The Costume Technician's Handbook
Third Edition
THE Costume
Technician's Handbook

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Contents

Foreword, vii / Acknowledgments, ix

Costuming

1
The Costume Shop
1

2
Health and Safety in the Costume Shop
36

3
Fabrics
61

4
Pattern Development
96

5
Costume Construction
166

6
Fitting and Alterations
244

7
Fabric Dyeing and Painting
270

8
Hair and Hats
288

9
Costume Accessories and Properties
325

10
Managing, Supervising, or Directing the Costume Shop
388

11
Computers in the Costume Shop
422

Conclusion
434
Reference

Appendices: Updates and Additions

I. Hats—Stiff But Safe 437
II. Lace-Covered Buttons 439
III. Mathematics for Costume Technicians 440
IV. Preserving and Reusing Costume Stock 442
V. Story of a Wig 449
VI. Stage Blood 451
VII. Where to Write for National and State Health and Safety Standards 454

Annotated Bibliography

Index

About the Authors

Website of additional resources, including a Shopping Guide/Source List:
http://www.heinemandrama.com/ingham-covey
At the beginning of the last decade in the twentieth century, fewer than half the costume shops in the United States had computers on site. Even in professional theatres and educational theatre departments where computer technology was being used every day in administrative offices and to sell tickets, the costume shop was often the last place in the building to enter the computer age. Several shop managers recall that the first computers to arrive on their desks were rejects “from upstairs” that had been replaced by newer models. Now, in the early years of the twenty-first century, it’s hard to find a costume shop that doesn’t have at least one computer, usually located on the shop manager’s desk. In larger professional theatres, and in almost all educational theatre departments, the costume shop computer is connected to an electronic network that allows access to other computers in other departments within the organization and to the Internet.

As in the rest of our daily lives, computers in costume shops have come to stay, and, most of the time, they’re in daily use. But how are they being used, and for what? The following discussion is not a how-to-do-it manual on operating a computer. There are more than enough of those already on bookstore shelves. It will instead focus on how various members of the costume staff are relating to the presence of computers in the hands-on, craft-centered world of the costume shop, and the various uses that have been and are being found for computer technology in this setting.

Change

Technological innovation has been a part of human life throughout history: the wheel, the printing press, the compass, the automobile—just to name a few—and now the computer. In every instance, when new technology appeared, some people always protested that a vital element in the human condition was being lost. There is no written record of a person expressing concern that the advent of the wheel would surely result in weaker muscles (although it’s probable someone did), but there are accounts predicting that the printed word, widely distributed, would adversely affect
human memory (and it probably did). Since the introduction of the personal computer in the 1980s, and subsequently the Internet, many people have expressed fears about the potential negative effects of everything from automatically corrected spelling and reconciled bank accounts (“Nobody will be able to spell or add a column of figures anymore!”) to the availability of too-easy communication (“Nobody will ever write a letter again!”). Many are also horrified by the deluge of advertising, the massive amounts of conflicting product information, and the endless number of posted thoughts by every person with online access, no matter how “far-out” or hate-filled those thoughts might be. A negative initial reaction to the computer is normal. The automobile brought air pollution, expensive and difficult-to-maintain highways, a politically charged dependence on oil, and yet another cause of accidental death. Few people, however, demand abandoning the car and returning to feet and horses; and very few people who possess computer technology that is well integrated into their lives would consider giving it up.

So, what does it mean to integrate computer technology into your personal and/or professional life? The simplest answer is: to use it. Almost no one owns a car merely to look at it, but a surprising number of computer owners buy one and either never get around to turning it on or, more often, use only one or two functions and ignore the rest. The first people in the theatre to integrate computers into their working lives were those whose routine daily tasks were made easier, quicker, and more accurate by the operations computer technology is good at: keeping track of financial transactions; recording ticket sales and subscriptions; and composing newsletters, brochures, and programs. When computerized stage lighting systems came on the market, the lighting designer, master electrician, and everyone else working in that production area quickly integrated digital technology into their working lives. Computer aided design (CAD) programs crossed over from architecture and engineering and entered the workday of scene designers, technical directors, and property artisans, providing them with onscreen tools for

FIGURE 11–1. Joan Raymond, Assistant Shop Manager; Cynthia Quiroga, Design Assistant; and David F. Draper, Shop Manager pause for a chat in the administrative section of the American Conservatory Theatre costume shop. Photograph by Rosemary Ingham.
producing both technical and illustrative drawings. Costume shops were the last places in most theatre complexes to integrate digital technology into what they do and how they do it. This was, in large part, because computers are expensive—and were much more so in the early 1990s—and for a long time there was no perceived need.

