characteristics. A stepwise regression procedure will be used to determine the most predictive combination and form of the independent variables.

Graphical analysis between the dependent variable and individual independent variables has been completed. Preliminary results suggest the following: Body expansion appears most strongly associated with garment weight, the sum of the garment and sleeve lengths, and garment fit. A positive relationship with each of these is evident. Garment length appears to dominate the association with the sum of the garment and sleeve lengths, but is reinforced by sleeve length. Henline circumference appears to be parabolically related to expansion, with some intervening effect of garment length being evident. There is some tendency toward positive association of expansion with seam stiffness and fabric drape. No clear relationship of expansion with other independent variables could be discerned.

Apparel Design Interaction: A Systematic Design Development for Body-Contouring Apparel Forms in Elastomeric Knitted Textiles

Beate Ziegert, Cornell University

The purpose of this study was to establish a pattern system for transforming basic two-dimensional slopers for woven material into slopers
for elastomeric knitted fabrics, and to develop slopers for swimwear, leotards,\(^2\) and unitards.\(^3\) A variety of different stretch fabrics will be grouped by stretch factor, such as comfort, performance and maximum stretch, into a chart. Stretch percentages will be systematically applied to existing basic two-dimensional apparel slopers originally designated for woven materials in order to build slopers for specific stretch fabrics.

Constructed sample garments will be tested for fit on the dress form and the human form. Comparisons of both will be made to evaluate the garments on the static designer's dress form and on the moving human form. The goal is to create a pattern system for "wrinkle free" garments that cling to body contours. The purpose of testing the fit is to establish an accurate relationship between the two-dimensional slopers and the three-dimensional garments.

Authors of literature related to sloper development and styling apparel through flat patternmaking systems rarely address the question of stretch fabric. Authors of texts regarding apparel construction of knitted fabrics discuss stretch factor only in relationship to patterns already developed for knitted stretch fabrics by the commercial pattern industry. An article on stretch fabrics in American Fabrics and Fashions (Fall 1980, No. 120) pointed out that stretch "will remain a high priority demand...throughout the eighties and beyond."

The procedure involves three stages:

1. Development of the fabric stretch chart. The stretch factor will be established by measurement and photographs will be taken to make the stretch factor visible and avoid overstretch.

2. Construction of basic apparel forms in size 10. These consist of dress with waistseam and sleeves, torso-covering hip-length garment, pants with waistband, one-piece bathing suit, leotard, and unitard.

3. Testing of the garments' fit on the dress form for objective static evaluation and on the human form for subjective evaluation. Criteria for assessing "wrinkle free" fit will be developed; judging will be by a panel of judges.

Summary of results to date:

1. The fabric stretch chart development is in progress because of the wide variety of types of fabric construction and the many methods to create stretch.

2. A pattern system has been established for fabrics with different stretch factors. The major results are--
   a. that the stretch reduction differs in different areas of the body both in the horizontal and the vertical direction.
   b. that the stretch reduction changes with the type of apparel form.

To date basic apparel forms and a one-piece bathing suit have been constructed. Results of testing on the dress form are being compiled.

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1 Slopers are basic two-dimensional shapes that are used as blueprints to develop secondary shapes in styling apparel. Also called foundation patterns for blocks.

2 Leotards are garments with sleeves but no legs.

3 Unitards are garments with sleeves and legs like a body stocking.
Authority Messages in Neckwear of Women Lawyers as Perceived by Jury Members

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The problem in this study was defined as being the effective projection of authority by women lawyers' courtroom clothing, particularly neckwear. The objectives of the study were as follows: (1) to determine the strength of authority messages in varying neckwear and (2) to determine the relationship between jury demographics and authority messages in varying neckwear.

The relevance of such a study lies in a traditionally male profession where tradition and authority break down when the lawyer is a woman. Classic tailored suits and blouses help to overcome the problem in the first impression jury situation, but neckwear remains questionable.

The method used involved the rating of photographs by jury members. The samples included 97 persons who had served on juries in Montgomery County, Virginia in the last six years. The 10 photographs held constant the woman lawyer, a tailored suit and blouse, and position and expression, while varying neckwear. The questionnaire included four demographics (sex, age, income, education) and eight components of authority (knowledgeable, confident, influential, trustworthy, reliable, capable, professional, efficient) rated on a six-point Likert scale. Each jury member rated each photograph on the eight components of authority.

Objective one was analyzed using a one-way analysis of variance in addition to Tukey paired comparisons to look at the order effect of photographs. Results indicated a significant difference in the neckwear with the strongest authority messages in two long narrow scarves tied with a flat nonvisible knot and tucked in the jacket. Also significant and sending the weakest authority messages were an ascot and a small square scarf tied with ends at one side.

Objective two was analyzed using a two-way analysis of variance with repeated measurements on one variable. Overall, men gave higher authority scores to neckwear than did women and older persons (over 45) tended to be less critical (scores toward the mean) than did their younger counterparts. In specific instances, women rated a dark print bow tie significantly higher on authority than did men while men rated a square side-tied scarf significantly higher than women did. Results would indicate that differing neckwear sends authority messages in varying degrees and that sex and age make a difference in the perception of authority messages in neckwear.

Nineteenth- and Twentieth-Century Appalachian Quilts of Floyd County Virginia

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This study was designed to trace the evolution of handmade quilts in Floyd County, Virginia. Specific objectives for the study were to
(1) investigate the fiber, color, and design of nineteenth- and twentieth-century handmade quilts of Floyd County, (2) determine the area aesthetics, and (3) determine the relationship of craftsmanship and design ability.

The procedure for the study involved the use of Virginia libraries as well as on-site examination of both documents and relics in Floyd County. Although there is no published history of the county, the Floyd Branch of the Montgomery-Floyd Regional Library housed an unpublished paper on the county's history containing stories previously transmitted by word of mouth. Various state of manufacturing and census reports were examined at the Newman Library in Blacksburg, Virginia. The county courthouse served as another source of documents. Those found to be most useful were wills and appraisals of individual households and inventories of store merchandise from 1831, the year the county was formed, until 1900.

A large portion of the information pertaining specifically to quilting was gathered by personal interviews because Appalachia has traditionally been an oral culture. Twenty-two Floyd County quilters were selected on the basis of quilting experience as well as origin and residence in the county. The same set of questions about the subjects such as family origin, quilt fabrics, quilting technique, and family quilt history were asked each quilter. Questions and answers were recorded on tape. In addition to the recorded interview, a four-part instrument was developed to be used in identifying the quilter's fabric fiber preference, color preference, and pattern and color combination preference in relation to specific quilt designs. Rating sheets were used by a panel of experts to determine design ability and by the researcher to determine level of craftsmanship. The relics examined consisted of the quilts shown to the researcher by the quilters who were interviewed. All relics were photographed using a 35mm single-lens-reflex camera.

Earliest quilts were primarily constructed of wool and linen, both fibers that could be locally produced. The growing season for cotton proved too short and its use became widespread only after it was industrially produced elsewhere. The colors were limited to those derived from plants indigenous to the locality and dyes that could be purchased locally. By the turn of the century, packaged aniline dyes were sold throughout the county. Plant dyes were then seldom used and colors in quilts followed those available on the commercial market.

Quilt designs in early days were limited to those brought to the area by settlers, sent by relatives living elsewhere, or observed in periodicals. All quilt patterns in Floyd County that were examined or referred to are known in other parts of the country.

The fabrics from which quilts were constructed reflected the county's geographic isolation as well as economic hardships. These fabrics were often salvaged from whatever was on hand. This included the better parts of old woolen clothes and cloth bags in which products such as sugar, flour, and animal feed were packaged. In the past as today, scraps from clothing construction were most widely used in quilts.

County aesthetic values were determined to be closely related to nature and function. Design lines were moderately complex and color preferences fell in the primary and secondary color range. Due to the historic functional use of quilts, no relation was found between the women's craftsmanship and design ability.
Photographic Study for Teaching Research, Fashion Documentation, and Fashion Theory to Undergraduate Students

Judith Zaccagnini Flynn, Framingham State College, Massachusetts

A two-semester course of study was developed for undergraduate students to teach research, fashion documentation, and cyclical fashion theory. The research component was developed as part of the Psychological and Sociological Implications of Clothing class. Lectures focused on title, hypothesis, review of literature and methodology development. A unit on visual literacy in clothing and qualitative research was included. Students began a research project by photographing 15 students in a natural setting on the college campus.

Fashion documentation was begun by analyzing the photographs taken. Garment and body characteristics were analyzed in relation to socio-cultural factors of the student population.

In the second course, which studies fashion theory, each student's fashion documentation data were keypunched and run on a computer package. Data for individual and class results were analyzed for each academic year. Lectures focused on quantitative data, computer use, graphic data, and implications of a research study. Fashion theory was studied and the fashions documented were related to cyclical fashion theory. A total of 1,212 photographs have been analyzed since 1979 allowing students to begin to plot fashion cycles.

A professional development grant was received that allowed a Photographic Research Manual for Fashion Documentation and Cyclical Fashion Theory to be printed.

Student exams have shown positive results in the understanding of the research process. Papers developed on research have given students an experience in conducting research. Students' written evaluations showed enthusiasm for research and found the assignments beneficial learning experiences for increasing observation skills and understanding fashion theory.

The Industry-University Connection: Waterproof Motorcycle Jacket Designs for Gore-Tex™ Fabrics

M. Jo Kallal, University of Delaware

The major purpose of the project was two-fold: (1) to expose students to the functional design problems faced by an industry research and development department and (2) to provide the cooperating company with fresh solutions to technical design and construction problems faced by product users.

A cooperative agreement between the Textiles, Design, and Consumer Economics Department at the University of Delaware and W. L. Gore & Associates, Elkton, Maryland, provided a complex design problem. Students were challenged to design a waterproof motorcycle jacket of Gore-Tex™ fabric that would be competitive with those currently on the market. In addition, W. L. Gore & Associates sponsored a design competition for enrolled students and provided a consultant to work with the class,
several speakers, second- and first-quality Gore-Tex™ fabrics, and financial support for competition prizes and a design presentation program.

Course concepts included functional design theory with emphasis on analysis of the target market, the sports activity, bodily movement, thermal factors, comfort, and styling. The primary problem to be solved was waterproofness. Solutions to "leakage" created by both heat and moisture transport mechanisms were sought through specialized seam and closure design, including evaluation of seam and thread location, garment opening design, closure design, and garment cut. Usage of seam-sealing tape required radical revision of typical construction sequences. To predict seam-sealability, cross-sections of construction points were drawn and evaluated.

Students designed, developed, evaluated, and modified three prototype jackets. A functional design consultant critiqued the second prototypes. The final prototypes and project description were presented to a technical and nontechnical audience and judges with motorcycle and/or functional design expertise.

The university-industry cooperative effort provided (1) students with a complex functional design experience, public presentation of their work, letters of recommendation from W. L. Gore and Associates, and media coverage of their designs, (2) W. L. Gore and Associates with technological solutions to waterproof closure design to be used in a newly developed customer consulting program with product users, and (3) the Textiles, Design, and Consumer Economics Department with improved expertise in functional design of waterproof garments, media coverage, and solid relations with local industry.

**Home-Based Enterprises**

Judith J. Leonard, The Florida State University

Over the past few years the emphasis in America has been on "conservation" and "production" rather than "consumption." A Comprehensive National Plan for New Initiatives in Home Economics Research, Extension and Higher Education (1981) recently released by the Science and Education Administration of the USDA targeted for research "home-based enterprises." With the current rate of unemployment, not to mention inflation, the home-based enterprise would seem to provide an appropriate career path for some, as well as a means of optimizing the family's real income through home-provided goods and services.

The current problems under investigation are to (1) identify specific types of home-based businesses in a particular geographic area and (2) identify problems of the home-based business owner that could be addressed through short courses offered by local colleges and universities. In addition, both demographic and psychographic information about home-based business owners is being collected. Participants have been home-based business owners for six months or more who have volunteered to complete a questionnaire designed for this investigation. Thus far, a wide variety of both service related and product related home-based enterprises have been identified—from an alteration service, to an
appliance repair business, to a small craft industry. The problems faced by these home-based business owners, unlike the diversity of types of businesses, have been similar. These areas of concern include everything from the pricing of products or services to knowing when and how to advertise. The end result of this research effort could possibly affect the future direction of post-secondary home economics programs.

**Special Clothing at VGRS:**
*Development and Evolution into the Mass Market*

Nora MacDonald, West Virginia University

The Vocational Guidance and Rehabilitation Services (VGRS) Sewing Department is the oldest, continually operating, special clothing mail-order service housed within a rehabilitation agency. The major purpose of this research was to explore the contribution VGRS has made to the field of special clothing design and marketing. Objectives were to (1) trace the history of the VGRS Sewing Department, (2) analyze the evolution of the VGRS special clothing line, (3) examine the VGRS sewing training program, and (4) study the production and marketing of the VGRS special clothing line. Data were collected by examining documents, interviewing agency personnel, corresponding with former department personnel, and observing department and agency operations.

Sewing has been a part of VGRS since its beginnings. In 1890, a group of girls from socially prominent Cleveland families formed the Sunbeam Circle. They hand sewed items, sold them at a bazaar, and used the proceeds to purchase items for disabled children. The Sunbeam Circle has sponsored a sewing training program for disabled individuals since the early 1900s. Today, volunteers serve on the Sunbeam Board, creating community awareness and support for VGRS. The Sunbeam Shop, and annual sales sponsored by the Board, generate funds that are donated to the agency.

VGRS officially entered the special clothing field in 1962, although preliminary work was done by Dorothy Behrens between 1960 and 1962. In developing ideas, Behrens discussed dressing problems of disabled individuals with many people, including such pioneers in the field as Helen Cookman, Muriel Zimmerman, and Mrs. Van Davis Odell. A 1962 Sunbeam Board grant enabled Behrens to complete the development of the special clothing line.

The initial design was a back-wrap dress for use by incontinent nursing home patients as a functional and fashionable alternative to the traditional hospital gown. Variations of this original design continue to be used by VGRS. After development of the original line, a mail-order catalog was designed, produced, and distributed during 1963, and continued to be the primary marketing method through the 1960s and 1970s. The focus of the department until 1980 was to accommodate individual customer needs.

A significant change occurred in the Sewing Department when a two-year Cleveland Foundation challenge grant was awarded to VGRS in January 1978, followed by a one-year grant in 1980. Sales expanded during this period because (1) sales representatives and two professional staff members were added, (2) Sewing Department business and marketing practices were
evaluated, (3) an item coding system was established, and (4) third-party purchasers were aggressively sought.

Increased productivity and visibility led to negotiations with Sears, Roebuck and Company during spring and summer 1981 for the inclusion of VGRS items in the Sears catalog. Three items were selected for the general catalog and 12 for the Sears Home Health Care catalog under the Fashion Care label. Many production decisions had to be addressed before full-scale production for Sears could begin. These included sizing, fabric ordering, menswear pattern development, labeling, packaging, and handling the increase in volume. This expansion has created the need for some 80 employees (many of whom are disabled) in the cutting, sewing, pressing, and packaging areas. Also, sewing training has shifted from the early focus on hand sewing to industrial power sewing; the training area can accommodate up to 16 disabled individuals at a time.

### Kids 'N' Clothes Exhibit

Anita Malone, University of Connecticut

A needs assessment of Connecticut Extension Home Economists determined that parents of young children need help in making decisions about their children's clothing.

For parents of children ages two to six to become aware of the social, economic, and health aspects of children's clothing was the primary objective of this project. Participants would gain information on constructing, selecting, and adjusting garments for young children and gain information on choosing appropriate footwear for young children.

The resulting exhibit, Kids 'N' Clothes, consists of ten 20" x 32" panels, colorfully pointing out how to shop for quality, what to look for in used clothing, and how children feel about their clothing. Four life-sized cardboard children appeal to parents to consider the total cost of clothing a child and cost comparisons between home-sewn and ready-to-wear purchases.

Accompanying the exhibit are 14 lesson guides for a series of 15-30 minute lessons to assist volunteer leaders. Kids 'N' Clothes has been used in libraries and shopping malls, at professional meetings, and with Head Start programs.

Written evaluations indicate the most useful ideas are the charts showing kids' sizes, how to tell quality garments, and how to layer for warmth. Others have commented on growth features, shopping for used clothing, and the helpfulness of the exhibit.
Eastern Region ACPTC Business Meeting Minutes
Atlanta, Georgia
October 21, 1982

The meeting was called to order by President Frances Duffield at 10:55 A.M.

Secretary Kay Obendorf read the minutes of the 1981 Business Meeting. The minutes were approved as read.

The Treasurer's report that had been prepared by Leatha Darden was presented and approved by the members. The projected budget for the 1982-83 was discussed by Frances Duffield. She urged all officers and committee chairperson to keep accurate records of all cost, even if they are not requesting reimbursement. This will allow an accurate preparation of the annual budget. Jan Yeager asked if the publication account is held in a Money Funds Account. The answer was that it is. Helen Douty asked if the treasurer's report was to be approved by the members. The reply was that the members of the ER-ACPTC Council have this responsibility.

Frances Duffield expressed the appreciation of ER-ACPTC to Lois Gurel for her work as chairperson of the Publications Committee. She also requested that everyone give support to Jane Lamb as chairperson of this committee for the coming year. The first issue of the Clothing and Textile Research Journal will be mailed to members in December, 1982. Other publications can be obtained from Loy Walton, Executive Secretary, National ACPTC. The call for information to be included in the ACPTC Newsletter will be issued November 1, 1982.

Frances Duffield expressed appreciation to all chairpersons that had worked on the 1982 ER-ACPTC Conference.

Carol Warfield reported on ASTM activities. She indicated that the L22 Standards are being revised and that the body measurement group has been given subcommittee status. She requested information from those persons interested in obtaining selected ASTM test methods for students.

The deadline for membership dues is November 1, 1982. Carol Warfield suggested that ACPTC should try to increase graduate student memberships and reserve membership from business and industry.

Nora MacDonald, Nominations Committee, reported that June Mohler and Carol Warfield were elected to ER-ACPTC Council. Jane Lamb was elected as ER representative to National ACPTC Executive Board.

The Archivist, Judy Flynn, is organizing ER-ACPTC records in a manner similar to those of National ACPTC. Past ER-ACPTC president's records go into the ER-ACPTC Archives.

By-Law and Handbook changes to bring ER-ACPTC in compliance with National ACPTC were presented by Judy Flynn. Bonding of ER-ACPTC Meetings and treasurers was discussed.
The National ACPTC Futures Committee, chaired by Marilyn Horn, is planning a National Futures Workshop on April 15-17, 1983, in Minneapolis. Eastern Region ACPTC will select its 7 participants at this conference. Completed nomination forms are to be given to Judy Flynn. The Think Tank at this conference will be focused on discussion of the future of ACPTC and Textiles and Clothing.

Barbara Starke, reporting from the meeting of the National ACPTC Board, informed the members that Phyllis Tortora is the National ACPTC President and that Barbara Starke and Jane Lamb are the ER representatives to the National Board. The National ACPTC Meeting will be held on July 5-9, 1983, in Hawaii.

Short committee reports were presented by the following persons:

Jo Paoletti
Barbara Scruggs
Ruth Weibel
Marry Barry and June Mohler
Grant Greapentrog

Jo Paoletti
Barbara Scruggs
Ruth Weibel
Marry Barry and June Mohler
Grant Greapentrog

Invitations for the 1987 ER-ACPTC Meeting were extended by local groups for Tallahassee, Florida and for Charlotte, North Carolina. The membership will be asked to vote on these meeting sites. Future meetings are:

1983 Hawaii (National)
1984 Greenbriar
1985 Providence
1986 Houston (National)
1987 Tallahassee or Charlotte

An ATMI Field Trip and Seminar is being planned for about 30 participants in Summer, 1983, by Mr. Donavan.

Frances Duffield announced that ACPTC and the Costume Society are working together to secure funds to publish some of Blanche Payne's work.

The new officers of ER-ACPTC are:

President Judy Flynn
President-elect Elizabeth Rhodes
Treasurer June Mohler
Secretary Kay Obendorf
Membership Carol Warfield

The Meeting was adjourned.

Submitted by:

KAY OBENDORF
Secretary ER-ACPTC

KO/kf
Attachment to ER-ACPTC Business Meeting Minutes:

The ER-ACPTC representatives to the ACPTC Futures Workshop, April 15-17, 1983, Minneapolis, are:

Amelia Adams
Marry Barry
Joann Boles
Lila Emenheiser
Suzanne Loker
Jo Paoletti
Elizabeth Rhodes

Alternates are:

First    - Carol Warfield
Second   - Carol Avery
Third    - Frances Duffield
Eastern Region
Treasurer's Report
Association of Clothing Professors
of Clothing and Textiles
October 4, 1982

Receipts
Balance on Hand, November 24, 1981 $2,729.89
(checking account)
Balance on Hand, November 24, 1981 4,159.38
(publications account)
National Dues Rebate $634.00
Interest on Checking 124.00
Interest on 230.79
Publications Account $988.79

Disbursements
Drexel University 81.67
Winterthur Bus Nora MacDonald 6.05
Postage & Xeroxing Auburn University 16.70
Xeroxing Leatha Darden 100.00
1982 Planning Conference
Auburn University 8.38
Xeroxing Elizabeth Rhodes 40.00
1982 Planning Conference Terrace Garden Inn 128.40
1982 Planning Conference Frances Duffield 50.00
1982 Planning Conference Leatha Darden 8.00
Travel Nora MacDonald 70.47
Nominating Committee Carol Warfield 3.49
Postage Jo Ellen Uptegraft 11.25
Conference Name Labels Jo Ellen Uptegraft 12.00
Ballot Name Labels Jo Ellen Uptegraft 783.23
1981 Proceedings

Total 6,889.27
$7,878.06
| Frances Duffield                      | 32.79 |
| Auburn University                    |      |
| Phone & Xeroxing                    | 38.88 |
|                                      | $1,391.31 |

Total Disbursements $1,391.31

Balance on Hand, October 4, 1982
(checking account) $2,096.58

Balance on Hand, October 4, 1982
(publications account) $4,390.17

Respectfully submitted

Leatha A. Darden, Treasurer
Western Region
ACPTC-WR OFFICERS AND COMMITTEE CHAIRPERSONS

OFFICERS 1981-82

Janet Else, President
Colorado State University

Orpha Herrick, President-elect
University of Hawaii

Doris Fuqua, Secretary
Fullerton College, California

Nancy Owens, Treasurer
California State University, Northridge

Marilyn J. Horn, Counselor
University of Nevada

Janet Else, Historian
Colorado State University

BOARD MEMBERS

Dorothy Ettl
Washington State University

Susan B. Kaiser, Nominating Chair, University of California-Davis

Christine L. Milodragovich
University of Montana

Merry Jo Dallas
Colorado State University

Ardis W. Koester
Oregon State University

Susan G. Carter
Brigham Young University

Anne M. Lambert
University of Alberta

ACPTC NATIONAL EXECUTIVE BOARD, WR REPRESENTATIVES

Janet Else
Jean Margerum, Membership
Audrey Gieseking-Williams, Bylaws and Handbook
Marcia Morgado, Regional Editor-ACPTC Newsletter
Nancy Owens, ASTM Liaison

CONFERENCE CHAIRPERSONS ACPTC-WR 1982

General
Naomi Reich
University of Arizona

Program/Local Arrangements
Naomi Reich

Registration
Brenda Brandt
University of Arizona

Tours
Patricia Otten
University of Arizona

Hospitality
Janet Quade
Northern Arizona University

Audiovisual Equipment
Ellen Goldsberry
University of Arizona

Media Publicity
Mary Jean Wylie
University of Arizona

Research Reports/Teaching
Innovation Reports
George Sproles
University of Arizona

Finances
George Sproles
University of Arizona

Proceedings
Charlene Lind
Brigham Young University

Evaluation
Susan Kaiser
University of California-Davis

Printing of Program
Naomi Reich
ACPTC WESTERN REGION CONFERENCE
OCTOBER 21-23, 1982
TUCSON, ARIZONA

THEME: OUR PAST - OUR FUTURE

Thursday, October 21

8:00 - 2:00 p.m. Registration and Tours
   Arizona Heritage Center "Maids in the Shade Exhibit"
   Walking tour of University of Arizona campus
   Walking tour of El Presidio, historic downtown Tucson
   Bus tour to San Xavier Mission (founded by Father Kino in 1700), Sonora Desert Museum and Saguaro National Monument

10:00 - 10:30 a.m. Hospitality Coffee

1:00 p.m. Opening Remarks
   Janet Else, President ACPTC-WR

1:30 - 2:30 p.m. Keynote Address "Developing Professional Style"
   Jean Ruley Kearns, Distinguished Scholar and Deputy Director, Consortium International Development

2:30 - 3:00 p.m. New Initiatives in Clothing and Textiles
   Report from National - Marilyn J. Horn, Chairman National Futures Committee
   Report on Research - Marcia A. Morgado, University of Hawaii
   Report from Western Region - Janet Else, President ACPTC-WR

3:00 - 4:00 p.m. Group Discussion: Issues Raised by New Initiatives
   Discussion leaders: Recorders:
   Marilyn Burns Ardis Koester
   Orpha Herrick Antigone Sutton
   Susan Carter Jean Margerum
   Charlene Lind Christine Milodragovich
   Marilyn Horn George Sproles

7:00 p.m. Dinner and Program
   "Navajo and Pueblo Weaving"
   Clara Tanner, Professor Emerita, Department of Anthropology, University of Arizona
Friday, October 22

8:00 - 9:30 a.m.  Research Reporting Session I
Presiding:        Marilyn Burns
Addresses:
"The Role of Clothing in Sex-Role Socialization: Persons' Perceptions Versus Overt Behaviors"
Susan B. Kaiser, University of California, Davis
"Color of Dress as It Relates to First Impressions of Personality Traits"
Linda K. Day Duntley
"Adaptation and Innovation in Highland Guatemalan Tapestry Woven Hair Ribbons"
Mia McElidowney, Edmonds Community College and Diana Ryesky, University of Washington
"Clothing Stereotypes on the College Campus: The Jeaning of America"
Margaret Rucker, University of California, Davis

9:30 - 9:45 a.m.  Coffee Break

9:50 - 10:40 a.m. Research Reporting Session II
Presiding:        Merry Jo Dallas
Addresses:
"Clothing Practices of Oregon 4-H Youth: Purchase, Daily Selection, and Care"
Janet May, Oregon State University
"Effect of Seals of Certification on Perceived Quality of Textile Products"
Jeanne A. Roberts and Kathryn Hatch (Hatch presenting)

10:30 - 10:40 a.m. Questions

10:45 - 12:00 noon Business Meeting

12:00 - 1:30 p.m. Luncheon—Introduction of new members

1:45 - 3:45 p.m.  New Technology in the Classroom
Presiding:        Orpha Herrick, President-elect ACPTC-WR
Addresses:
"The Computer Age Has Arrived in the Classroom"
Frances Mayhew, University of Delaware
"Utilizing CAI for Textiles and Clothing Instruction"
Joan Laughlin, University of Nebraska-Lincoln

3:45 - 4:20 p.m.  General Session: "Reflections and Course of Action"
Marilyn J. Horn, University of Nevada
4:20 - 5:00 p.m.  **Poster Session: Instructional Materials**
   Presiding: Ellen Goldsberry
   "Art Principles and Elements as They Relate to Clothing"
   Mary J. Thompson, Brigham Young University
   "Designing, Producing, and Funding Television Classes"
   Linda Thiel Lansing, Fullerton College, California

7:00 - 9:00 p.m.  **Computer Workshop**
   Leaders: Joan Laughlin and Frances Mayhew
   Facilitator: Dan Davidson

**Saturday, October 23**

8:30 - 10:00 a.m.  **Panel Discussion: Two- and Four-Year College Interaction**
   Presiding: Susan B. Kaiser
   Moderator: Linda Thiel Lansing
   Panelists: Marcia Morgado, Nancy Owens, Doris Hime, Margie Chitwood, Doris Fuqua, Phyllis Specht

10:00 - 10:30 a.m.  "Mexican Indian Dress"
   Dianne Dittemore, Arizona State Museum

10:30 - 12:00 noon  Visit Exhibit "Mexican Indian Dress and Masking"
   Stewart Meehan, Arizona State Museum

1:00 - 5:00 p.m.  **Tours**
   Repeat all of Thursday morning options except Arizona Heritage Center
   Bus tour to Amerind Foundation (specializing in native American cultures of the Southwest)

1:00 - 3:00 p.m.  **Executive Board Meeting**
DEVELOPING PROFESSIONAL STYLE

Jean Ruley Kearns
Distinguished Scholar and Deputy Director
Consortium International Development

I hesitated about my topic because talking about developing professional style might imply that one has "arrived" or has the final word on it. I do not. Over the years, however, I have worked with many successful people and have observed some of the attributes that contribute to their professional style. Today I propose to share this list of observations with you. Some of these successful people possessed all these attributes and some possessed a few. I am not stating that these suggestions will make you successful, but they can't hurt.

I have eleven suggestions. For purposes of clarity, I will list and describe each as a success principle or strategy. I am certain that this list is not exhaustive but hopefully, it will encourage the flow of creative juices. My purpose is to help you explore your style and possible enhancement of that style.

Success principle #1--Learn the rules of the game. You may not agree with the decision-making process in your organization, but until you are in charge, forget about an overt change. In fact, even when you are in charge, you may not be able to change the rules! The process of learning the rules in most organizations is complicated by the lack of a rule book. You learn the rules by observing, listening, and using a mentor, if one is available. In addition, you learn to manipulate the rules for your own advantage. You cannot win unless you play by the rules. Also, there may not be a single set of inflexible rules. Learn the rules and work within those limitations.

Success principle #2--Know the players. Get to know the people with whom you work. By this I mean, the janitors, campus police, dean, department head, secretaries, anyone who answers to you, to whom you may answer, or who may have an impact on your work. By knowing fellow workers, you begin to build a network of people who can help you perform your job more effectively.

One technique you may use is la veillee strategy. I'm sure you've never heard of la veillee, but if you came from southern Louisiana, where the first language is French, the term la veillee would be familiar. La veillee describes lengthy visits. Prior to the time our society had television and multiple automobiles, we visited neighbors or relatives and truly interacted with them. In terms of being successful, and developing style, time must be spent getting to know the people with whom you work.

La veillee can take the form of a coffee break, a luncheon, or just a conversation in the hallway. Initiate conversations with those with whom you have not interacted often as well as with those with whom you interact frequently. Interacting helps both you and others. For example, if you need to work out a problem, it is much easier to work through that problem with someone you know.

Success principle #3--Assess and improve your image. This is an important aspect of any job. First you must decide on the image you want. Do you want to be viewed an innovative, forceful, humorous, organized,
and/or a good supervisor? Decide on the qualifications you want people to recognize in you. In addition, keep in mind the organization for which you work and select objectives that are valued by your administration.

One popular writer in the field of dressing for a successful image is John Malloy. I admit that I hesitate to talk about dress in front of you since you are recognized as the best-dressed professionals on most campuses. But Malloy did a piece of research I would like to review today. He formed a research associates team consisting of a young man and a young woman. With these research associates, he went to various organizations with which he was working. At half of these organizations the research associates dressed in conservative business dress and at the other half, they dressed like fairly casual college students. The team members conducted themselves in the same way for all visits. At the end of the visits, Malloy called the organizations and told them that the research associates would now continue the work Malloy had contracted. In those organizations where the team members were dressed in conservative business fashion, Malloy's proposal was accepted. But in those organizations where the team presented themselves in casual college dress, the response was that the organization did not feel the research associates could do the job. People are judged to a significant extent on that first image. First impressions are lasting and people make judgments relative to how a person can be trusted, or if they would like this person to be part of their organization.

Malloy also suggests that persons are judged more on how they speak than on what they say. Try to avoid accents. Heavy accents are sometimes associated with a lower status background and it is especially true when you are in the international arena. A deep southern accent is a real asset in the South but not so in other areas of the country. If you have an accent, try to modify it as much as you can. Do not use slang, try not to shorten words or chop sentences, say yes instead of yeah, and push yourself to be verbal. This last suggestion is especially for women. It sometimes is difficult for one woman in a group of men to be verbal. Also, make sure that what you say has value. Women are four times more likely than men to modify their statements with such phrases as "I think" or "well maybe." These expressions are weakening modifiers that show uncertainty on the part of the speaker. Avoid the tendency to modify or seek approval in this way.

Body movement indicates how you feel about yourself. Visual signs are as varied as verbal signals. A successful person acts successful. Stand straight, move decisively, and try to remain calm. Compose yourself if you are nervous, pause before you speak, and stand still as you speak. If you are short, invent ways to be more visible. A pillow on the seat of an office chair or elevator shoes may help. You must be visible to be taken into consideration.

Social skills are absolutely critical for advancement. This includes correct table manners, carrying on a polite conversation, introducing people properly, and being social. Regardless of what today's society says, these actions still count in the business world.

Success principle #4—Show your image. According to Carl Sautter, there are nine tools by which you can show your image in daily office procedures:
Your memos should reflect your image. Make them short, clear, and infrequent. Someone who sends frequent or lengthy memos is asking people to ignore those memos. Keep in mind that memos and letters should be allowed to cool a bit before being posted. I've always been glad when I've allowed a letter to sit overnight before signing it. The extra time allowed me to make certain I said exactly what I wanted to say in the correct tone.

Your office is the backdrop of your image. It can say clutter or business. You can enhance your surroundings even within limitations. Basically your office should look organized but not unbusy.

Telephone manners are important. How do you feel when you are having a conference with someone and that person takes calls while you try to continue the conference? You feel you are not important. Instead, ask your secretary to hold all calls for that period of time. By this action you have indicated to the person the importance you attach to the conference.

Write short, congratulatory notes to people. You may not even know them, but if they have done something special, congratulate them. We all like to receive recognition.

Liven up your reports with graphics. There is no reason to send a dry, dull report. Make it interesting to read.

Newsletters are an under-used PR resource in most organizations. Offer to write an article for a newsletter, or start a newsletter. It is difficult to know what is going on in most large organizational units and newsletters help.

If your unit has a bulletin board, use it to advantage. However, don't allow your announcements to stay up on the board for months because that says no one is really using the bulletin board.

Think about how you intend to handle such holiday opportunities as birthdays, Christmas cards or gifts, and office parties. You need to determine how you are going to handle these in terms of your image.

Many people are incapable of handling staff meetings. In fact, this falls into the category of on-the-job training; you learn to chair a meeting by chairing a meeting. I have been through some miserable meetings, and I'm sure you have too. We waste a lot of time in meetings. The key to a good meeting is be organized, get started on time, and move ahead.

Success principle #5--Identify and stick with your priorities.

Dr. James Stiffen, author of *How Outstanding People Manage Time* and president of Stiffen, Stiffen and Associates, a management development company, estimates that most people could be 20, 30, or even 40 percent more productive. The biggest reason for wasting time is that people don't know how to allocate time and energy. Dr. Stiffen says the key to using time more effectively is identifying the most important task first and then concentrating on that activity. The seven tools that Stiffen has observed in successful managers are--(1) decide personal and professional goals and write them down, (2) redefine and rewrite them, (3) repeat these goals regularly so they are part of you, (4) set priorities, (5) regularly update those priorities, (6) if you want to remember something, write it down, and (7) have a convenient place to put everything and put everything in its place.
Success principle #6--Acquire the necessary management skills. In 1980-81, a Woman on Management Study Group, composed of Shari Anderson, Patricia Casarez, Charlotte Hall, and Glenda Wojtasiak, conducted a study of women in management in the Greater Milwaukee area. This study was conducted in conjunction with the 1980-81 Future Milwaukee program. Information was acquired through mailed questionnaires. The responses of women managers were revealing in terms of what they perceived as important on the job. The following information comes from that study.

When asked to rank specific management skills according to their importance to success as a manager, 45.9 percent ranked communications skills highest. Communication, human relations, and problem-solving skills rated the most important relative to the individual's success. Delegation skills were rated lowest by the newest managers but highest by those who had been in management for longer periods of time. It seems that delegation skills become increasingly important to women managers the longer they are in management. Managers who found it difficult to delegate had various ways of overcoming the problem. One manager said, "I delegate anyway, despite my feelings of losing control, and it does get easier." Another one said, "I establish schedules for project completion that allow sufficient time for redirection if necessary." Many indicated that management training had helped to develop delegation skills.

The women managers indicated there appeared to be some problem in accepting females as authority figures. Failure to listen to a woman's opinion also was noted. Many women complained of lack of recognition and not being part of the decision-making network. The most common form of resistance managers experienced from other females fell into areas of jealousy and lack of trust. It appears that women are more likely than men to challenge the authority of women managers. This will probably continue until we have more women in management positions.

When asked what caused the most conflicts in their managerial roles, many women indicated time management. Most of the women also said they had a dislike for organizational politics. Problems were not always from outside sources, and one woman said she felt her own unwillingness to actively influence events rather than passively accept them had created a great deal of conflict. Wanting to please everyone, wanting to be a friend to everyone, and experiencing discomfort at making unpopular decisions also were listed as problems.

Having identified areas of conflict, the respondents also identified their approaches to effectively dealing with conflict. One of them said, "Take the direct approach, objectively review all sides of the situation and reach the most reasonable compromise." Another commented, "Be assertive, really believe in the responsibility each person has to take care of him or herself."

Relative to management style, 70 percent of the respondents said they felt they possessed a democratic leadership style. Seventeen percent said they stayed in contact with their staff, but they did not monitor or interfere with staff activities. Thirteen percent indicated they monitored their people and projects very closely. Over 50 percent of the women said their management style had changed since they became managers.

The majority of respondents indicated they have or had a mentor, someone that they could talk to and who could help them. Many are now
serving as mentors to other women coming along in the management field. There was a definite pattern in this study that indicated women want to give support to and receive support from other women. Many of the respondents declared they had been involved in professional women's networks and many more said that they would benefit by such networking. The established "old boy system" is the single biggest source for career advancement and women recognize the need to build it. Networking can provide moral support for the daily dilemma and also advance information about position openings. Professional meetings and management training also appeared to be important helps for the women manager.

Relative to compensation, the women who entered management between the ages of 21-30 earned more money than those who entered management later in life.

The respondents were asked a series of questions about management of their personal lives. In most cases, career goals had an impact on personal life. Many of the women said their career involvement resulted in lack of time for personal interests and relationships. Generally, however, they said that setting and achieving career goals had increased self-confidence and had opened doors to new relationships. A hospital vice-president said, "Setting career goals puts everything into perspective; it makes personal life better because you know you are and where you want to go." Another woman said, "Career families are more complicated but more fun." A dual-career family forces one to stretch and move and one must be flexible and open to change. Another said, "I make better use of what little time I have and I delegate responsibilities." Some indicated that their marriages had benefitted by career goals and others said that career goals and marriage were able to live side by side.

You need to plan your career, be prepared, be firm, take the time and effort to learn to manage, be assertive, be visible, make efforts to remain up to date in your field, and recognize your assets, accept them, and make the most of them.

Success principle #7--Learn to cope with stress successfully. Executives commonly have specific kinds of strategies to cope with stress. A large majority recommend physical exercise to relieve stress. Golf, tennis, hunting, running, or jogging are mentioned frequently.

Roger Ricklefs of the Wall Street Journal staff asked executives for their advice to young executives in coping with stress. The most common suggestion was do not worry about it, ignore it, and avoid it. Other suggestions included learn to control stress, have other interests, keep a perspective, keep in shape, and find the right job. Dealing with stress appears to be a question of mind over matter. One executive commented, "Keep a happy home life and keep a balance in your life." Another said, "Don't keep the problems inside, yell, scream, kick the desk and tell someone to get lost."