All that has changed. Costume shops have computers and many technicians have welcomed the time-saving, money-saving, and additional creative advantages offered by digital technology. In one way or another, computers are being integrated into the everyday work life of the costume shop staff, individually and as a group.

Managers First

The costume shop manager was often the first person in the shop to perceive the need for a computer and, usually after a good many requests and considerable negotiation, the first to have one installed on his or her desk. Because need first appeared limited to a modest amount of word processing, generating forms and procedure lists, and keeping track of production accounts (online shopping and research came later), the first computers in most costume shops had limited capabilities. In many cases, it took quite a while for administrators to recognize the advantages of extending wires far enough to connect the costume shop with the rest of the organizational network.

However, even with hard drives measured in megabytes rather than gigabytes and severely limited random access memory (RAM), many costume shop managers found their work lives changed overnight by the computers on their desks. As costume shop computers were upgraded to more powerful machines and their users became more skillful, the potential for change, particularly innovative change, increased.

It is not that a costume shop manager today is doing different administrative tasks than in those days before the first computer landed on his or her desk. Most of the activities remain the same: entering production purchases and routine expenditures somewhere, reconciling financial records, filing records of actors’ measurements, and keeping up with routine correspondence. Now, however, with a little help from digital technology, these jobs can be done quicker, more efficiently, and, remarked one costume supervisor, “in ways that are lots more interesting.”

The managers in almost all costume shops record and reconcile accounts on their computers. Some use financial management software and other create their own account profiles on a spreadsheet program. Since most shop managers are responsible for several different budgets simultaneously, this is an area where digital technology always saves time and increases accuracy. Once the accounts are defined, any new expense can be posted in the correct place and the account balance will adjust automatically. On reconciling the total account for one production, a shop manager explained: “I confess I use a commercial software program because it does so much of the work for me. In this case the designer, the craft supervisor, and I entered all the purchases. When the show closed I went through the purchase orders, the petty cash receipts, and the credit card statement. I checked off each item, added several receipts that hadn’t been recorded, corrected a couple of mistakes we’d made in entering, and watched the math happen. We balanced out. In about twenty minutes.”

Database programs are also useful for costume shop managers. “I collect information all the time,” one costume supervisor explained. “Sure, I could keep all that stuff in a file folder, or on three-by-five cards. But when I turn that information into a computer database, I can set it up so it organizes the stuff in
FIGURE 11–2. The product inventory view of the MSDS database written by costume director Gordon DeVinney at the Cincinnati Playhouse in the Park. The window defines several colors of acetate-nylon dye distributed by Aljo and used in the costume shop.

FIGURE 11–3. Another view in the same database as 11-2. This window features emergency instructions for treating someone who has come into accidental contact with the dye. The MSDS database can be accessed from every computer on the Cincinnati Playhouse in the Park network, making it easy to find in the event of an accident involving any product in the database. The database was compiled on Microsoft Access. *Forms courtesy of Gordon DeVinney.*
a whole bunch of different ways.” He likes to exhibit the database he created to store and organize actors’ measurements. It contains measurements of all the actors who’ve performed at his theatre for the past eight years. Within the database each actor’s “vital physical statistics” are entered in such a way that his or her information can be retrieved in several different configurations. “I can pull up a group consisting of all men or all women,” the shop manager explains. “Or the actors in a specific production. Or a particular season. I can also make a selection of individual actors and create a group “cheat sheet” that has all the basic measurements the shopper needs when she hits the streets.” He pointed to the measurement form displayed on the computer screen. “And if somebody in Alaska needs this actor’s measurements for a show she’s rehearsing in up there, it’s only an e-mail or a fax away.”