Success principle #8--Develop a sense of humor and use your emotions. I believe that family humor is a significant factor in helping the young develop a sense of humor. Inside humor really does help you to get through many situations, although you have to make sure that you use humor at appropriate times. I strongly recommend using humor whenever possible.

There are many examples of the power of emotion. You may have read Norman Cousins' book. Norman Cousins, the former editor of Saturday Review, had a degenerative disease a few years ago. Instead of staying in the
hospital, he checked himself out, threw away the pain killers, and took massive doses of vitamin C. He also watched hours of a television show called Candid Camera. The success of his laughter therapy is reported in his book, The Anatomy of an Illness.

From year one, I have heard women can't be effective managers or executives because they are so emotional. Women cry, women have hysterics, and women do all kinds of strange things. Yet, there is no observable difference between a male and female temper tantrum. But because of the present stigma that women are more emotional, they must hold on tighter, and show less emotion.

Learn to use emotions. If people learn how to use their emotions constructively, emotional energy will work for them. Use your energy to accomplish something. Avoid the blues. Attempt to recognize your moods and learn to identify what causes them. Various psychologists suggest keeping a mood diary. Write in the diary approximately four times a day how you feel. As a pattern emerges, ask yourself if you had too much junk food, too much coffee, or stayed up too late. Search for the cause, then work on it!

One of the best remedies for a bad mood is daily exercise. Get outside and run the mood off. Exercise increases the production of neurotransmitters that are very important brain chemicals that can improve the quality of your sleep as well as the quality of your mood. If your mood is bad, change your environment. Indulge yourself by doing something you enjoy--read a book, see a movie, visit a friend, buy some flowers, or do something nice for someone else.

Don't feel responsible for others' moods. If you are an owl married to a lark, try to accept the difference. If your office mate is an owl and you are a lark, you experience some of the same kinds of problems. The key is to use good will and motivation.

Success principle #9--Work well with subordinates. As women progress in executive management ranks, there will be more and more opportunities for men to work for women. Alma Baron, professor of management at the University of Wisconsin's Management Institute, said that men still have attitude problems dealing with women, especially supervisors, in business. John Cooper, a Chicago psychologist who conducts training seminars, says that no matter what their background, women executives tend to be less confident than men relative to achieving their full potential in the work world. This may not be true in 100 years but women executives today are still learning to accept their equality.

A second reason men don't want to work with women is that women do not have clout. Women supervisors do not have the power to win the game! A third reason is that women don't know how to play the game. Men comment that, "If she doesn't know how to play the game, she won't get ahead and I can't get ahead unless she gets ahead." The fourth reason given is women supervisors come on too strong. Men get confused when women behave in a manner a man thinks is unbecoming, especially in terms of using strong language; this adds to a feeling of uneasiness. Baron suggests when a woman is competitive, she also becomes a target for hostility. There is a fine line between being competitive and being aggressive. At this point in our culture, a woman cannot be aggressive. A male worker also may have the feeling his boss may be a "token" woman supervisor.
Success principle #10—Avoid burnout. Today burnout is almost a syndrome verging on a trend. There are numerous examples of burnout. Air traffic controllers said they left their jobs in part because the daily tension was unbearable. Nurses, professional athletes, students, executives, as well as hundreds of others, experience burnout. According to Lance Morrow of Time Magazine, burnout runs through the teaching profession like Asian flu. "Possibly," said Mr. Morrow, "it depresses people to be assaulted by those they are trying to civilize." Two years ago, William McGuire, president of the National Education Association, said burnout among teachers "threatens to reach hurricane force if it isn't checked soon."

Remember that one is not "switched on" one day and "burned-out" the next. Robert Veninga and James Spradley defined five stages that lead from stress to burnout. These stages are—(1) the honeymoon—intense enthusiasm and job satisfaction, (2) a fuel shortage—fatigue, sleep disturbance, possible drinking to escape, or even shopping binges, (3) chronic symptoms—exhaustion, physical illness, acute anger, and depression, (4) the crisis—an illness that may become incapacitating, deep pessimism, self-doubt, obsessions with one's own problems, and (5) hitting the wall—when career or even your life is threatened.

Success principle #11—Manage your time. This is probably the most difficult. As we progress, we begin to see time in perspective and it becomes more precious. For those of us who are busy, as most of us are, the realization there are only a certain number of hours in a day is a problem to be faced on a daily basis. The best time managers I know are also the busiest people I know.

I have never been impressed with people who take home stacks and stacks of papers. This is admittedly a personal bias and I know that not everyone agrees, but I try to maintain a separation between my home life and my professional life. If, because of increased work load I must use some home work time, I limit it to a very short span of time. I advise students to begin to develop time management early.

You should set up criteria for use of your time and learn to say NO. I think I was programmed very early to say "Yes, I'll do it" (especially if it is six months in advance). Part of being a home economist means being in a helping profession, and this programs one to say, "Yes, I'll be glad to do it." Remember however, if you are pulling yourself in too many directions, you are not going to have anything left.

Attempt to make decisions in a timely fashion. Some managers manage by delay. Their attitude is, if I don't make the decision, maybe somebody else will make it for me and I won't have to take the blame. If you really want to get into the management business, you have to make decisions. Additional suggestions are to look ahead, make goals, eliminate unnecessary travel, eliminate unnecessary meetings, and buy extra time by using machines and forms. If you write the same letter a dozen times a year, devise a form and use it. Obviously, you can't get rid of all your work by passing it to someone else, but some delegating allows time for other aspects of your job.

As you evaluate your use of time, ask yourself some questions. Do you take home a bulging briefcase? Do you spend too much time on the phone? Are you still doing many of the tasks you were doing before you were promoted to this position? Do you find yourself pressed for time
to plan your work? Do you sometimes fail to delegate work? Do you worry about someone taking your job?

Planning is critical in time management. Procrastination is something that we all experience and we deal with it in different ways. I deal with procrastination by doing the hardest job first. You may divide large jobs into sections and attack one section at a time. Try making all telephone calls for the day at one time. Think about using "down time." If you wait for children or airplanes, or for meetings to start, have some work that you can do while you wait.

And finally, build in some rewards. Build in something to do for yourself that gives you a stroke for doing the job--taking a long, hot bubble bath, reading a new novel, or whatever is appropriate for you. Cultivate serenity, if you can't change it, accept it. Don't dwell on the past, work for the future. Be prepared to lose if you are going to get into the game of being successful.

You have heard my thoughts on success and developing style. This last thought I share with you is one concept I periodically rediscover; it is--"This is not a rehearsal, this is it!" If you want to be a manager, president of a university, head of your department, or whatever, you've got to start now. You can't wait until the next time around. Take the opportunity and grab with all the gusto you can.

NEW INITIATIVES IN CLOTHING AND TEXTILES:
REPORT FROM NATIONAL

Marilyn J. Horn
Chairman, ACPTC National Futures Committee
University of Nevada

At the June 1982 meeting in Cincinnati, the ACPTC National Executive Board approved a proposal for a national workshop to discuss the future of textiles and clothing as a field of study. The workshop is now planned for April 15 to 17, 1983, in Minneapolis.

Statement of Objectives
The overall purpose of the project is to develop long-term goals and future directions for the field of textiles and clothing. To achieve that purpose, we propose to--
• become skillful in the use of future forecasting techniques and methodologies;
• discuss and investigate the philosophical foundation of the field of textiles and clothing as it is shaped by current and future trends;
• consider the potential outcomes of alternate courses of action regarding programs of work and administrative affiliation.

Plan of Work
The current proposal is to conduct a national workshop for a select group of leaders in the field who are knowledgeable of current and future
trends and their potential impacts on textiles and clothing as a field of study. This will be a three-day workshop concentrating on future forecasting techniques conducted by a consultant from ASI (Anticipatory Sciences, Inc.). A summary of the major outcomes of the workshop will be published in the Clothing and Textiles Research Journal, the ACPTC Newsletter, or as an independent publication for dissemination back to the total membership in each of the three regions. In addition, the fall 1984 regional meetings will be planned around a similar format, with the national seminar participants returning to their regions as consultants.

Selection of Participants

Workshop participation will be limited to approximately 30 persons. It is imperative that we have an appropriate mix of backgrounds represented (e.g., textiles, design, fashion, social/psychological, economic aspects, as well as extension, teaching, research, and administration). The number of representatives from each region will be on a proportional basis according to size of membership. Eastern and Western Regions are to elect seven participants each, with a minimum of three alternates; Central Region will elect 14 representatives, with a minimum of five alternates. Candidates should be screened prior to election regarding their availability on the days of the workshop, and also their willingness to assume travel and per diem expenses. Elections will be held at the October 1982 regional meetings. Specific election procedures are left to the discretion of the regions.

NEW INITIATIVES IN CLOTHING AND TEXTILES:
REPORT ON RESEARCH

Marcia A. Morgado
University of Hawaii

It is in the context of discussions of future directions that we have studied present concerns of the Western Region. In order to talk about the future, we have tried to get a handle on our current membership and our current interests. The questions we asked were--

• What does the membership of the Western Region look like?
• What are the major concerns of our members?
• Do we share some concerns in common?
• Are there relationships between concerns and demographic factors?

We devised a questionnaire to elicit information from our membership. It was based on questions developed from a list of concerns generated at the 1980 ACPTC National Meeting in Washington, D.C. After we refined and elaborated upon these items, we constructed a simple rating system that allowed members to express a level of interest for each issue. Additionally, we wrote a section to address demographic questions. The responses were converted to numerical scores that could be analyzed through a computer program.
The questionnaire was mailed to all members of the Western Region; three-fourths of them responded. We evaluated the data collected, looking at factor patterns, chi square, correlation matrices, standard deviations, and simple percentages. This report is a summary of the findings.

A look at our membership shows considerable diversity in academic backgrounds. (Table 1) Almost 25 percent have earned highest degrees in fields not directly related to textiles and clothing, such as education, forestry, American studies, and various branches of the social sciences. Another third have earned highest degrees in home economics. The remainder have highest degrees in textiles and clothing areas.

**Table 1. Field in Which Highest Degree Was Earned**

23% - Law, forestry, American studies, education, social sciences

32% - Home economics, home economics education

45% - Textiles and clothing, clothing design, textiles chem tech, merchandising/retailing

We are a well educated group, although in the context of academic positions in higher education, we are not very strong. Less than one-third of us have earned the highest academic designation.

**Table 2. Highest Degree Earned**

Doctorate - 27%

Masters - 67%

Bachelors - 6%

In terms of rank, our organization is dominated by junior faculty. In some cases, however, members are attached to institutions that do not assign rank. This accounts, to some extent, for the heavy loading at the instructor level.

**Table 3. Rank**

Professor, researcher, specialist - 14%

Associate - 28%

Assistant - 28%

Instructor - 26%

Lecturer - 4%
Most of us, about 60 percent, earn between $15,000 and $30,000. Those at the bottom of the salary scale are likely to hold part-time positions.

Table 4. Salary

<table>
<thead>
<tr>
<th>Salary Range</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $15,000</td>
<td>14%</td>
</tr>
<tr>
<td>$15,000 - $20,000</td>
<td>16%</td>
</tr>
<tr>
<td>$20,000 - $25,000</td>
<td>24%</td>
</tr>
<tr>
<td>$25,000 - $30,000</td>
<td>22%</td>
</tr>
<tr>
<td>$30,000 - $35,000</td>
<td>13%</td>
</tr>
<tr>
<td>Over $35,000</td>
<td>11%</td>
</tr>
</tbody>
</table>

We are primarily an instructional faculty. Over half of us have time assigned to instructional activities only.

Table 5. Time Assigned To Instruction

<table>
<thead>
<tr>
<th>% of assigned time</th>
<th>% of membership</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>54%</td>
</tr>
<tr>
<td>50% - 95%</td>
<td>29%</td>
</tr>
<tr>
<td>20% - 45%</td>
<td>10%</td>
</tr>
<tr>
<td>0%</td>
<td>7%</td>
</tr>
</tbody>
</table>

Less than half of the members have time assigned to research, extension, or administration.

Table 6. Other Time Assignments

- **Research:** 21% of all members have time assigned to research
- **Extension:** 11% of all members have time assigned to extension
- **Administration:** 18% of all members have time assigned to administration

It might be interesting to investigate the extent to which the "publish or perish" dictum affects our group. A third of the membership accounts for all referred publishing in the region; and about 20 percent are responsible for all juried exhibitions of creative work.
Table 7. Peer-Reviewed Endeavors

<table>
<thead>
<tr>
<th>Number of juried endeavors</th>
<th>% of members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publications: 0</td>
<td>67%</td>
</tr>
<tr>
<td>1-5</td>
<td>26%</td>
</tr>
<tr>
<td>6 and above</td>
<td>7%</td>
</tr>
<tr>
<td>Creative Exhibitions:</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>78%</td>
</tr>
<tr>
<td>1-5</td>
<td>19%</td>
</tr>
<tr>
<td>6 and above</td>
<td>3%</td>
</tr>
</tbody>
</table>

That gives you a sense of who we are. Now let's take a look at the issues that we said concern us.

An evaluation of the completed questionnaires established that five broad areas exist in which specific issue-related concerns might be expressed:

- development of instructional programs
- directions for the discipline and for our programs
- concerns about our image
- research activities
- individual professional development

Within each of these five general categories are many specific items that elicit expressions of concern. Some categories may be of more concern to one individual than another, and some issues are going to be more important for some people than for others. What we tried to do was identify those specific issues of concern that tend to appear significant for the Western Region as a group. In the tables that follow, those issues will be identified with asterisks(**). We have determined that the general categories that contain the most issues of concern also constitute areas of greatest concern for the Western Region.

Instructional program concerns center around--

- needs for faculty expertise in particular content areas, as well as the development of other kinds of staff instructional capabilities;
- concerns related to attracting quality students to our programs and assuring that they will be employable;
- improvement of facilities available for instruction.

Table 8. Instructional Programs

A. Needs for faculty
  - Expertise in content areas
  - Strengthening instructional skills
  - Development of course materials
  - Increase in faculty numbers
B. Concerns for students
   • Attracting stronger students
   • Job placement for students
   • Increasing student numbers**

C. Needs for improved facilities

   On the whole, our study suggests that the strength of instructional programs is not a major concern. There is, however, one item that we are very concerned about, and that is the number of students in our programs. A question we might ask is: Have our enrollments changed in ways that are different from that of other academic areas? Our concern about student numbers will surface again as part of another set of issues that seem to be more critical for us at this time.

   Our next area of concern has to do with defining directions—directions for the discipline as well as for individual programs. It includes the idea that the directions we establish relate to our ability to secure support from institutions. The study also suggests that our ability to attract new students relates to our sense of direction.

Table 9. Concerns for Direction

A. Where we are going
   - Directions of the discipline
   - Direction of individual programs

B. Support for programs
   - College and university support**
   - Interaction with other departments and programs

C. Attracting students**

   As a group, we express more concern about direction than we do about instructional programs. Because we appear to be primarily concerned with attracting students and securing institutional support, we might want to ask: In what ways can we define directions to bring about an increase in student numbers and secure stronger college and university support?

   Our next cluster of concerns has to do with our perceptions of the image of textiles and clothing, the strength of the image, and the means for enhancing it.

Table 10. Concerns for Image

A. Strength of programs, as affected by
   • budget cuts**
   • staff research capabilities**
   • research outputs**
   • college support**

B. Perceptions of administration, as affected by
   • textiles and clothing research generally
   • directions of the discipline
   • directions of the program
   • academic strength of students
   • status of the profession**
C. Research outputs, as these affect
   • academic strength of students
   • salaries

D. Extra-mural funding grants**

   Included in this cluster are factors that deal with the ways in which the image of our programs is affected by budget cuts, research efforts, and college support.

   Concerns for our image also include perceptions of our relations with upper-level administration as these relations are affected by the strength of the discipline, academic skills of our students, and in particular, the status of our profession.

   Additionally, the effects of our research outputs on attracting qualified students and on our own salaries is a matter of consideration, as are the ways in which extramural funding grants impinge on the image of textiles and clothing programs.

   Our study indicates that questions related to image are of principal concern to this group. Our programs are threatened with budget cuts, and we appear to relate these cuts to our image. We are concerned with getting stronger support from our institutions, with how the strength of our research output has an impact on our image, with acquiring extramural funding, and with the status of textiles and clothing as a profession.

   The following relationships occur between image and demographic factors:

   • Persons who hold Ph.D.s are less likely to think administration is critical of textiles and clothing programs than are those who do not hold Ph.D.s.
   • Persons who have time assigned to research or time assigned to extension are much more likely to be concerned about the need to strengthen research outputs than are those who have no time assigned in these areas.
   • Persons who have time assigned to administration are much more likely to express concern over needs to strengthen staff instructional capabilities than are those who have no time assigned to administration.

   A fourth category of concerns cluster around questions related to research. In this area we find--

   • items that address the need to strengthen staff research capabilities and research outputs;
   • questions related to our feelings about the sufficiency of the knowledge that has already been generated in our subject areas;
   • concerns related to needs for joint research with other units on campus, increased computer use, and securing funding.

Table 11. Research Concerns

A. Strengthening of
   - Staff research capabilities**
   - Research outputs**

B. Sufficiency of available body of knowledge

C. Working with other campus units

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D. Computer use**

E. Extramural funding grants**

Although we are primarily an instructional faculty, the ACPTC Western Region is very concerned about research-related issues. Research concerns appear to be a priority issue for us. We are concerned about ways to strengthen both capabilities and outputs in this area. We need extramural funding grants specifically as these apply to research efforts, and we are concerned with using computers in the context of our research.

The following relationships occur between research issues and demographic factors:

- Persons who have published are more likely to express concern over needs to strengthen staff research capabilities than are those who have not.
- Persons who are not tenured are much more likely to express concern over needs to strengthen staff research capabilities than those who are tenured.
- Both those who have time assigned to research and those who have time assigned to extension are more likely to be concerned with the need for strengthening research output than are those who do not have time assigned in these areas.
- Persons assigned primarily to instruction and extension are more likely to express concern over increasing computer use than are others.

Table 12. Professional Development

A. Reinforcement for activities
   - Promotion and tenure criteria
   - Salary

B. Status of the profession**
   - Direction of the discipline

C. Use of time and money

D. Additional training

E. Money for professional travel**

The final cluster of concerns deals with professional development. One set of professional development issues has to do with the nature of criteria for promotion and tenure and how to meet them; and with reinforcement for professional activities through salary increases and administrative recognition. A second cluster of items deals with the status of our profession as it relates to professional development. Other concerns included finding ways to use time and money effectively, acquiring additional training in certain subject areas, and securing money for professional travel.

As a group, we are strongly concerned with two of these issues. One is the need to find funds for professional travel. There is a strong relationship between salary level and concern for this issue, not surprisingly, with those at the lower levels tending to express the most
concern. At all salary levels, members are greatly concerned about finding funds to attend meetings such as this one.

The other issue we are concerned with has to do with the status of our profession. As we might expect, this is an integral part of our ideas about our individual professional development.

In sum, it appears that the salient issues for the AGPTC Western Region membership at this time deal with questions of the image of textiles and clothing and matters related to textiles and clothing research.

NAVAJO AND PUEBLO WEAVING*

Clara Lee Tanner
Professor Emerita, Department of Anthropology
University of Arizona

Prehistoric Background

Prehistoric peoples of the Southwest left a rich heritage in weaving that the historic Indians continued down to the present. Primitive cave dwellers of more than 8,000 years ago seemingly started it all with the weaving of baskets, mats, and possibly belts and bands. Beginning a few centuries before the Christian era, sedentary populations further developed these inherited traditions, reaching high levels before the Spaniards arrived in 1540.

Known as Basketmakers and Puebloans, these fine prehistoric weavers used a variety of materials, developed many techniques, and produced many of the garments that are still woven today plus a few other items. Materials were often from wild plants such as apocyuum, milkweed, and yucca. Whole yucca plants or leaves were gathered, the long fibers were removed, spun, and twisted, into two-, four-, six- or other-ply cordage. This cordage was then woven, usually into bands or sandals of plain or tapestry weave, and very frequently these pieces were decorated in geometric designs in color, usually black or red. With the introduction of cotton, probably from the south, a great boost was given the weaving craft. Old and new materials alike were spun on a wooden spindle stick that had an attached whorl of stone, clay or wood, a device still used today by native Indians.

From the resultant fine thread, plain or dyed, the prehistoric people wove a variety of objects in a variety of techniques, apparently on an upright loom. Bags were often in a reverse diagonal twill weave with decorative bands in red, brown, and white. Breech cloths were sometimes long bands of plain weave secured by a narrow waistband, or they were broad bands, one in an elaborate double weft twill decorated dominantly in blue and white zigzags. Frequently a design was painted on a plain weave blanket, in black on white background or in more elaborate colors,

*Illustrated lecture.
such as red, green, and black. Interestingly, tie and dye also was done on plain weave cloth. Geometric designs also were created in weft-wrap, for example, in a child's poncho, with horizontal lines front and back and a centered geometric motif on the front. Twine-plaiting was done by these prehistoric people as illustrated in a shirt decorated with an elaborate fret pattern in two versions. Undecorated black or white kilts were commonly woven, or many were ornamented with a wide band of design in black and/or red along the bottom edge. These were secured at the waist by belts of plain weave, or, commonly, braided and with a long fringe.

**Historic Developments**

Seemingly there is continuity in weaving from the prehistoric past into the historic period, with some traits lost, some added. One addition was made by the Spaniards in materials, namely wool; along with this material they also contributed the carder. Spinning was and still is done with the native spindle stick and whorl. The transition from prehistoric times in terms of forms, techniques of weaving, and design was a smooth one. Actually the Puebloans made few changes for years to come. Because of this, and because the Navajos, once they acquired the craft, moved ahead at a rapid pace, the following background discussion will concentrate on the latter tribe.

Puebloans, who live in New Mexico, except for Hopis in Arizona, do little or no weaving today, but the Hopis continue to produce many items, particularly for ceremonial usage. Men do the weaving in this pueblo, setting up their vertical looms in the home or in the ceremonial chamber, the kiva. On the other hand, Navajo women, who are the weavers in their tribe, set up the loom in the hogan or home, or outside under a shade. They begin by stringing the warps on poles in a horizontal position, throwing a ball of wool yarn over each end of this makeshift device. The warps are then secured at the ends and placed in the upright loom, which is a simple affair of two upright and two horizontal poles. An adjustable rope at the loom top allows lowering of the warp, for the weaver sits on or close to the ground.

A word should be said regarding materials in historic times. Commercial wool of several types came to the Indians at various times. First, in the early 1880s there was bayeta yarn in the form of a red material that was manufactured in England, traded to Spain and then to Mexico, and eventually it reached the Southwest. Navajos raveled the material, respun it, and wove it along with other wools. Bayeta was used by some Puebloans, for example, Cochiti, Acoma, and Zuñi. In fact, it was used by Zuñi as late as 1881, and into the early 1900s by Navajos. Zephyr was popular in the mid-1800s, Germantown wools appeared early in the second half of the 1800s and is still used. Today wool is imported from various parts of the world, used largely by Navajo Indians.

Among the Navajos, the major weave is tapestry, either plain or twill; weft threads are inserted between alternate warps for the former and in various alternations for the latter. For smaller insertions, a wooden comb is used to push down the wefts; for longer areas of inserted wefts, the batten stick is employed. Both the comb and batten stick were known and used by prehistoric weavers. Attached to the warps of the Navajo loom were a heddle and a heald rod, both used to facilitate weaving.
**Pueblo Weaving**

Except for belts or bands, practically no weaving is done today by Puebloans except for the Hopis. Belts, which are also made by Navajos, are largely done in a warp face or warp float technique, although wider sashes may be in a plain weave. Too, there is the popular braided wedding sash. In the medium width and longer belt, which is most popular, Navajos and Hopis produce styles that are predominantly red, usually with black and white added to those of the former and black and green to the belts made by the latter and by some other Puebloans, for example, the Acoma Indians. Bands are narrower in width and shorter. They may be used as hair ties or garters. Navajo garters are red, usually with a black line down each side and white patterns between them. Some Zuñi styles are similar while others have different colors, especially yellow, and they often have zigzag designs down the center. Frequently the Hopi style is red and has the narrow black edge stripe and small white horizontal patterns. Wool was the preferred material in most of these belts and bands.

One of the most interesting belts is the cotton wedding sash or braided belt with long fringes, the latter giving an additional name to this piece, namely, rain belt. Still made by the Hopis, it was formerly woven by most of the other Puebloans; slight variations occur, for example, in the Santo Domingo belt in its narrower width and in the area of the attached balls at the top of the fringe.

Many Puebloans wove a sash 6" to 8" wide, usually of wool, although some were of cotton with brocaded ends and short fringes. The main length of the sash is white while the ends are decorated with geometric designs in black, red, and green. White parts of the pattern are areas of the basic plain weave showing through the brocaded parts. Hopis still produce this sash.

Breech cloths were made of cotton or wool and were "sized" for boys or men. The basic clout was white, blue, or black and decorated with a fairly wide variety of patterns. One example had a dark blue center and wide ends of black in a diamond weave. Some Zuñi pieces were embroidered in blue. Acoma clouts may have narrow or broad geometric end decoration in red and green, as noted in an 1800-1850 example. Some breech cloths were all black except for a bright red and green central floral theme.

Little known are Puebloan knitted or crocheted footless stockings of wool or cotton. Cotton leggings are usually white, crocheted or knitted, with designs running the length of the piece. A San Juan pair is decorated with end-to-end diagonal bands and has a fringed edge, while a comparable 1982 Hopi-made pair is more like the typical Rio Grande style with parallel zigzags from end to end. Another 1982 Hopi pair of footless stockings is knitted of black wool and has an elaborate clock down one side.

A long (32"-45") but narrow (17"-20") cotton, plain-weave kilt was woven in most of the pueblos. These have a very narrow (2"-5") bit of embroidery along only part of the ends, for at the top where a belt is worn it is left plain. A Cochiti piece has the typical kilt design: black and white stepped motifs representing clouds and parallel bands of red and white delineating the fields. A 1982 Hopi piece is extremely well woven and the end embroidery is carefully executed. Rarely, a kilt was painted as in a red Santo Domingo example.
The everyday dress of wool worn by the Pueblo woman was a simple, single oblong that she arranged under the left arm and over the right arm. This is an interesting piece for it has a black or dark brown center section in diagonal weave and wide top and bottom bands in dark blue, usually in diamond weave, plain, or in zigzags. Red and green cords mark the divisions between these sections. Although other Puebloans produced this same dress style, for example, Acoma, there were variations. At Zuñi an older style had dark blue ends, embroidered with geometric or butterfly designs, but later diamonds replaced these different motifs. Average-sized dresses were about 40" by 50" but varied according to the size of the wearer. These dresses were woven primarily to be worn about the home. They also were seen in ceremonials, for example, worn by young girls in the Hopi butterfly dance.

One of the most colorful of the Southwestern Pueblo handwoven items is the woman's manta or shawl. This is similar in weave to the dress or may be plain weave. In either case, artistry is centered in top and bottom embroidery. In early years at Zuñi, design was in a narrow red band or a wider and more flamboyant style, both about 1850-1870. Touches of another color, such as green, might appear in the latter style. Embroidery was equally attractive in Acoma mantas of these early years. Sometimes additional colors appear in the Acoma shawl, for example, blue.

For many years, a white cotton rectangle in plain weave was produced by various Pueblo groups. In this plain state it served as a wedding dress for the Hopi bride, later to be embroidered and worn on ceremonial occasions. This wool embroidery was in a simple black pattern at the top and in a more elaborate design and color at the bottom. Within diamond-shaped areas appear, characteristically, alternating cloud-rain and conventionalized butterfly, bird, or dragonfly motifs, usually in red, yellow, green and black, all against a green and black background.

Another characteristic shoulder blanket called a maiden's shawl is woven with a black or blue and a red band on the long upper and lower edges. The red band may be broken into narrower or broader lines or it may be solid. Made of cotton, the center of this piece is plain-woven at Zuñi and in a diagonal weave at Hopi.

A few open-work cotton shirts were crocheted in the Rio Grande, but the same piece was knitted at Hopi. More common were woven types, with or without sleeves. Hopis preferred the sleeveless type, in solid dark blue or black diagonal twill or sometimes in black and red stripes. In the 1982 Hopi Show at the Museum of Northern Arizona, Flagstaff, a white sleeveless shirt carried elaborate brocading in a wide bank across the center in black, red, and green.

More pleasing in some ways are Zuñi and Rio Grande Puebloan embroidered shirts with sleeves. One 1850-1870 Zuñi piece has a band of pattern at the shirt bottom, end of sleeves, and around the juncture of sleeves and body; then small designs are scattered over all the shirt and sleeves. A Jemez Pueblo cotton piece has bright red embroidered bands in the same area as on the Zuñi example, plus larger decorative areas on front and back of the body and sleeves of the piece. These shirts were usually cotton.

A great variety of blankets were produced by the Puebloan people, largely in tapestry weave, most of them exemplified in Hopi pieces. These were simple and complex striped woolen blankets, some for babies in
black, blue, and white, some shoulder or bed blankets in various color combinations such as black and white, or black and red, or black, red, and white, or vari-colored. These blankets present a wide variety of band and line combinations. Rarely other treatments occur such as a mask woven into a blanket. Black and white, plain or twill-woven plaid shoulder blankets were made for boys and men; these continue to be woven today.

Navajo Weaving

Navajo Indians were late arrivals in the Southwest, coming but a short time before the Spaniards. Seemingly they brought little with them in the way of material culture. However, they were—and are—amazingly adaptive, they are highly capable of borrowing a culture trait from another people, and converting all or part of it to their own uses. This they did extensively after they arrived here. Many of their contacts were with Pueblo people, thus it is not surprising that they borrowed heavily from them in the weaving craft—the loom and its equipment, techniques, forms of woven garments, colors, and even designs. Navajos might also borrow any symbolism of design significant to Puebloans; however it must be noted that with rare exception, there is no meaning to be attached to modern rug patterns. Removed from context, religious design loses its meaning.

One other important incident in Navajo history should be mentioned. This was the rounding up of all Navajos and the four-year period of captivity, 1864-1868, known as Bosque Redondo, in eastern New Mexico. According to the leading authority on this subject, Joe Ben Wheat, Navajos were weaving by the mid-seventeenth century and by mid-eighteenth century times were going off in new directions on their own, developing new techniques, new colors, and new designs. Navajos were replacing the Puebloan-preferred plain weave with tapestry, including diagonal twills. This is exemplified in a Massacre Cave piece dated about 1800. Tassels at the corners of blankets, paired three-ply selvage cords, and lazy lines rapidly became Navajo weaving traits. Lazy lines are diagonals in the woven textile resulting from the weaver sitting in one spot to complete a segment of a blanket, then moving over and joining her newly created segment to it.

A few points will illustrate the development of Navajo weaving from 1750-1850, with a definite lingering of some traits into later years. Colors became varied and included light golden brown to dark brown-black, native-dyed (reddish brown, dyed black (no natural wool is really black), yellow, and green, plus indigo and bayeta red, the last appearing about 1788 according to Wheat. Much of the designing in this period included stripes in zones with plain bands, or diamonds or triangles between them; or wavy stripes; or beading.

Forms of garments included the woman's one piece Pueblo-style dress that started changing into a two-piece garment not later than 1788. This dress had a wide dark center and wide top and bottom borders of cochineal red, decorated with dark blue lines, triangles, crosses, zig-zags, or diamonds. This garment began to disappear at Bosque Redondo but continued to be made into late nineteenth-century years.

The wide and short chief's blanket, which is really a man's shoulder piece, is rooted in simple black (or brown) bands against a creamy white ground. Then wider bands developed—often red, at top, bottom, and in
the center of the blanket. This earliest style is termed Phase I, and dates about 1800. In Phase II, about 1850, within the wider bands were added small geometrics, while Phase III (ca. 1860) saw a growth of these geometrics beyond the edges of the bands. Comparable to the man's shoulder blanket is a piece woven for women. It is wider than long; it has edge-to-edge narrower bands. Although it went through similar stages of development, they are more quiet and less flamboyant than in the man's piece.

Other forms of Navajo weaving, dating 1750-1850, include the serape and the diyugi. The latter is a coarsely woven piece that served for everyday wearing and as a bed blanket; they were soft, fluffy, and coarsely woven. As they were in constant use, they did not last long; therefore few of them have been observed. On the other hand, serapes were better made, lasted longer, and were better designed; many of them have survived. Both of these types had longer warp and shorter weft dimensions.

Many changes occurred in Navajo weaving between 1850 and 1900. Except for shoulder blankets, particularly the so-called Chief's style, practically all weaving during and after these dates was warp long and weft narrow, in varying proportions. Elaboration occurred in arrangement of design, with lingering edge-to-edge styles, and with the appearance of new elements, such as meanders, crosses, and some life forms in these horizontal bands.

Vertical layouts for pattern were developed, as well as the eye-dazzler style that involved bright colors and great design dynamism. A shift from blankets to rugs started about 1885. Fringes were added to Germantown pieces, particularly on the saddle blanket. There was also a continuation of classic designs in a muted manner. Four thousand Mexican Saltillo blankets were distributed among the Navajos at Bosque Redondo, to influence some design toward central diamonds in later years. The Moqui style, a distinctive blanket, was developed at an earlier time and continued late into this period. This involved a predominance of indigo blue with various arrangements of white and red such as simple edge-to-edge or end-to-end, and ornamented with stripes, crosses, diamonds, or other geometrics. Some Moqui designs were more complex.

Wheat says that Germantown yarn and aniline dyes were known in Bosque Redondo days, 1864-1868, but neither became popular until 1875-1885 when more traders encouraged the Indians to use these materials. Several materials and/or color sources may be noted in a single blanket, such as indigo, anilines, and native dyes, or five or six different kinds of raveled materials.

Many of these developments carried over into the twentieth century; some wavered and died. The blanket gave way to the rug, which affected both quality of weave and design. Degeneracy of the craft was rampant for a time, but in the late 1940s a trend toward finer weaving started, and higher peaks have been attained in recent years than in any nineteenth-century period. Thread counts of 120 or more per inch, to be noted in Two Gray Hills weaving, are lacking in pre-1900 blankets. Design is highly subjective—some think that all good and creative styles belong to the years 1800-1900, while others are equally convinced that the finest artistry belongs to the current century.
Two trends can be noted in nineteenth-century Navajo weaving as a whole—one, the development of general styles that may appear anywhere on the Reservation, and two, a significant development of regional styles. The former may include rugs with various combinations of black, white, red, tans, and grays; or miscellaneous uses of vegetable dyes; or saddle blankets; or occasional very large pieces. The regional rug consists of distinct styles limited to a relatively small area.

General rugs are woven in black, white and red; or this combination plus grays and/or tans; or black, white, and gray alone; or in a wide range of softer colors of vegetable dyes; or softer or more brilliant aniline dyes. Rare rugs of great sizes have been produced at various locations on the Reservation.

A most interesting decorative style, woven infrequently but over a wide area, is the two-faced rug, so named as it has a different pattern on each side. It is produced by inserting colors in an over-three-under-one rhythm on each side, quite loosely, letting the three threads on each face carry a different design. This piece is still produced today.

Saddle blankets always have been and still are woven on various parts of the Navajo Reservation. These are of many types: a soft, fuzzy piece of plain tapestry weave has been produced for years and traded widely. A reverse weave twill style has remained popular since pre-1900 days to the present; this weave produces diamonds, diagonals, zigzags, and a variety of other geometrics. Sometimes the double saddle size has different patterning and/or color in each half. Another trend in the saddle that tends to be made in the Coal Mine Mesa area toward the western part of the Reservation uses an extra thread to outline the pattern and is called a raised outline style.

Pictorial and sandpainting rugs are not bound to any particular region. The former may involve any subject matter familiar to the weaver—birds, cattle, horses, sheep, or other animals; circus creatures, wagons or trucks; hogans, shades, or fences; or ceremonial or festive gatherings. One weaver saw a painting by a different tribal artist and reproduced it in her rug. The sandpainting rug borrows this subject matter in terms of a partial or full portrayal of ceremonial paintings of sand made for rituals. Much fine detail is common to this style.

Significant indeed is the trend in Navajo weaving that involves the development of regional styles of rugs. Actually, there were several of these apparent in the first decade of this century, then there was a great spurt in this direction in the 1930s that has continued to the present moment. Examples of the major regional styles will be given.

Two Gray Hills rugs are widely known. Woven in western New Mexico north of Gallup, they are woven in black, white, and/or grays and tans. One observed piece had six different shades of tan woven into it! Characteristically there is a major central theme, a small and simple motif in each corner, and usually two or more borders in the rug pattern.

In the southern part of the Reservation, in Arizona, is the area of Ganado. Hubbel (of the famous trading post of the same name) made available to Navajos of this area a fine rich red color. This was used either in the major and characteristically large motifs of decoration or as background, but usually in abundance in the famous Ganado Red Rug. To the south of Ganado is the Pine Springs-Wide Ruins area—here are woven the finest, in both design and weave of the vegetable dye rugs.
Coarser design and weave typify the eastern Arizona Chinle vegetable dye styles. Subtlety of pattern and soft-colored designs characterize the former pieces, deeper colors and larger patterning the latter rug style.

Yei figures, which represent Navajo deities, are abundant in sandpaintings. They have been borrowed by the weaver for rug decoration, presented singly or in small or large groups. Two areas on the Reservation feature this subject matter, the Lukachukai of northeastern Arizona and the Shiprock of northwestern New Mexico. Rugs produced by the former group have featured darker backgrounds, less colorful yei figures, and are woven in native wool. The shiprock style stressed lighter backgrounds and more colorful figures in Germantown yarn. Probably the pickup truck is responsible for the exchange of ideas, particularly background colors, between these two groups.

Another western Reservation specialty in design is the storm pattern. This contains a central motif (center of universe) from which emanates zigzags (lightning) to the four small squares in the rug corners (directional houses of the four winds), and an odd design at the two ends (water bugs). This rug is frequently woven in black, white, red, and gray.

Quite different in weave is the Crystal rug of western New Mexico, for bands in its edge-to-edge patterning may have a distinct waviness. This is accomplished by inserting wefts in a loose manner for several repeated rows, then battening them down, this giving the wavy effect to the band. Adjacent bands are in regular weave, thus lacking any waviness.

The latest trend in Navajo weaving is the production of fine rugs in the Ganado-Pine Springs-Wide Ruins areas. A deep rich red dominates in color. Design features many small, outline patterns in white, or black and white, and a few motifs in tan. Most of these rugs are of fine weave. This trend also anticipates a future of blending or exchange of ideas between different areas of the Reservation.

It can be said, except for the Hopi Indians, weaving has practically ceased among the Puebloans. On the other hand and despite the fact that Navajo weaving is at a lower level in terms of quantity production, some of the finest products of the Navajo loom belong to recent years and to the present. Young women, who like their mothers win prizes, promise a continuation of this fine craft of weaving among the Navajo Indians.

THE COMPUTER AGE HAS ARRIVED IN THE CLASSROOM

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This paper will trace the development of the digital computer, identify the various educational applications that have been made, present "state of the art" in computer-assisted instruction, and provide some projections into the future of the computer as a teaching tool.
The Development of the Digital Computer

If you think of the digital computer as a product of the twentieth century, you are about 100 years off. Actually, some of the components of our contemporary computer were developed even earlier. Considering the focus of this group, I expect these early developments to be of some interest.

The French silk industry was established in Lyon by Louis XI in 1466. The fineness of the silk fiber made it most applicable to the creation of intricate woven patterns. Sometime during the fifteenth century, an Italian immigrant by the name of John of Calabria introduced a new silk loom that greatly eased this weaving process. The arrangement of warp yarns that were to be lifted together each time a filling yarn was passed between them was marked onto squared paper. These warp yarns were then attached to a common cord that when pulled caused all these warps to be lifted at the same time. The loom introduced by John of Calabria was called a "draw loom" and the job of pulling the cords was given to children called "draw boys." If the draw boy should pull the wrong cord, an error would appear in the pattern. This error would not be evident until well after it was made, when it would be impossible to correct it.