In another costume shop, a similar database program contains records of all the clothing donations that have been made to the costume stock. After each donation is recorded, a mouse click instructs the program to generate a form letter expressing thanks for the donation and explaining the theatre’s policy regarding the assessed value of whatever was donated. Another mouse click activates the printer and the letter appears, followed (after click number three) by a properly addressed envelope.

Peripherals and Posture

The central processing unit (CPU), enclosed in its plastic shell, is the main piece of hardware in all computer systems and, all by itself, it does a great many things. Without additional pieces of hardware, however, the CPU alone cannot perform all the operations that fully integrate digital technology into costume shops. These other items, referred to as peripherals, are the auxiliary units that extend, and sometimes complete, the work of the CPU. The peripherals attached to most costume shop computers include a scanner, a printer and, in some places, a wide-bed printer and/or a plotter.

In addition, if the computer system is a few years old, there may be an external modem connecting the computer to the Internet and an external Zip drive for backups and storage. A newer CPU will more than likely include an internal modem and a CD-ROM drive. By the beginning of the twenty-first century, CDs (compact discs) were rapidly replacing all other kinds of disks for backing up and storing files. Who knows what new and improved forms of information storage will soon be on the market?

Whatever computer system a costume shop has, or is planning to have, it will include a number of separate but connected pieces of equipment and require a sturdy desk or table, comfortably accessible to users. Because health and safety concerns now include protection against repetitive motion injuries and related physical strain, it’s important to position all parts of the computer system so that the back, neck, and wrists of anyone using the computer can be in the most optimum position relative to the screen and keyboard.

A standard desk is almost always too high for good computer posture when a person is working at the keyboard. Ideally, elbows should maintain a ninety-degree angle so wrists don’t break downward as the fingers move over the keys. The thighs should also be at a ninety-degree angle to lower legs. For many technicians, this means raising the chair height until the elbows are at the correct angle, then adding a footrest. Tall people may now find that their thighs are bumping the underside of the desk or table. An adjustable computer workstation is a good investment if it fits into the budget and into the available space. A less-expensive alternative is a keyboard holder that can be attached to the underside of a desk or table. This has the double advantage of lowering
the keyboard to the correct height and freeing up more desk space.

Make sure the computer screen (monitor) is also at the proper height to protect the cervical spine from compression. Experts say that the monitor should be at a fifteen-degree angle below the sight line. Most technicians can recognize this angle without actually measuring it. It means that the eyes are focused slightly down and the head is neither tipping forward nor leaning backward. This position allows the person working at the computer to sit up straight, with shoulders relaxed. Maintaining correct posture while working at the computer will prevent a great many aches and pains caused by physical stress, and protect all technicians from more serious repetitive motion injuries.

People whose vision is corrected by glasses or contacts may suffer considerable eyestrain after spending many hours working in front of a computer screen. They may have to visit their eye doctors to have the focal point of their corrective lenses adjusted for the distance between the lens and the screen. Some people who wear glasses, particularly bifocals, have a pair they use only when working at the computer.

Last, but not least, take breaks. It’s important for people working in any job that requires them to be in the same position for many hours to get up, walk around, stretch, and look out into the distance for several minutes during every work hour. A shop manager who is spending most of a day at the computer should take scheduled breaks. Out on the shop floor, stitchers should stand up and leave their sewing machines at regular intervals while cutter/drapers should step away from their tables and do the same.

**Everybody Online**

The frequency of computer use in a costume shop speeds up considerably when an Internet connection is introduced. E-mail and access to the World Wide Web can affect everyone’s work positively when computer use is integrated into the total process of building costumes.

The first thing the staff will notice when the costume shop goes online is that communication becomes easier and the telephone doesn’t ring as much as it did before. “I love the fact that you never get a busy signal when you send an e-mail,” one technician remarked. “Or get put on hold.”