The son of an organ maker, Basile Bouchan, must have seen his father wrapping a piece of paper around a cylinder as he was constructing an organ. The organ maker's paper was perforated to act as a guide for the placement of pegs onto the cylinder. The pegs operated levers that selectively opened the organ's pipes as the cylinder turned. Bouchan had observed the "on/off" concept of the binary numbering system, which forms the basis of computer machine language. In 1725, Bouchan applied this idea to the draw loom. He wrapped a piece of perforated paper around two cylinders pressed against metal rods. The warp-lifting cords were attached to these metal rods. A rod not lined up with a hole in the paper would be displaced laterally causing the attached cord to lift specific warps, thereby creating the desired pattern.

In 1728, another Frenchman by the name of Falcon used perforated cards and laced them together into an endless chain to replace the paper rolls.

The idea was improved on once again in 1741 when Jacques de Vaucanson, a famous maker of automata, returned to the perforated cylinder concept but added a ratchet device to advance the cylinder. For the first time the loom could be operated with an assistant. The silk weavers' riots that followed this development caused Vaucanson's loom to sit in the Paris Museum of Arts and Crafts until the beginning of the next century.

In 1800, Joseph Marie Jacquard perfected the silk loom. He returned to the connected card idea and mounted the string of cards, each of which controlled one portion of the pattern, over a revolving squared-off cylinder. Jacquard entered the loom in the 1801 Paris Industrial Exhibit, for which he was awarded a bronze metal. Despite the contributions of others, the Jacquard name is associated with the card-controlled loom.

About this time the mathematicians entered the picture. The first was a brilliantly eccentric Englishman named Charles Babbage. Babbage, who waged a life-long battle against the organ grinders of London claiming their incessant noise robbed him of one-quarter of his working power, was the inventor of the ophtholmoscope (for examination of the retina), skeleton key, locomotive "cow catcher," and the speedometer. Concerned
by the errors in mathematical tables that were recopied from one text to
another, Babbage proposed the development of a machine to calculate these
tables by means of a series of additions. Curiously enough he called
this machine the "Difference Engine." (The word "engine" is derived
from the same root as "ingenious" and carried the meaning of a clever
invention, rather than a power source as we interpret it today.) In
1823, Babbage received a government grant to complete the Difference
Engine. However, he ran into technical problems and eventually abandoned
the project.

While working on the Difference Engine, Babbage became aware of the
Jacquard loom's card driven mechanism. Applying this approach to his
calculating machine, he envisioned the Analytical Engine, a punched card
controlled calculator. This machine carried out a variety of mathematical
operations, not just addition. Controlled by punched cards on which
instructions were carried, this Analytical Engine was equivalent to the
modern computer. The Analytical Engine was never completed by Babbage
due to lack of financial support. Considering Babbage's eccentric nature
and the abandonment of the Difference Engine project, the government was
unwilling to support this new venture. Also, the idea was far ahead of
existing technology. Mechanical linkages of gears and levers greatly
hindered the calculating speed of the Analytical Engine. Although he
never succeeded in completing either of his inventions, Charles Babbage
is considered to be the "father of the computer."

Considering the tenor of the times, it is amazing that the first
computer programmer was a woman. Augusta Ada Byron, the only legitimate
daughter of the poet Lord Byron, was an educated woman accomplished in
language, mathematics, and music. She translated a French paper about
the Analytical Engine and added her own notes as well. This translation
represents most of the known information about the Analytical Engine.
She also developed a demonstration program for the Analytical Engine.

The science of statistics was born early in the nineteenth century
as well. Census taking was used as a means to gather data on the American
population. Due to the influx of immigrants to America, tabulating the
data gathered in the 1880 Census was a monumental job. Herman Hollerith,
an electrical engineer, was assigned the task of developing some automated
way to count the returns. Once again the card idea was used. Hollerith
punched holes in the cards in predetermined positions to represent
specific pieces of information such as "sex," "age," "number of children,"
and the like. A matrix of electrified spring wires was mounted into a
clamping device. As each card was placed between the jaws of the clamp,
the electrified wires that lined up with holes in the card passed through,
causing a circuit to be completed. Each circuit controlled a counting
device that advanced one digit with each signal. Since dollar bill
holders were available, Hollerith designed his electronic tabulating
machine to use a control card the size of the 1890 dollar bill. This
machine made possible the quick calculation of complex correlations, and
allowed the 1890 Census to be completed in half the time of the previous
one. Hollerith's enterprise later became a part of the International
Business Machines Corporation (IBM).

In 1944, a computing machine that operated on Babbage's concept was
finally built at Harvard University by Howard Aiken. The machine was
called the Mark I Automatic Sequence Controlled Calculator. Howard Aiken
was totally unaware of Babbage's work. Controlled by punched paper tape, its electromechanical operations made the Mark I only five to six times faster than a desk calculator.

The Mark I was displaced two years later by the ENIAC, an acronym for Electronic Numerical Integrator and Computer. The ENIAC had totally electronic circuitry that meant its speed was limited only by the time required for an electron to travel along a length of wire. The ENIAC used vacuum tubes and plug boards (not unlike a telephone switchboard). Its operations were 500 times faster than any electromechanical device. The ENIAC was one of a crop of computers with strange sounding names like EDVAC, UNIVAC, JOHNNIVAC, ILLIAC, and even MANIAC.

About the same time as the ENIAC, the EDVAC (Electronic Discrete Variable Computer) was developed by a Hungarian American named John Van Neumann. The EDVAC was superior to the ENIAC because of two innovations. The EDVAC used binary notation, which means that the basic machine code was represented in numbers expressed in base two. Binary notation uses only two digits, zero and one, to express numbers as compared to the more familiar decimal notation that used 10 digits, zero through nine. The other innovation of the EDVAC was the ability to store programs (or instructions for the computer) in the computer memory in the same fashion as data is stored. This eliminated the necessity for punched tapes or cards and made it possible for one program to manipulate another.

The ENIAC and EDVAC are now totally obsolete due to a trend toward miniaturization. The vacuum tubes from which they were constructed were bulky, unreliable, and generated tremendous heat. These tubes were replaced in the 1950s by transistors that were smaller, more enduring, and generated much less heat. At this time the high speed magnetic core memory also was developed. The integrated circuit that combined first hundreds and now thousands or tens of thousands of transistors onto a single silicon chip about the size of your fingertip was introduced in the 1960s. Each step in the miniaturization of the computer increased its speed by shortening the path along which the electrons needed to travel to relay their message. It is this miniaturization that has made first the mini and now the microcomputer possible. Today the table top computer is more powerful than the Mark I, which filled a large room.

Educational Applications

The first application of the computer's capabilities to the educational setting was machine-scored objective testing. This development made the #2 pencil a necessity to any student in a large class. The next application was computer-generated individual tests. The instructor would create a pool of test items to be stored in the computer. The stored test items would be grouped by concept and equivalent in difficulty. Such a pool of test items could require considerable time commitment from the instructor to develop. The computer would be programmed to select test items at random from the pool according to the specifications of the instructor. In this way each student would be provided a uniquely individualized exam. Grovalynn Sisler of Oklahoma State University and some of her advanced students have published several articles in the Journal of Home Economics describing their success with this approach (Good, 1975; Wilkins, 1971).

Once the computer could generate the test and then grade the students' responses, the next logical step was to program the computer to provide
the students with evaluative feedback on their performance. Based on a criterion referenced model, the computer could provide students whose exam performance satisfied the criterion with a printout directing them to a resource reading on the next concept and requesting that they return to be tested on the new material by a certain date. Students whose exam performance was below the criterion would receive the message to study a remedial unit and return for retesting. This Computer-Managed Instruction (CMI) has been used most effectively by the military for training large numbers of students with minimum staff. The computer can monitor the progress of each student and identify the point at which instructor's help should be sought.

The next step, the concept of Computer-Aided Instruction (CAI), is based on the Personalized System of Instruction (PSI) developed from the work of the well-known psychologist B. F. Skinner. Computer-Aided Instruction goes beyond PSI because the computer can be programmed to judge students' work, respond immediately whether answers are correct or not, or if instructions have been correctly followed. Thus, Computer-Aided Instruction is interactive.

The earliest computer-aided instruction was developed (with great difficulty) on computer systems designed to maintain records, manipulate complex mathematical algorithms, and calculate statistics. These early developers had to reshape this stubborn code to produce subroutines that would judge, branch, and create graphics. It was obvious these computer systems were not conducive to the easy development of instructional materials.

The late 1950s and early 1960s witnessed a significant commitment on the part of computer engineers toward development in the area of educational applications. Established computer corporations began investigation of authoring languages such as Coursewriter, developed at Florida State University for IBM. The TICCIT system (Time-Shared Interactive Computer Controlled Information Television) was created at Mitre Corporation by Victor Bunderson and John Volk at the University of Texas and Brigham Young University. TICCIT Courseware was initially implemented at Phoenix College in Arizona, which is still using these English programs.

About the same time, Donald Bitzer was working at the University of Illinois, Urbana Campus, on a computer system designed specifically for educational applications. He called the final version of his system PLATO (Programmed Learning for Automated Teaching Operations). The patent disclosure date for the PLATO system was April 6, 1961 (Bitzer, 1961). PLATO's advantage was the options provided for student input: alphanumeric input typed on a standard keyset or the pressure of a finger on a touch-sensitive screen. The PLATO terminal screen providing 513 x 513 piccells (or points of minimal resolution) could generate extremely precise charts and educationally motivating graphics with animations, if desirable. Peripherals such as music and voice synthesizers, digitizing pads, hard copy printers to mention a few, could be easily interfaced with PLATO. In addition, PLATO could be programmed to operate audiovisual aids and electronic devices such as random access slide projectors, videotape players, oscilloscopes, and the like. PLATO is programmed in a powerful authorizing language called Tutor. Tutor is an alphanumeric language that uses straightforward word commands. A lesson on the PLATO system called Aids allows authors to train themselves by explaining the
functions of each command in the Tutor Language. This "on-line" documentation is not unique to PLATO, but can be found in the catalogs of many programming and authoring systems.

Perhaps a moment should be spent at this point to define the several levels of computer language. Basically, there are three to four levels of computer language used with the computing systems in business and education today. The lowest level is called "machine" language. This is the binary language that uses two digits, zero and one, to indicate whether a circuit is to be open or closed. Zero indicates the circuit is open; one indicates the circuit is closed. Programming in machine language is tedious work and is done only when higher languages are inadequate to develop the desired operation.

The next level is called "assembly" language. In assembly language, groups of binary digits or "bits" are combined into mnemonics that represent characters such as numbers or letters. Combined in groups of eight binary digits, this code is often referred to as "octal." Still somewhat bulky and awkward to program, the characters of assembly language are combined into subroutines that perform a specific operation such as adding one number to another or presenting a word on the screen. This operation will be performed when the name given to the subroutine is entered into the program. The name of the subroutine is called a "command."

A language whose programming code is created through the use of simple commands is a "programming" language. Specific programming languages have been developed to satisfy the diverse needs of computer users. Fortran (Formula Translator) was developed for the scientific and engineering community. COBOL (Common Business Oriented Language) was developed for business users.

The needs of educators require the further combination of the simple commands of programming languages into elegant subroutines that can match the students' response to a list of correct or anticipated incorrect answers and print an appropriate message on the terminal screen if a match is found; or request students to enter their names enabling the computer to refer to "Sue" or "Bill" or "Fran" on subsequent messages; or draw a butterfly, make it flutter across the screen until it is grabbed by a hand that emerges quickly from a bag. Languages that include such features are called "authoring" languages. TUTOR, PASS and LISP are examples of authoring languages. Since programming languages and authoring languages contain a hierarchy of code, they much be translated back to a simpler form that can be recognized by the computer. It really is only a machine that responds to directives relative to opening and closing electrical circuits. This translation back to machine language is performed by a magic "black box" called a "compiler."

The final critical contribution of the 1950s and early '60s was the development of the simplified programming language called BASIC (Beginners All-Purpose Symbolic Instruction Code). Developed at Dartmouth University, the fundamentals of the BASIC language could be mastered in a matter of days. The simplicity of this language facilitated the rapid production of equally simple computer-aided instructional materials. Most of the microcomputers (which began to appear around 1975) are programmable in some form of BASIC.

During the 1970s, Dartmouth University and the Universities of North Carolina, Iowa, and Texas formed a consortium called CONDUIT to acquire,
evaluate, and distribute quality instructional materials. Established through a National Science Foundation Grant, CONDUIT is currently located on the University of Iowa campus under the direction of James W. Johnson. Unfortunately, however, CONDUIT is not at present collecting or evaluating any instructional materials related directly with home economics. Locating educator-produced instructional software with home economics content has been my pet project for the past two years. The results of the first wave of this nationwide survey have been published by my colleague, Nancy Dillon, who has recently been compiling directories of home economics related materials gleaned from those available through commercial sources (Dillon, 1982). As far as I know, there is presently no group of home economics educators formally evaluating home economics software. However, at their recent meeting in Cincinnati, the American Home Economics Association voted to establish a task force to develop criteria for the evaluation of home economics CAI materials. Hopefully, if this task force works in concert with members of the Home Economics Special Interest Group (SIG/HomEc) of the Association for the Development of Computer-Based Instructional Systems (ADCIS), a mechanism will soon be in place to provide sound peer evaluation of the scholarly quality of computerized instructional materials so vital to our untenured contingency.

Current Issues of Concern

Several current issues are identified related to CAI. These include hardware (equipment) selection considerations, compatibility of CAI languages, and mode of courseware development.

The question as to whether or not computer-based education is a legitimate mode of instruction is rarely debated in the 1980s. The focus of debate is now whether to commit one's institution to time sharing on a mainframe system or the independence of the stand alone microcomputer. The initial outlay in cost to fill a classroom with microcomputers could equal that for the same number of "dumb" cathode ray tube (CRT) terminals for a dedicated mainframe system. The additional charges for the telephone hookup to the mainframe central processing unit, especially when long-distance lines are used, may sway the balance in favor of the stand alone system for remote or small installations such as individual elementary and secondary school districts. Also, galloping technology promises to shortly overcome the current limitations on memory space and graphics quality in the microcomputer. However, such enhancements may render existing micro hardware and software obsolete, requiring replacement rather than continual updating, which is more easily accomplished with the mainframe set up. Another consideration is the fact that the microcomputer market has been enlarged within the last two years by several products with very desirable features. However, the software available for these late arrivals is very limited.

The last statement leads into the next current issue of concern. Many of the microcomputers are programmable in the BASIC language; however, each hardware manufacturer has developed its own specific version. Also, as hardware updates occur, the software often changes as well. For example, the Apple III computer can run software designed for the Apple I, but the Apple I cannot run software designed for the Apple III because the Apple III hardware has a wider range of capabilities. To add to the problem, the software for most mainframe systems is completely machine dependent and therefore totally incompatible with other software. This raises the issue of the nontransportability of software. Where is the
motivation for the investment of many developmental hours into instructional materials that are not available to reviewers and users alike who do not have access to a similar computer system? Some sort of standardization of CAI language seems necessary—much more easily noted than accomplished, I am sure.

The third current issue is the formalization of software development. The days of the individual software developers are quickly waning. The individual who alone embodies expertise in content area, educational strategy, and computer programming is rare indeed. More and more support facilities are being provided by industry, Control Data Corporation, for example, and institutions of higher learning. The Office of Computer-Based Instruction at the University of Delaware, directed by Fred Hofstetter, is a highly refined model with which I am very familiar (Seiler, 1981). However, I am aware that other such support facilities do exist on other campuses as well. These support facilities provide interested faculty, who are content-rich, with assistance in the adaptation of this content to modes of learning that are most appropriate for instructional computer applications and also provide skilled programmers to implement the final product. As the criteria and mechanisms for lesson evaluation mature, the quality of existing courseware will become evident as will the value of this "team" approach to courseware development.

Future Projections

What lies ahead in the area of computer-based education? The technological and logistical predictions are both optimistic and exciting. The functional hardware barriers of memory and graphics capabilities, as well as the incompatibility of courseware, should soon be overcome. Hopefully, these transportability innovations will bring with them some means by which the author's vested interest, currently very vulnerable, can be protected. There is no meaningful protection for computer software under copyright legislation at present.

This enhanced transportability linked with mass production and greater acceptance will produce increased use, which will bring costs down. Some consideration has been given to the transmission of computer information by satellite, as television communications are sent today. With this capability, the home television set could be used as an interactive learning center (Luehrmann, 1979).

The nearly perfected videodisc will soon provide programmable storage for visual materials. Slides and motion picture film will be available for computer manipulation like any other information stored in a data base. Can you imagine having all the slides in the art library available on a disk that could be carried in a briefcase? What an intoxicating thought to an historic costume instructor!

Another exciting CAI innovation about to be perfected is the concept of artificial intelligence. Artificial intelligence attempts to duplicate application level cognitive operations. For example, given rules of syntax and a vocabulary list, the program could generate language. By providing the logic of a concept instead of merely a limited set of problems with answers permits the instructor (whether man or machine) to work with the students. Artificial intelligence requires a total analysis of the concept by asking them to predict outcomes or make analogies, or by providing other challenges, the students' level of understanding can be assessed. Through sophisticated judging mechanisms and individualized
interrogation/confrontation strategies students' competencies are strengthened and broadened (Glaser, 1982). Finally, to prepare future teachers it seems imperative that computer literacy, computer-assisted instructional theory, and possibly lesson design become a part of the teacher education curriculum. This seems a timely addition to any complete methods course. Considering the abundance of courseware being developed in home economics related areas and the ready acceptance of children for computer-aided instruction, our inservice teachers will need the ability to evaluate available materials and integrate them fully into the classroom environment.

References:
UTILIZING CAI FOR TEXTILES AND CLOTHING INSTRUCTION

Joan Laughlin
University of Nebraska-Lincoln

One-half million micro computers in homes by the end of 1982, two million by the end of 1983, in one out of every five homes by 1985, predicts a company executive. "If you were born before 1965, boy you're going to be out of it," Time Magazine (May 2, 1982) quoted Charles Lecht in the cover story. A computer whiz kid explained "parents (teachers) are out of the computer age. They had their own age."

Our 1982 incoming freshman class includes some computer literate students. Most of our students in the next five years undoubtedly will be computer literate. Does (or should) this carry a message to us, our teaching technology, and our curriculum development? Or should we sit "pat," ignore Toffler's predictions for the Electronic Cottage, and wait for the post-computer technology age some predict for the year 2,001. Computers are not the future, they are the present. And we can't ignore their impact on our students and our way of instruction.

What can computers do for and to the instructional process? First let's skip the "the computer as object of instructor," or learning about computers and focus on "the computers as support tool," or learning with computers.

A computer can be used to enhance programmed instruction, an approach in which material to be mastered is divided into sequential segments, or frames. After reading the frame, the learner answers questions. If mastery is indicated, the learner moves on to a new frame. If mastery is not achieved, the student is detoured through review for relearning.

Here's where a computer can excel--in CAI, or Computer Assisted Instruction, especially when it involves drill or practice and multiple routes to correcting misinformation.

Two important points before we go any further. Point 1--we don't need to know about the inner workings of a car to be able to drive one. As long as our car gets us where we want to go, we're happy, and if it fails, our trusty serviceman can repair it. Just as I had to learn operation and defensive driving skills, so, too, I'm learning operation and computer skills.

Point 2--computers cannot replace instructors. I'll share with you how we are using computers as teaching tools at Nebraska. Notice, I said tools. They are a small, but mighty part of the total curriculum. The computer should be an extension of the teacher rather than something separate. If the instructor feels unsure and threatened by this teaching tool, dislearning can occur. Above all, our field--home economics, must use computers in a humanistic way. A "good" computer program is one that encourages group participation in the learning process, and "good" computer uses are those that help individuals develop skills for dealing with the demands of the "real world."

Appropriately programmed, computers lead the learner through questions, and responses or interaction, with instant results or judgments. When feedback is supplied to a correct response, that correctness is reinforced. When the response is incorrect, encouragement and relearning can be immediate.
Computers are patient. They can ask the same problem or type of problem over and over. Furthermore, multiple paths through the subject matter can be taken, depending on the individual student response and/or progress.

One hidden advantage to computer-assisted, self-paced, programmed instruction in Textiles, Clothing and Design is approximately half our students are merchandising/retailing majors. These students will use the computer as an everyday tool during most of their professional careers, and their success with this tool probably will be proportional to their attitudes toward computers. Thus we see this as an opportunity to develop positive experience, and thus positive attitudes, toward computers early in college careers.

The University of Nebraska has encouraged incorporation of innovative teaching techniques in the classroom, particularly those that use the computer facilities. There were two simultaneous beginnings to our CAI—programmed instruction: (1) development of the programmed instruction learning modules and (2) development of the computer software. Let's begin with the second first.

We have several groups of remote computer terminals located in selected buildings on each campus. By using regular telephone lines, students access the conversational monitor system (CMS) that runs on an IBM 370 computer housed in the state capitol building in Lincoln. The fast response of the CMS provides the means for implementing conversations between the student and the computer.

In the past we felt it was necessary to take each class to the terminal room during the first lab of the semester for a "hands-on" experience before requiring them to complete lessons. Now we recognize that computer-sophisticated students need only a one-page instruction sheet and an introduction through slides in the first lab.

The interactive software programs developed to capitalize on CMS potential include Fortran programs of multiple choice format and fill-in-the-blank format. "Choice" is a program that presents the student with a series of multiple choice questions and appropriate responses to incorrect and correct answers. An advantage of using a multiple choice question technique is it provides positive reinforcement and immediate feedback by automatically scoring the answer. It also responds with appropriate information explaining why the choice was correct or incorrect. The "choice" program is quite flexible as it provides from two to nine multiple choice answers. Another program format available is "blank." This is a program designed for fill-in-the-blank questions. This program places emphasis on vocabulary and recognizes these words as the appropriate responses.

Our program enables the student to be recognized by name, which has proven to be very important for reinforcing positive attitudes toward computers. After two attempts, the computer is programmed to provide the correct answer. At the completion of the learning experience, the number attempted is determined, and a score computed and reported to the student, along with a message of encouragement or congratulations.

Over the time we have used these programs, we have developed several accessory software programs. Students have their own accounts, and the system records each student's log-ons and dollars used. An additional software feature monitors each of the eight lessons, recording all
students who requested those lessons, how far the student progressed, and on what date. This feature has made work left at home excuses no longer applicable.

Learning packets were developed in 1975 to supplement the introductory textiles course. Students check out from the library the booklet that contains programmed instruction and directions to interact with the computer. The students are directed to read the first frame of the lesson, then respond to questions presented by the computer. The booklet follows a programmed sequence of instructions unique to each subject matter unit presented.

For some of the lessons, the programmed instruction manuals include fabric swatches. With 10 manuals, and thus 10 sets of swatches, we can serve up to 100 students per semester. Those involved in textiles recognize the tremendous savings of time and expense in swatch preparation, without sacrificing learning.

Evaluation is important, and evaluation of computer use has been three-fold: (1) The ongoing costs are minimized. Students use an average of $5.00 computer time per semester. (2) Student grades have improved over pre-CAI students' grades. (3) Students report a positive attitude toward the comptuer and the CAI lessons. Students comment that the lessons are most helpful in preparing them for examinations. Several students have commented that they would like more CAI lessons, especially covering fiber properties.

Currently, I'm using my personal computer to assist in managing instruction. Every educator who gets into computing seems to think of their grade book first--for this is where computers excel. Options include adding and updating grades so I can maintain a record on each student. But most important, since I teach a large lecture section of textiles in a 200-seat auditorium, the program is designed to output a student report at any time during the semester.

We, at Nebraska, anticipate more student hands-on experiences with micro computers. One difficulty is equipment cost. A micro computer lab is necessary so students have access to micros as readily as they now have access to terminals from the mainframe. What should be the considerations in the two basic areas of hardware and software? Although many feel the important decision should be hardware, hardware and software decisions go hand in hand; and over time, the most important decisions center around software. The software available includes commercially developed, teacher developed, and authoring systems.

Commercially available software is cost effective and easy to use. No special teacher training is required, but it lacks adaptability. One of the more important packages to textiles and clothing is VisiCalc and similar versions such as Super-Calc and Target.

Teacher developed software is custom tailored to the individual teacher and the unique classroom situation. The overriding disadvantages are time and money. The more complex the program, such as simulation games, the more time required.

A third option is to use an "authoring" system, or "authoring" languages such as PILOT or AUTHOR. A computer-naive instructor can use these tools to design software that fits the classroom situation. These programs take advantage of the usual "sequential" frame patterns
of programmed instruction; that is information presented, questions asked, student answers and feedback given, and then cycle repeated.

The authoring system does provide versatility in CAI, but its major disadvantage is limitation in the complexity of the learning or response branching; that is, multiple solutions to complex problems are not possible. For many questions, there is only one answer. Some programs limit the number of questions that can be checked.

Here are some suggestions:

• Make learning as interactive as possible. To do this means to require a response from the student as frequently as possible and to provide instant feedback. Give the learner two or three trial questions to practice how to respond before the lesson actually begins. This is extremely important for first-time computer learners as anyone who has played "Pac-Man" or "Asteroids" knows. Plan for "one-finger" responses when possible. Remember, typing may be a skill the learner has not mastered.

• Make screens easy to understand, avoid too much information. Never use more than two dozen words at a time on the screen. Use graphics whenever possible. Frame the text or illustrate with simple graphics. Show the learner, don't tell.

• Have the learner respond frequently. Avoid huge blocks of text, or screens that only perform. Let the learner control the pace of the lesson. Go backward or forward at will.

• Plan for wrong answers. Use hints and second chances. Incorporate feedback and correct explanations for the most common mistakes.

• Build challenges into the experience. Use branching PI so students who master the material move on to a new concept. Students who are having difficulty should be allowed two to three tries.

The major problem we face is limited sources, especially for self-paced instructional material developed by subject-matter specialists—and someone who can adapt it to the computer.

On the plus side, CAI is a very popular concept, and in 1982, the visibility and acceptance of computers have mushroomed. Blame it on Pac Man, or the Time Magazine cover story, or television coverage of classroom computers—it's the talk of all campuses, preschool through university. Parents want their children to learn with and about computers.

Even though there are other ways to learn, CAI will grow because it's interesting, it's exciting, it's valid, and it's as big as E.T.

REFLECTIONS AND COURSE OF ACTION

Marilyn J. Horn
Chairman, ACPTC National Futures Committee
University of Nevada

First, let me thank all of you for writing this speech for me! Each of you made a fine contribution to the "future-forecasting"
discussions held yesterday. I am especially grateful to the group
recorders who summarized and condensed their material into the following
reports. The five "developments" or "trends" that served as the spring­boards for the discussion evolved out of some general trends predicted
for educational programs in general and for business and industry, and
out of some of the things already happening on selected campuses through­out the country.

Discussion Group #1 (Marilyn Burns, leader; Ardis Koester, recorder)

Problem: What would be the anticipated outcomes for textiles and
clothing if clothing were cut to individual measurement by laser, fused
together automatically; if computerized selections of color and design
were matched to body type and style preferences?

Outcome 1. Clothing and textiles professionals would need to be
retrained. They would need retraining in the areas of (a) technology
(including computer hardware and other technical equipment), (b) subject
matter (including software and the writing of programs), and (c) educa­
tional delivery systems (including new teaching methods via tele­
communications).

Outcome 2. Consumer education would be handled through a limited
number of professionals working through intermediaries such as consultants,
other teachers, or parents. Emphasis would be on helping the consumer
understand the increased personalization possible; on the role of clothing
in the socialization process and the psychological effects clothing may
have; on specialized needs (such as the handicapped); on helping interpret
people's needs and how to make satisfying decisions.

Outcome 3. There would be a need for a broader scope in research,
including such areas as international economics and crosscultural studies,
if new forms of clothing are to satisfy a variety of peoples in different
situations. There also would be a need to evaluate consumer satisfaction
with clothing production systems.

Outcome 4. There would be the opportunity for textiles and clothing
personnel to work with business and industry in the integration of design,
production, and marketing in the best interests of the consumer. Re­
tailing procedures would probably shift to computerized catalogs. The
group lamented the passing of the sales rack, since there would be less
waste, and every garment would be wanted.

Discussion Group #2 (Orpha Herrick, leader; Antigone Sutton, recorder)

Problem: What would be the anticipated outcomes for textiles and
clothing if home economics units were reorganized into the departments
of (1) Family Resources, (2) Energy and Environment, (3) Family Health,
and (4) Human Development?

Outcome 1. Textiles and clothing could be integrated into each of
the four areas. We would lose our current identity, but build new
identities under new names. New identities may be stronger since
current identity is often perceived as weak. Negative aspect would be
lack of visibility and a weakening of textiles and clothing by being
divided or segmented.

Outcome 2. We would need to improve communication. Extension
agents from all four areas would need to work together to share research
findings with citizens through a statewide network. Department heads
and deans would need to be updated so they would know what we are capable of doing.

**Outcome 3.** We would learn to work with others in disciplines we formerly thought of as "different." To realign ourselves, we would have to work with others to integrate disciplines or perspectives: people would be developing greater breadth. A mentor system could lead to self-enhancement and greater visibility of textiles and clothing subject matter. Meshing of disciplines would lead to team teaching; integration with others could build on one another's strengths.

**Outcome 4.** Fashion Merchandising (generally the major with the greatest number of students) would be approached from a consumer rather than merchandising/management/buying viewpoint. Apparel manufacturing and fashion merchandising do not emerge as significant components in this type of organization. (Comment: the four divisions appear to have consumer oriented titles; in some states consumer and social programs are being cut and vocational programs are being funded.)

**Outcome 5.** If faculty do not agree with the restructuring, or if we do not see how we fit, textiles and clothing will die as a field. We must prove that our programs are beneficial and that students are marketable

**Discussion Group #3** (Susan Carter, leader; Jean Margerum, recorder)

**Problem:** What would be the anticipated outcomes for textiles and clothing if subject matter areas in home economics are transferred to related root disciplines (e.g., nutrition to biochemistry, child development to psychology, design to art, etc.)?

**Outcome 1.** Root disciplines would be strengthened but the applied aspect would be weakened; limited application to families and individuals. Applied aspect would become a stepchild to the root discipline (i.e., in faculty, funding, tenure, etc.). Some thought applied aspect would be strengthened rather than weakened by connection to other disciplines through the interaction of both faculty and students.

**Outcome 2.** The clothing and textiles professor becomes a consultant; he/she becomes more competitive, has greater incentive to update and upgrade, more open to communication with people in the root discipline. The textiles and clothing professor would have the opportunity to teach humanistic skills and to enrich students in the root discipline. There would be greater opportunities for textiles and clothing in research, public relations, and consulting; more freedom plus more support; more students in the program; more males (since title of root discipline would be more attractive).

**Outcome 3.** There would be a loss of unity within the textiles and clothing area. Textiles would go to chemistry, merchandising to business, design to art, history of costume to theater, construction to vocational education. We would lose the concept of home economics as a profession; we would lose the home economics philosophy, the recognition of the importance of the family to community and nation, the contacts with peers, the training of home economics teachers, the clothing and textiles major.

**Discussion Group #4** (Charlene Lind, leader; Christine Milodragovich, recorder)

**Problem:** What would be the anticipated outcomes for textiles and clothing if all undergraduate programs become general studies or technical
vocational education; if professional programs in home economics are offered at the post-baccalaureate level only?

Outcome 1. There would be a greater need to coordinate all training agencies (i.e., colleges, universities, businesses, vocational schools) to articulate who trains students, at what level, and for what purpose. It would improve liaison between universities and businesses, making textiles and clothing professionals more visible, improving job possibilities for students, and attracting more funding. Training programs might be limited according to geographic access (i.e., advanced training in textiles available only in areas where textile mills are located).

Outcome 2. There would be increased need for training of faculty, with increased demands placed on faculty, but with greater flexibility. Greater emphasis on faculty internships with industry; more interchange of jobs between faculty and industry (joint appointments); demand for more flexible lifestyles--increased movement from one geographic area to another, more faculty exchanges.

Outcome 3. The image of the profession would be enhanced; more status awarded to those with advanced degrees (which all textile and clothing faculty would have to have); additional education or training required would elevate textiles and clothing to the level of a "real" profession.

Outcome 4. There would be increased demands on students for (a) money required to complete graduate training, and (b) additional time required. Fewer programs would offer textiles and clothing at the graduate level--students would have to go further in school or not go at all. If vocational programs were implemented at the college level (as in Europe) students would be forced to decide upon career goals earlier. Some students may never "find" textiles and clothing through a general undergraduate program. This would mean loss of people to the profession, postponement of student involvement in the textiles and clothing area.

Outcome 5. It would demand faculty who are more widely versed on how textiles and clothing impacts upon all other areas. It also might result in internships at the graduate level, greater demand for expertise in alternative communication techniques (self-taught modules, telecommunications, etc.). The group also raised the following question and made these comments: Why train students at the undergraduate level when they can get jobs without any degree? Two antithetical outcomes are possible: (a) If times get tight economically, people may seek out home economics for its skills-oriented approach to life. This would create an increased demand for training home economists and an increased need for graduate programs. Or, (b) no one recognizes home economics as a viable area for general education, so it exists only at the graduate level. Thus, home economics cannot attract graduate students, there will be a reduction of home economics graduates and high school teachers, high school home economics programs will close, and home economics will be lost as a profession.

Discussion Group #5 (Marilyn Horn, leader; George Sproles, recorder)

Problem: What would be the anticipated outcome for textiles and clothing if educational programs become industry supported and industry operated; if in-service or on-the-job training replaces the traditional academic college program?
Outcome 1. Home economics would become more general in orientation:
(a) Home economics content will be taught in the general curriculum,
e.g., costume history in History of Western Civilization, etc. (b) More
students will be exposed to home economics through the general curriculum.
(c) There will be more emphasis on broad concepts of home economics, less
on technical skills. (d) Fewer but "better" students may enroll.

Outcome 2. Research will become more applied in focus, less basic:
(a) Research will be used more because it will be practical, goal­
oriented. (b) If research is controlled by industry, basic research
geared to "distant" future needs would be limited or nonexistent.

Outcome 3. Home economics as we know it today would cease to exist.
Some home economists would gain employment with industry. The need for
educators with traditional specialties would be limited. Retraining
would be necessary for those with outdated skills.

Outcome 4. The ethics of research would be changed, e.g., research
becomes more subjective, thus there will be a need for more ethical/
critical/moral thinking about research goals and objectives.

Outcome 5. A new educational system will arise to provide consumer
information, perhaps replacing government and extension programs.
Industry may fully control these information programs.

Outcome 6. Taxes would be lowered because citizens would not have
to support school systems.

Outcome 7. We might be more selective about who goes to college,
and thus attract only the most qualified and motivated students.

Outcome 8. Students may obtain more "on the job" experience with
industry early in their education, thus sharpening their selection of
personally desirable careers.

Outcome 9. Industry-based education may be more practical, e.g.,
create a more skilled and productive employee.

The purpose of these discussions was process not product. We're not
going to change the world or determine the future for textiles and
clothing in an hour's discussion. This was just one attempt to get us
thinking in futuristic modes. Change and uncertainty are always threat­
ening. People don't want to believe these kinds of things could happen,
and the responses to such suggestions often are negative at first. Some­
one observed that the people who had already experienced such changes
were more receptive and made more positive responses. Sometimes we
expend our emotional energies defending the status quo.

Many people cope with these kinds of threats by trying to improve
their present skills and doing better the things that they have always
done in the past. We are so blinded by the things we do habitually, we
often miss out on our greatest opportunities. We must develop new kinds
of intellectual skills and new kinds of values.

What We Need to Do--A Plan of Action
1. Look farther down the road than just the next five years. Most of us
see the future as a simple extrapolation of the present. We need to look
beyond computer technology.
2. Develop anticipatory thinking skills. The only way to optimize
information is to anticipate events and to be prepared.
3. Become future literate. We need a broad base of information about
the future to imagine probable outcomes.
4. Be willing to daydream. Fantasizing anticipated outcomes is not a waste of time.
5. Be willing to look at a variety of alternatives. There is no one future for all, nor is the future predetermined.
6. Raise issues and ask questions. There are many other issues that could be identified, and many questions that we need to address ourselves before somebody else addresses them for us. Among them:
   • Should textiles and clothing seek to retain its affiliation with home economics in the future?
   • What content areas would be more appropriately tied to other units (e.g., to business schools, trade schools, industry-supported programs)?
   • What new relationships with other disciplines could be identified? What would be the potential consequences of new affiliations?
   • If textiles and clothing wants to strengthen ties with home economics, what new thrusts will be needed?
   • What content areas in textiles and clothing are uniquely related to home economics?
   • What content areas would need to be added to fit the philosophical base of home economics?
   • Is textiles and clothing the most logical combination of subject matter and/or the most appropriate label for our area?
   • What kind of people do we hope to attract to the field? Should we engage in promotional strategies to attract large numbers of people to ACPTC, or should we set membership standards so high that only the most prestigious would qualify?
   • In the face of economic recession, do we continue to build up our marketing skills to push consumer products and stimulate the sale of fashionable clothing?
   • In an information society in which there is instant data retrieval via computer, would we opt for highly trained specialists who serve as repositories for vast amounts of factual knowledge in a particular field?

   What options do we have? What kind of a future do we want? Let's get busy and answer some of these questions!

PANEL DISCUSSION: TWO- AND FOUR-YEAR COLLEGE INTERACTION

Linda Thiel Lansing, Panel Moderator
Fullerton College, California

The diversity of schools represented led to a wide variety of articulation situations being presented by the panelists. The extremes were Hawaii, which was directed at one point in its history not to articulate with the two-year schools, to California with the largest number of two- and four-year schools, presenting a massive problem in articulation. Colorado, like Hawaii, has only a few schools involved,
but many students transfer to Colorado State University from out-of-state schools, which creates difficulty in transfer credit and course evaluation. Also, when home economics programs are reorganized, articulation may take new directions.

Teachers and administrators viewed articulation from somewhat different viewpoints depending on their involvement with students, course evaluation, and curriculum. Generally, concerns are as follows:

- Teachers and administrators of two-year schools are concerned that courses meet vocational needs as well as be transferable.
- University teachers are concerned that students are prepared for the advanced courses at the university.
- University administrators want their graduates to have the knowledge and skills to be a creditable graduate.
- The university evaluator faces the difficult problem of course matching and evaluation.
- The student wants courses that are transferable and will meet university requirements.

The importance of continuing communication and understanding between schools was stressed by each panelist as indicated by the following points:

- Universities must keep the two-year schools appraised of curriculum and course changes.
- The university needs to be aware that two-year schools must offer courses that meet the needs of students in two-year vocational programs as well as transfer students. Thus, prerequisites for lower division courses, of necessity, must be limited.
- Two-year schools must keep in mind that even though a course is similar to an upper-division course, the units can transfer only as lower-division credit.
- Exchange of information regarding texts, course outlines, and other materials indicative of course content and scope helps the university evaluate transfer courses, and the two-year schools offer courses that will be accepted at universities.
- Articulation with other departments on the same campus is another area for communication.
- A mechanism for challenging university classes is an alternative when course evaluation is difficult.
- When students may transfer to more than one university, it is advantageous for universities to articulate so requirements for transfer courses are similar.

The use of computers as proposed in California may simplify curriculum coordination and course matching; however, it seems to be the consensus of the panel that personal communication and interaction between the schools is the most important aspect of successful articulation.

Marcia Morgado, Panelist
University of Hawaii

In Hawaii, two- and four-year textiles and clothing programs are distinct. The student populations are different, and the intended outcomes are each unique. It may be that Hawaii serves as a model for coordination between two- and four-year colleges. We have, however, no articulation.
One of the reasons we do not meet with our colleagues to evaluate programs relates to the position taken by our administration during reorganization. Many of you are facing reorganization processes now and may find yourselves in similar kinds of situations. This is what happened to us.

Our textiles and clothing program is seated in an agricultural college. Land-grant status provides the college with substantial federal funding, and these external funds give college administration unusual autonomy and power on our particular university campus. Four years ago, the textiles and clothing department became a token in a struggle between college and university administrators. These are some of the events which followed:

There were intimations that all lower-division textiles and clothing courses would be removed to the community colleges; that a piecemeal reallocation of fashion design courses to the College of Arts and fashion merchandising courses to the Business College was appropriate; and that total elimination of textiles and clothing courses from the four-year campus was likely.

An advisory committee, composed of university, community college, and private sector representatives was appointed to clarify the role and responsibilities of textiles and clothing programs in the state. The committee determined that community college students tend to enter the labor market at the end of their programs, and that these students are properly trained for technical, rather than professional, positions in the fashion industry. They determined that the university's four-year program should more appropriately train future professionals for management-type responsibilities. While some of the same course content might be necessary in these programs, the community colleges should focus materials in ways that are meaningful to developing technical expertise in their graduates. At the university, concepts rather than skills should be emphasized.

In the events which followed, administration placed a moratorium on interaction with community college programs.

Clarification of the roles of two- and four-year programs did not markedly alter the flow of students between our programs; very few students transfer from one program to the other. Ideally, a community college student who intends to transfer to the four-year campus completes only general university requirements, postponing all textiles and clothing course work until the junior year. If a student with previous textiles and clothing work does enter the four-year program, academic advisors are guided by the advisory committee report, which clearly suggests that community college work and university work are not equivalent. In questionable areas, the student, a faculty advisor, and the instructor of the course in question confer to determine how the student will be responsible for materials. Students may elect to challenge a course by passing examinations or, in some cases, by presenting examples of work in a particular area. Students also may be asked to unofficially audit parts of a course or particular class sections to complete partially fulfilled requirements.

We do not, however, apply the same criteria in evaluating the work of transfer students from other universities or from community college systems outside our own. Work which has been completed outside our
system is generally evaluated as equivalent to our own, and we tend to
be more lenient with evaluating the partially filled requirements of
out-of-state transfers than we are in evaluating work completed in our
own state.

Our four-year textiles and clothing program has undergone massive
changes in the last four years. We have substantially revised lower-
division courses, added prerequisites for entry to some courses, added
a four-course interdisciplinary core, and integrated textiles and clothing
with previously discrete departments of home economics and human develop-
ment. So massive and continuous have these changes been that our own
faculty is often unclear about aspects of the program, and it is not
conceivable that faculty in the community college system can possibly
offer either coordinated materials or adequate advising to students who
might wish to transfer. At one level, we appreciate that our very dif-
ferent objectives control the flow of students between the campuses. At
another, however, we understand that lack of articulation must result in
the loss of potential students, and we are keenly aware that the administra-
tive mandate that prohibited articulation has resulted in the loss of
collegial relations between our campuses.

Doris Hime, Panelist
Colorado State University

To simplify my remarks, I want you, as a member of the audience,
to pretend. Pretend that you are the typical young person who is
anticipating attending college. Today, you have just graduated from
high school and have decided that you want higher educational training
in some aspect of the fashion industry.

You have several choices of where to receive this training. You
can attend a technical school, a vocational school, a two-year college
or a four-year college.

After much deliberation and information gathering, you choose to go
to a two-year college. This college is respected, is accredited, and
offers an Associate Degree in Fashion Design--your first love for a
career choice.

You enroll, love your classes, develop your skills and talents,
and graduate with good grades. With your transcripts and Associate
Degree in hand you begin the job search. After six months you still
have not found a job in your field and you are dismayed, discouraged,
and frustrated. You found yourself to be either underqualified, over-
qualified, or you have had no related work experience for employment in
the fashion industry.

Because of present economic conditions, you decide it is best to
get a degree from a four-year school. You research these schools and
find one in your home state. You apply at Colorado State University
with an anticipated major in Textiles and Clothing. Because of enroll-
ment quotas imposed by the state legislation, you wait another year
before being admitted. Finally, you are admitted, arrive at the uni-
versity, and receive your transfer evaluations. You find that only 18
semester credits in general education courses have been evaluated by the
university degree section; the other 54 semester credits are listed as
vocational courses and must be evaluated by the Assistant Dean of the
College of Human Resource Sciences (formerly the College of Home Economics).

You go to your assigned adviser to register for classes and explain your transfer evaluation problems. Your adviser calls in the Assistant Dean and the Department Head to help evaluate the "vocational courses." After several hours, your courses have been evaluated and a tentative schedule has been worked out for you to follow for the next three years. Yes, three years! That's six semesters before you can complete your requirements for a four-year degree.

Your problems with course evaluations are--
1. You can only transfer in 64 credits of the 72 completed at the two-year college.
2. You must complete 45 upper-division credits as all credits from your two-year school transfer as lower-division courses.
3. You must pick up 30 credits of required lower-division courses.
4. You have more than enough elective courses but lack required courses.

You decide to stick it out. Now, you are completing your last semester and are currently enrolled in the internship program. In retrospect, you find yourself to be more mature and a more rounded individual due to your experiences and schooling over the past six years. Your technical knowledge is good and you have developed various skills and talents. You have begun your job search again and so far have had six interviews. You now have broader choices. You are happy and excited; yet, a bit bitter. Some questions come to mind:
1. Why can't high school counselors be better informed about various schools and available careers in the fashion industry?
2. Why can't the two- and four-year schools interact better so articulation would be easier?
3. Why should it take five years to complete a four-year program?
4. Why is the industry looking more to the four-year degree than the two-year degree?

Margie Chitwood, Panelist
Mt. San Antonio College, California

Since I am one of two people from the same college sharing ideas with you, I've chosen to relate to you the mission and philosophy of the community college, as well as the role of home economics at the community-college level.

Community colleges, which is the correct terminology for California two-year colleges, have a very broad mission as identified by our State Board of Governors and our Chancellor's Office. We are comprehensive colleges providing our communities with transfer programs, vocational/occupational programs, remedial programs, and avocational/recreational programs. This involves 70 college districts using 107 college campuses. To date, California has provided these services to students without cost, or with minimal cost.

But California is facing economic problems. As unemployment rises, our citizens are looking to our community colleges and their low-cost educational programs. College budgets have not grown, so many of our colleges have reached an impacted status. The National Center for Education Statistics states that 53 percent of all freshmen and sophomores
in the country attend a community college. And, the American Association of Community and Junior Colleges projected a 4 percent enrollment increase this fall over last. Our college had a 6 percent increase in enrollment.

Thus, we find California examining its mission and its governance—local control versus state control. It seems fairly certain that the transfer programs and the vocational/occupational programs will remain. But, there is much discussion regarding the remedial and avocational/recreational programs—the latter related to home economics. At the same time, the four-year universities and colleges are developing programs that are vocational and avocational. Cognizant of this, we in home economics at both two-year and four-year schools need to understand each other's functions and be supportive of each other's programs.

Students attending a community college generally do so because of location, convenience, low cost, and open-admission policies. The latest national figures show the average student is age 27; students are about equally divided between females and males. Students commute to campus, many on a part-time basis. Most have either full- or part-time jobs, many have family obligations, and many already possess some type of college degree. But, don't forget our remedial function. In the same classroom, you may find students with college degrees and students ill-prepared for college. At a recent staff meeting on our campus, our California Community College Chancellor, Jerry Hayward, stated that one out of every two Californians has attended a community college in our state.

Mt. San Antonio College offers a full home economics curriculum with a transfer program, four vocational programs, an A.S. Degree in general home economics, and many avocational courses. We have 12 full-time staff, and 19 part-time staff, all of whom support the field of home economics and endeavor in their teachings to meet the diverse needs of their students. We see home economics as a total program and every student enrolled in our classes as a potential major. With support and encouragement from our staff, we find many students who begin our classes for vocational training or for personal interest and then decide they want to major in home economics and continue their education either immediately or at a later time at a four-year college/university. This makes it important to us to have good articulation policies.

Our college handles all formal articulation agreements through one person. Department input is constantly sought by this person and initiation of articulation can begin through us or through inquiry from another school. Our staff frequently visit other campuses and we invite other faculty to our campus. Our staff also is involved in and very supportive of our professional organizations. By being visible and in contact with our colleagues, we are able to informally articulate our classes by sharing course content and activities, many times working out favorable solutions to potential problems.

Once articulation is completed, information is available to students within the department, or in the Counseling Office. There is a separate sheet for each college/university with which Mt. San Antonio College has an articulation agreement. The sheets list Mt. San Antonio College courses and their equivalent at the corresponding college, in either a general departmental listing or as a specific major.
Our home economics courses must meet the needs of transfer students, vocational students, and avocational students. To do this, we sometimes do not have the prerequisite courses required for the same course at the university, or we offer a similar content course in lower division. Is it wrong for us to do this? No, not according to our mission. The question is, does the content change when we do this, and therefore, the articulation?

The answer lies in the fact that the colleges and universities need to have close communication with and respect for each other. Look at the past, glean the good, and add ideas for the future. Our conference theme reminds us that this is why we are here—Our Past, Our Future.

Doris Fuqua, Panelist
Fullerton College, California

I speak on behalf of a community college with a strong vocational program in Fashion Design and Fashion Merchandising, as well as a strong Clothing Construction and General Home Economics transfer program.

Our greatest problem is in the vocational area. Many of our excellent students come to the realization that they want to be "educated" as well as trained and are looking around to transfer to a state university to get their bachelor's degree. We have not yet found a good school to recommend for a career program, other than the private trade schools where the technical training is strong but not the academic program. In the universities and state colleges, the academic program is excellent but they have not yet been allowed to develop a strong career program.

A second problem is juggling the needs of our vocational students with that of the transfer student in the same program and courses. Too often, each of the four-year schools has its own system of courses, course content, unit value, and prerequisites. We have difficulty keeping up-to-date on each and meshing them with our programs. Often students start a program intending to transfer to a specific school but change their minds and plans. The community college cannot feasibly offer the same course (such as textiles) with different sections for transfer and vocational students in order to meet the requirements of the four-year institution. Our vocational students are just as qualified (translated as "smart") as our transfer students, and often a lot more motivated. We have difficulty keeping the needs of the vocational student in mind as we plan coursework to meet the needs dictated to us by the receiving institution. I recommend some sort of consortium so all community colleges and four-year schools involved in fashion subjects who normally do "business" with each other can reach an agreement on course content, unit value, title, and prerequisites.

Four-year schools need to have a clear definition of two-year schools. The role of community colleges is to provide the following:

1. The first two years of a bachelor's degree program; students choose a community college because of
   a. cost
   b. personal maturity
   c. academic ineligibility (we have many "late bloomers")
   d. "luck of the draw" in being accepted to the school of their choice
   e. opting for a more "hassle free" environment
2. Vocational education--a training ground for a specific career or
   a. need for an income or retraining
   b. reverse transfer, where those with degrees are trying a new
      field (a BA in History is commendable but may not pay the
      bills!)
   c. opportunity to "test" a number of different fields without
      the expense or restrictions of a university
3. Community enrichment and personal management

If we thoroughly understand how each school system functions in the
total picture, and if we work together as equals though at different levels,
we may increase the articulation between our programs.

The role of the community college is at the moment in the hands of
the State (California) awaiting more decisions about where money is going
to go. The celebrated "hit" list defunded many popular courses that were
requested by the community but did not meet with Sacramento's approval.

This effectively ended the "community" portion of our system. (Strange
examples: jogging was permitted but aerobics wasn't. One campus voice
pointed out how many "hits" seemed directed at female sounding titles!)

Our Advisory Boards are very carefully selected to include a broad
spectrum of business people because we try to keep our vocational program
as current as possible. I suggest we also include persons from the
universities to help care for the transfer of our vocational people.

I suggest that the four-year schools continue their efforts to
develop a stronger vocational "track" in their upper divisions to provide
a direction for our excellent career-oriented students who also wish to
be educated for an effective life. Perhaps a cooperative venture where
we have the expertise and physical facilities for advanced course work to
be taught under their aegis and our environment is one possibility.

And lastly, our entire discipline of home economics is running on
rough road. We need to work together as a united front to continue to
serve home economics and present it as a thriving, up-to-date, valuable
discipline, which should be at the center of everyone's daily existence.

Phyllis Specht, Panelist
Mt. San Antonio College, California

Today, I have many thoughts about what I should say on this panel
that were not in my head when I arrived in beautiful Tucson. Learning
how the flora and fauna of the desert adjust and survive in their desert
habitat, I understand, too, that there is meaning for our profession
here. We must adjust to survive in our habitat of the future.

Marilyn Horn's dynamic presentation has jarred my understanding--
the future is now. Many of our members have reported happenings in our
profession that are appalling: "hit lists," elimination of courses,
and elimination of entire departments. Change and adaption is our only
course of action.

We must take lessons from the Navajo weavers who have survived
through history. We must prepare to meet the challenge of change on
our respective campuses. We will continue to weave our personal tape-
tries. Like the Navajo who has replaced the running deer in her weaving
with the Ford truck, we have learned that we must weave a computer into
our design for the future. We also have learned from many others who
have shared with us here that we need to prepare for and activate many other design changes in our tapestry of the future.

As a student of historic costume, I feel we in ACPTC have a precious heritage to protect and continue that dates back over 20,000 years to prehistoric people. The production and embellishment of clothing and textiles has survived all the changes of history. We must find the way in our future to continue, to survive, to flourish, to prosper, to create so that this magnificent heritage passes to the future. I suggest the following:

• Priority must be given to keeping clothing and textiles classes in the college curriculum.
• ACPTC must become more active in supporting community college programs, both transfer/academic and vocational/consumer.
• State university staff should give more direction to community college staff for class content, particularly for those classes pending articulation. Information is needed in the following areas:
  academic standards
  theory
  application of skills
  goals and objectives
This includes classes in both academic and vocational programs and classes in both upper and lower division.
• University staff and community college staff in geographically related areas should study the feasibility of sharing curriculum in basic classes. This practice would help to increase enrollments on the community-college level and allow university faculty to concentrate on more specialized curriculum.
• We need to investigate sexism in the clothing/textiles/fashion merchandising classes. Are we attracting or "turning off" male students?
• We need to develop techniques to learn where our students are coming from and where they are going. What careers are in the future and how can we help students connect with these emerging opportunities?
• We must reach for the future and greet change—adapt to it and make the future part of the rich heritage of our profession in the tradition of the weavers and sewers of all great civilizations.
The Role of Clothing in Sex-Role Socialization: Person Perceptions Versus Overt Behaviors

Susan B. Kaiser, Margaret Rudy, and Pamela Byfield
University of California, Davis

Children as young as two to three years of age use clothing as a cue to sex differences when perceiving others. Symbolic interactionists would attribute such perceptions to the meanings (such as masculine versus feminine) that clothing symbols have for young children. Previous research has indicated that preschool children link traditionally sex-typed behaviors to young girls' clothing styles (pants versus skirts). According to cognitive developmental theorists, early person perceptions progress from inferences of expected behaviors to the attributions of personal traits or qualities. The present study was designed to assess the relationship between young girls' use of clothing in behavior attributions and their own play behaviors.

Forty girls from three preschools participated in the study, which incorporated both observational and personal interviewing methods. In the first phase of the study, the girls were unobtrusively observed in a random, predetermined order during free-play time in their preschools over a four-month period. Each girls' play behavior during approximately 100 15-second intervals was recorded on a checklist of play activities. In addition, their clothes were rated on a four-point scale (from very masculine to very feminine dress). A high degree of inter-observer reliability was obtained for both the behavioral and the clothing observations. In the second phase of the study, line drawings of four girls' clothing styles, designed on the basis of the scale used in the observations, were presented to the girls in individual interviews. The girls were asked to match the styles with each of 20 play activities representing both traditionally masculine and feminine play behaviors.

The observational data were analyzed by calculating the mean proportional differences in play behavior as a function of clothing style worn. A matched-pairs analysis was used to compare each of five pairs of clothing styles and all pants versus all skirts. No significant differences in play behavior were found as a result of clothing differences. The interview data, on the other hand, indicated that the girls were more likely to match stereotypically feminine play behaviors (such as playing with a doll) to the more feminine styles of dress. Functional considerations (such as the selection of pants to protect one's dresses from getting dirty) were not always as evident in their clothing/play associations, particularly in the case of the younger girls. In addition, a chi-square analysis indicated that the younger girls were less likely than the older ones to assign aggressive behaviors (such as hitting) to more masculine clothing styles. This finding would be consistent with the notion that children make more straightforward, behavioral inferences before they attribute personal traits (such as aggressiveness) to individuals or groups of individuals.

Despite the fact that the girls' play behaviors were not significantly related to their clothing, there was a direct relationship (r = .40, p < .01)
between the degree to which they stereotyped on the basis of clothes and stereotypic play behavior (such as wearing a dress when playing house). Further analysis indicated that age was also positively related ($r = .29$, $p < .05$) to stereotypic play behavior. This suggests that individual differences (that is, stereotypic perceptions and age) exist that may influence overt behavior. Symbolic interactionists contend that people tend to act, and then later explain their behaviors when called upon to do so. This would explain the lack of an overall significant effect of clothing on overt behavior. However, older children and those with more stereotypic perceptions may be more likely than younger children or those who do not stereotype on the basis of clothes to consider what they are wearing before acting.

These data suggest that sex-role stereotypes that include clothing are internalized at a relatively young age; they provide the basis for inferential processes through which expected behaviors are assigned to perceived others. They also may influence overt behaviors in some children. Therefore, clothing should be considered as an important component of programs in preschool education that are designed to reduce sex-role stereotyping.

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### Color of Dress As It Relates to First Impressions of Personality Traits

Linda K. Day Duntley (copyright, May 1982)

Research has shown that manner of dress influences first impressions of status, social impressions, personality traits, and attitudes. It also has demonstrated that individuals have specific reactions to and preferences for different colors, and attribute different psychological meanings to different colors. This empirical data formed the theoretical basis for this research, which was conducted to examine the influence color of dress has on first impressions of personality traits.

An experimental research design was developed to determine if color of dress influences first impressions of personality traits, and specifically how warm versus cool colors differ in effect. The between-group independent subjects design used color of dress (warm versus cool) as the independent variable. The dependent variable was subjects' response to perceived personality traits on a bi-polar, semantic differential questionnaire. Two hypotheses were tested:

I. There is no significant relationship between color of dress (warm versus cool) and first impressions of personality traits.

II. There is no significant difference in responses to color of dress between females and males.

The research sample consisted of 75 college students enrolled in secondary education classes at San Francisco State University in the spring 1982 semester. Five classes were used, and each class randomly was divided into two groups. The first group (Group A) saw a series of slides of six models respectively dressed in orange, blue, yellow, purple, red, and green. The second group (Group B) saw a series of slides of the same six models respectively dressed in blue, orange, purple, yellow, green, and red. The style of dress remained constant. Each subject rated each model on seven bi-polar personality-trait pairs: friendly/unfriendly, energetic/lazy,
imaginative/conventional, assertive/passive, confident/insecure, intellectual/dumb, and extroverted/introverted. The results were analyzed using t-tests to determine if statistically significant differences existed between groups on each model. Females and males also were compared to determine if there were any statistically significant differences between their responses to each model.

The results for Hypothesis I showed overall significance for three of six models. The results also showed that the models who demonstrated overall significance did so in the expected direction in two out of three cases. In these cases, cool colors produced more favorable personality-trait ratings.

The results for Hypothesis II indicated that in a majority of the total comparisons (38 out of 42) there was no significant difference between the responses of females and males. These results indicated that women and men react to color of dress by rating first impressions of personality traits in similar ways.

The results of this research demonstrated that color of dress often, but not always, is a crucial factor in the formation of first impressions of personality traits for both women and men. Since impression formation influences initial and subsequent interpersonal relations, these results are relevant for everyday social experiences.

Adaptation and Innovation in Highland Guatemalan Tapestry Woven Hair Ribbons

Mia McEldowney, Edmonds Community College
Diana Ryesky, University of Washington

This study examined the historical and contemporary manifestations of tapestry woven hair ribbons (cintas) worn by women of Highland Guatemala. Through the use of statistical analysis, the specific characteristics of length, width, color, and design motif were examined to differentiate town-specific identity within the historical sample, and contrast contemporary modifications as seen in the "tourist" hair ribbon.

Tapestry hair ribbons have historically been a traditional craft specialization of the town of Totonicapan and its immediate surrounding area. In the ethnographic literature of Guatemala, this type of hair ribbon has commonly been referred to as the "Totonicapan-style" cinta. This distinction is based solely on the origin of production, without recognition of any town-specific affiliation. However, the variety of tapestry hair ribbons that have been collected by museums visually indicate distinctive differences that are capable of distinguishing town-specific identity.

Today, two types of tapestry hair ribbons are being produced by the weavers of Totonicapan. One is the "traditional-functional" form, historically produced in distinctive styles for about 25 communities. This form now shows evidence of being produced in only six to seven varieties. This condensation reflects a general trend in women's costume toward a regional standardized dress and away from town-specific identity.

The second type presently being woven in large quantities is the "tourist" hair ribbon. It shows essential changes in form through the simplification and standardization of design elements and also in the
volumetric increase of hair ribbons made. The "tourist" hair ribbon, produced for non-Indian consumers, has functionally changed from being a hair ribbon to being a belt.

Data for this paper were gathered from detailed research on a sample of 95 hair ribbons from the collections of the Museo Ixchel del Traje Indigena in Guatemala City, Guatemala and from fieldwork in the town of Totonicapan. An analysis using the t-test (separate variance) statistic was applied to 15 pairs of town-specific groups. These groups were selected on the basis of their visual similarities or dissimilarities. Each pair was analyzed using 44 variables of primarily measurement data and including data on color and design complexity.

The results indicated that the characteristics of total length, center length, and width showed statistically significant differences among town-specific styles. In some cases, the additional characteristics of color, design motifs, pattern length, and tassel type strengthened the distinctions. These findings suggest further research in analyzing stylistic change through statistical methods such as cluster analysis and distance charts of t-test averages. The importance of this methodology is its potential for objective analysis of stylistic change and variation within textiles, clothing, basketry, and pottery. Further implications of this study suggest the potential associations between the quantitative aspects of stylistic change and the socio-cultural changes that have and are occurring within Highland Guatemala's Indian communities.

Clothing Stereotypes on the College Campus: The Jeaning of America

Margaret Rucker, Rhonda Hughes, Jessica Utts, and Nancy Bruno
University of California, Davis

A series of studies reported in the early 1970s suggested the existence of clothing stereotypes related to political attitudes among college students and other young adults. These studies indicated that "hip" or informal dress was typically perceived as reflecting liberal attitudes of the wearer whereas "straight" or more formal clothing was perceived as signaling conservative attitudes. Furthermore, the different clothing stereotypes and political attitudes were apparently associated with different college majors, with agriculture and engineering majors being relatively conservative and liberal arts majors being relatively liberal.

With the waning in importance of the counterculture as a social movement, there has been a concomitant decline in research on different clothing stereotypes on the college campus. Recent work on visible consumption patterns seems to be based on the assumption that jeans now serve as a universally appropriate symbol for today's college student. The present study was designed to test that assumption, that is, the hypothesis of no difference in clothing stereotypes associated with different groups of college majors.

The focus group interview technique was used to generate preliminary data on female dress styles and college majors. The interview data were used to develop a pilot questionnaire including pictures of various dress styles and lists of different majors. Subjects were asked to rate the likelihood of students in each major wearing each of the pictured outfits.

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Based on the pilot data, a revised version of the questionnaire was developed. This questionnaire included five styles of dress (skirted suit, pantsuit, ethnic dress, jeans, and overalls) and five college majors (animal science, art, engineering, psychology, and textiles) with scales for rating professors as well as students in each major. This questionnaire was mailed to a systematic sample of 120 recent university graduates from various majors.

Of the 120 questionnaires, 83 usable questionnaires were returned and 9 were undeliverable, for a response rate of 75 percent. Analysis of variance and individual comparisons were used to test for differences in clothing stereotypes.

The student data indicated that all of the differences in clothing averaged across majors were significant, with informal styles (jeans, overalls) seen as more likely to be worn than more formal styles (ethnic dress and suits). However, there was also a significant interaction between clothing and major. The differences among majors appeared to scale on an informal-formal dimension related to function rather than attitude. Animal science majors were seen as most likely to wear jeans and overalls, followed by art, engineering, psychology, and textiles. The reverse order was found for the pantsuit and skirted suit. Those majors falling at the informal end of the continuum are more likely to engage in activities where informal clothing would be functional, such as working with animals and equipment.

The professor data indicated that suits were seen as the most likely attire for this group as a whole. Again, however, there were differences by department, with animal science and art typed as more casual than engineering, psychology, or textiles.

In conclusion, the data provide support for jeans as the most generally accepted symbol of student dress and suits as stereotypic attire for faculty. However, they also suggest that these stereotypes differ by major.

These data have implications for further testing of the effects of clothing cues on impression formation, especially as related to consistency theory. They suggest that there are apt to be situations in which styles of dress may be a source of conflicting cues, that is, as a reflection of personal political attitudes versus academic group membership.

Clothing Practices of Oregon 4-H Youth: Purchase, Daily Selection, and Care

Janet May, Oregon State University

The purpose of this research project was to examine the clothing practices included in the purchase, daily selection, and care of clothing by adolescents, to determine to what extent these practices are performed independently or influenced by others, and to identify the dimensions of and factors involved in the activities themselves. Clothing practice profiles were developed for the three age groups corresponding to divisions in the Oregon 4-H program.

The Clothing Practices Survey was developed by the researcher and completed by 553 Oregon 4-H members who attended seven summer programs throughout Oregon in June and July 1981. Of the 553 completed surveys, 490 were usable. Respondents were nine to nineteen years old and grouped
by age: 276 Juniors (9 to 12 years old), 145 Intermediates (13 to 15 years old), and 69 Seniors (16 to 19 years old).

The Clothing Practices Survey consisted of 34 items concerning clothing selection, care, and purchase practices, and demographic information. Respondents indicated the frequency of the activity involved with each of the clothing practice items by circling one of the following responses: never, sometimes, half the time, usually, and always. Clothing practice profiles were developed for each age group based on the median, modal, and mean responses to each item. Sex differences were considered within each age group. Age group profiles were compared and similarities and differences noted.

The age group comparison revealed increasing frequency of independent activity in all three clothing practice areas (selection, care, and purchase) as age increased. Parental influence on daily selection, care, and purchase practices appeared to decrease with increasing age. Siblings' influence on selection, care, and purchase practices was minimal for all age groups. Peer influence on selection and purchase practices increased from "never" or "sometimes" for Juniors to "sometimes" or "half the time" for Intermediates and Seniors. Media influence on daily clothing selection practices and clothing purchase practices in terms of wearing or buying identical or similar clothing was minimal for all age groups. Media influence on clothing purchase practices in terms of looking at advertisements increased with age, but purchases of advertised clothing items remained about the same for all age groups. Age group comparisons also were made for selection factors and other care and purchase practices including responsibilities for care of the member's and family's clothing, planning clothing purchases, sources of funds and methods of paying for clothing, use of clothing label information, and purchase factors.

Analyses of variance were used to test the study's six hypotheses to determine if significant differences existed in the clothing selection, care, and purchase practices that adolescents perform independently. Using the 95 percent confidence level, significant differences were found in the selection, care, and purchase practices for the three age groups. Significant differences were found in care and purchase practices for 4-H clothing project enrollment categories, but not in selection practices.

The Clothing Practice Profiles developed from this study can be used as a basis for planning future revisions of the Oregon 4-H clothing project and clothing related activities for all 4-H members. The Profiles also might be used for adult programs for adolescents' parents as a means of providing a basis for understanding one aspect of adolescent behavior. Retailers and advertisers who are targeting the adolescent market might benefit from an examination of the parts of the Clothing Practice Profiles that concern adolescents' attention to different types of advertising and the types of advertising that lead to most frequent purchases.

Effect of Seals of Certification on Perceived Quality of Textile Products

Jeanne A. Roberts, Washington State University

Many researchers have investigated consumer use of information in the marketplace. However, numerous important questions remain to be answered.
Little published research has focused on the role of seals of certification in quality judgments or the use of informational cues to judge textile product quality.

The effect of seals of certification on consumers' perception of textile product quality was investigated. Objectives were to determine (1) the influence of seals of certification on perceived quality in the presence of price and fiber content, (2) whether perceived quality varied with the type of textile product, and (3) the relationship between selected extrinsic cues (price and seals of certification) and the intrinsic (product and performance) characteristics on perceived quality.

Data were collected in an experimental setting and through a questionnaire. Participants rated the quality from one (low) to five (high) for either 12 men's acrylic/nylon blend socks or 12 men's V-neck acrylic/wool blend sweaters that had been labeled with combinations of price (high or low), fiber content (wool or acrylic), and a seal of certification (Monsanto Wear-Dated as a familiar seal, Seal of Approval as a fictitious seal, or no seal) information. In the repeated measures design used, each subject received all 12 treatments provided. On the questionnaire, participants indicated how important various cues were in judging quality and their perceived meaning and recognition of seals of certification. This information was useful in interpreting the results of the experimental setting. Forty female home economists, residing in Washington state were selected to participate because it was likely they would be knowledgeable about intrinsic product and performance characteristics of socks and sweaters. A Kruskal-Wallis rank analysis of variance test was used to determine significant differences in quality ratings on the questionnaire among products. A chi square analysis was done to determine significant differences among products based on the responses to various physical characteristics. A correlation coefficient was used to compare product and performance variables.

Seals of certification in the presence of fiber content and price had little influence on perceived quality of textile products even though participants recognized seals of certification and understood their meaning. However, there was a price and fiber content interaction that meant the effect of price depended on which fiber content was being considered. Participants preferred wool when it was associated with a high price.

Little difference in quality ratings occurred for the socks and sweaters when the products were labeled with the same combination of informational cues or when participants indicated on the questionnaire the importance of informational cues in judging quality. The greatest difference among products in judging quality was based on the importance of physical product characteristics, appearance, construction, and fabric.

Participants perceived a relationship between familiar seals of certification (Monsanto Wear-Dated and Woolmark) and certain intrinsic product characteristics (fabric and performance) and intrinsic performance characteristics (feel, warmth/coolness, strength, wear, resistance to pilling, shape retention, and shrinkage). When the seal was unfamiliar, the fictitious Seals of Approval, some tendency existed for participants to establish a relationship between that seal and product characteristics, but not between that seal and performance characteristics. Further research is needed to explore other extrinsic cues, such as, price or brand name, in relation to intrinsic characteristics of a product.
These results can be used by public policymakers, retailers, manufacturers and educators to reduce consumer dissatisfaction, lower incidence of unnecessary repurchase, and lower wasted consumption dollars. Consumers are the ultimate beneficiaries of research examining the use of information.

POSTER SESSION: INSTRUCTIONAL MATERIALS

Art Principles and Elements As They Relate to Clothing

Mary J. Thompson, Brigham Young University

Some of the fundamental concepts clothing and textile majors can learn in their undergraduate work are those dealing with the art principles and elements. CT majors are introduced to these concepts early in their core requirements. However, in upper-division classes they seem to have limited memory of the concepts and little ability to apply them in the analysis of clothing design. Therefore, through better understanding these concepts, students will--

- increase their understanding of what clothing design entails
- better understand how the principles and elements interact and compliment each other
- gain an appreciation of the aesthetic unity found through the application of the principles and elements

Principles are defined as balance, emphasis, rhythm, scale, and proportion. Elements are defined as line, texture, and color. Manipulation of these principles and elements culminates in harmony of the design. In clothing, none of these concepts exist in isolation. Clothing is an excellent vehicle through which the components of art design may be illustrated, perceived, and experienced. Styles in fashion may come and go, but if the principles and elements of design are well understood, they can be recognized in any garment.

It was decided that a more in-depth approach to teaching the principles and elements of design was needed due to the recurring emphasis placed on these basic concepts in other classes within the department. It was felt that a more visual approach to teaching this subject was essential, and thus a proposal to develop a slide/tape and a videotape series was generated. Funding of this proposal was provided by the college and the campus motion picture studio.

Clothing used in the photography was provided by a local department store. Current, yet classic, styles were selected to illustrate the principles and elements of design. (Where current fashions were not available, an artist was used to do sketches.) A CT faculty member worked as the content specialist and a professional photographer and script writer were assigned to this project. In most instances, professional models were used. The CT faculty member had control over apparel selection, hair and makeup, and script content, and approved the slides used in the series.

The series contains approximately 700 slides with synchronized script and music. Each carousel of slides covers one of the basic concepts and is presented in a format where approximately three-fourths of the
presentation is in teaching the concept and the remaining one-fourth is used in testing the newly gained knowledge. The complete series also is available on videocassette.

The results of this project are as follows:

- it is the most current and professional teaching tool now available on the art principles and elements;
- each slide carousel within the series covers a principle or element independently; therefore, a student can begin anywhere in the series and learn concepts for the particular area under consideration;
- the visual presentation of these concepts provides an interesting and in-depth learning of the principles and elements of design;
- the series may be used in initially teaching the concepts as well as by students individually as a review, reinforcement, or update of their knowledge;
- the series has marketing potential to clothing stores for in-house training of sales personnel as well as for customers.

Designing, Producing, and Funding Television Classes

Linda Thiel Lansing, Fullerton College, California

Education is becoming an ongoing, life-long endeavor and is no longer limited to the traditional, young, full-time college student. Thus, college classes must be offered in diverse and innovative ways to reach students who cannot attend regularly scheduled classes. The part-time student who works full time, the mother with young children, and the older adult can all benefit from classes that they can fit into their schedules and locales.

The use of television in education is increasing--both on and off campus, but often there is not the financing, time, or professional staff and facilities to produce a professional production. Today's sophisticated students expect the same standards they see in commercial television and are often turned off by a poorly produced program.

One California college has found the solution to some of these obstacles in producing television classes. Coast Community College in Orange County develops and distributes high quality telecourses for use in broadcast and nonbroadcast formats. The cost of producing these programs is often shared by commercial companies. In addition to funding, these companies often make available the expertise of the professional staffs.

A recent course titled "Sewing Power" was developed by Coast College in conjunction with the McCall Pattern Company. McCall supplied content and production input and professional art, developed three patterns especially for the class, and arranged interviews with several well-known fashion designers and fashion-sewing consultants. Coast College provided a very experienced and professional production staff and well-equipped facilities. An adequate budget made it possible to hire professional on-camera talent, an academic adviser, models, seamstresses to construct samples, and a set designer.

In addition to the 20 half hour television programs, an extensive study guide was developed that brings together the text, Reader's Digest Complete Guide to Sewing, and the video through special exercises. It
also is designed to aid the students in both evaluating their own projects and developing decision-making skills in wardrobe management and construction. To assist the learning manager of a television course, there is an instructor's manual that includes suggestions for administering the course and a bank of test questions that can be computer graded.

A course that is planned and developed as a television course is more effective than one first offered as a regular on-campus class, then taped and aired as a television course. In planning the course, those components that need visual representation are put in the video lessons and those that are best expressed in writing are included in the study guide, if not in the text. The total course is designed as a series of individual learning packages with each television lesson and the accompanying study guide lesson creating a module. Thus, the video can be offered over public television, a campus station, or in a library or learning center where it can be viewed by individuals at their convenience.

A well-produced television course that is aired on public television not only meets the needs of the student who wishes to receive credit but it also provides education and enjoyment to anyone who may wish to view the program. Thus the television lessons are designed to be complete in themselves and do not rely on the text or study guide.

Television is a strong force in almost everyone's life. The time has come to use it in education to its fullest potential by designing courses that utilize the unique capabilities of this media.
1. Call to Order: The business meeting of ACPTC-WR was called to order by President Jan Else.

2. Introduction of Executive Board members: The current board members were introduced.

3. Minutes of the October 24, 1982 Business Meeting at Portland, Oregon were printed in the Proceedings which members have already received. Merry Jo Dallas moved, it was seconded and approved, that the minutes be approved as written.

   After review of existing Handbook policies and budget procedures, the Fiscal Policy Guidelines Ad Hoc Committee (Jean Margerum, Audrey Gieseking-Williams, and Merry Jo Dallas) reported a need for further information before making recommendations for the allocation of any "excess" funds. The committee will review minutes and past budgets to determine existing fiscal policies and recommend additional policies and procedures regarding fiscal matters as needed.

5. Membership Committee: Jean Margerum, committee chairman, reported that a letter had been sent to any non-renewing members. Membership stands at 149 with a loss of 7.

6. By-Laws Committee: Audrey Gieseking-Williams, Chairman, noted that the By-Laws and Handbook are in the process of incorporating the national By-Laws and Handbook changes into the Regional, particularly noting that the WR Representative will be a 2-year term and that the Regional President will be a full voting member of the National Board.

7. Nominating Committee: Susan Kaiser, Chairman, reported that 79 ballots had been returned, with the election of Shirley Friend as President-Elect, and Peg Rucker, Ellen Goldsberry, and Phyllis Touche-Specht as Board Members, and Christine Milodragovich as National Board Representative 1982-85. Susan announced that the Board had elected Charlene Lind as President-Elect to replace Shirley Friend who moved to the Central Region.

8. Publications: Merry Jo Dallas reported that she will be National Newsletter Editor for a two-year term with Marie Carver of Eastern District as Associate Editor and Marcia Morgado as Western Region Editor. The call for articles is NOW. Categories are: Research, Innovative Teaching, Legislative Reports, and Conference Reports. A new listing called VIP in ACPTC will list awards received by Association members. Entries for Calendar of Events are still
available for a $5.00 fee. Publication is in April.

The Clothing and Textiles Journal with Marjorie Joseph as Editor and Nancy Owens as Assistant Editor will be made in December. They will need articles for next Spring.

9. WRCC-23: Research News Notes which includes abstracts of research reports of this region will attempt to include other regions as well, according to Merry Jo Dallas, editor. Bibliography on Temperature Effective Clothing and Textiles will be available for a fee later.

10. ASTM Liaison: Nancy Owens, Regional Representative, reported that the group is now working to standardize sewing machine terms and have set a goal to make body measurements of a garment available to the consumer on its label. Also L22 and L24 standards are being revised.

11. ATMI is sponsoring a field trip seminar in Atlanta specifically for ACPTC. They are seeking persons in decision making positions to attend. Persons interested should fill out the forms available and send them to Fran Duffield.

12. 1982 WR Meeting: Naomi Reich, Chairman, reported on the status of the conference.

13. 1983 National Meeting: ALOHA! Orpha Herrick, Chairman of the National Meeting, reported that "Hawaiian Perspectives" will be July 4 through 9 and that approximate costs will be available around November 15.

14. 1984 Regional Meeting: Tom Peterson of Utah State indicated that Utah State, BYU, and University of Utah will host the 1984 meeting, possibly in Salt Lake City approximately the 3rd week in October. The 1985 meeting site is not yet selected.

15. Futures Committee: Jan Else announced the report will be continued in the afternoon session and urged a strong commitment to the organization by all members. She urged everyone who could to complete the interest form for the Futures Workshop.

16. The meeting was adjourned by President Jan Else at 11:50 a.m.

Respectfully submitted,

Doris Fuqua
Secretary, 1981-82
ACPTC-WR Financial Report  
October 19, 1982

### Assets

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