E-mail connects the costume shop staff with designers who are out of town. One of the remarkable things about e-mail is that it has opened the door for asking little spur-of-the-moment questions that very few people would think deserving of a long-distance telephone call. Unable to figure out a detail in the costume sketch, a cutter/draper finds it easy to pose her question on the computer screen and send it off to the distant designer with a single mouse click: “Is the belt on her first act dress separate or built-in?” If the designer has a scanner or a drawing tablet, the e-mailed answer may contain a drawing as well as a written answer.

E-mailing within a theatre organization is a highly efficient means of sending messages to groups of people or departments without having to print out copies and distribute them by hand. Many theatres have shops and rehearsal halls located blocks or miles away from administrative offices. E-mail bridges the distance, especially when it’s a quick question that requires only a brief response. “Can I send a stage manager to pick up Joe’s shoes so he can rehearse in them tomorrow?” “Yes.” Or “No. They won’t be back from the repair shop until Thursday.”

The World Wide Web opens many different doors for costume shop technicians. During one workday:

- A shop manager spends forty-five minutes examining the features of several different industrial ironing systems on
illustrated websites before selecting and putting in a purchase request for one.

- A costume designer and her assistant search for a supplier who sells lederhosen. (They find one.)
- An assistant shop manager looks for the manufacturer of a new thermoplastic product she recently read about in a theatre journal article.
- Before ordering a new brand of fabric paint, a painter/dyer goes to one of several independent MSDS database sites to check on its toxicity, because, he says, “It’s almost impossible to get an MSDS from a supplier before you purchase the stuff.”
- A craftsperson, searching for help on a current project, enters a descriptive phrase into a search engine and is rewarded with a website on which another costume technician has posted tips for covering Victorian parasols.

Every technician in the costume shop will eventually integrate the World Wide Web into his or her workday.

Digital Cameras

A digital camera records an image that can be transferred directly into a computer. In minutes the image can be examined on the screen, printed, and saved in a file. Even more important for costume technicians, that image can also be e-mailed, posted on a website, or written to a CD and sent by mail.

It’s difficult to find a costume shop today, or indeed a costume designer, that doesn’t have a digital camera. Most technicians and designers use them regularly in a variety of situations:

- An assistant travels to a nearby theatre to “pull” and borrow men’s suits for an upcoming production. Rather than selecting a dozen possible suits from the racks and hauling them back for the designer to see, the assistant puts each of the suit jackets on a tailor’s form and snaps digital photos from which the designer can choose the suits she likes and wants to try on the actor.
• A theatre that has agreed to rent a costume to another theatre e-mails digital images of items that might fill the request. From these the designer can narrow the choice. With already high shipping costs going nowhere but up, it makes sense to pack and send only those costumes that stand a good chance of being used.

A costume director sums up one of the most important uses of a digital camera in her shop: “A digital camera keeps the design communication going, particularly if you have a designer who is in and out of the shop a lot during the build of their show. Preliminary mock-ups can be photographed, then e-mailed; or I can print them out and send them by fax. Follow-up discussions by phone result in clearer responses and quicker decisions.”

Digital Textile Printing

On page 276, Deborah Dryden concluded her fabric dyeing and painting essay with a paragraph about the exciting possibilities of digital textile printing in the costume shop. The first part of the process, creating a design on the computer or importing one from another source, is relatively straightforward once the technician has learned to use an appropriate software program such as Adobe Photoshop or ProCreate’s Corel Painter. Printing a color design on a piece of fabric larger than a letter- or legal-size sheet of paper (8½ × 11 or 8½ × 14 inches), however, is more complicated and requires a far more expensive piece of equipment.

As Ms. Dryden points out, designs generated from or scanned into the computer can readily be printed from the screen onto fabric pieces, using an ordinary inkjet printer, if those pieces are no larger than the sheets of paper that fit into your printer tray. Pretreated fabrics firm enough to move through the printer are available commercially or you can prepare your own. (See Figure 11–5 for directions on one method of preparing a fabric piece for use in an inkjet printer.) Once they are steam-set for permanence, computer-generated designs printed on fabric can be used in many ways to trim and decorate small areas in costumes: collars, cuffs, bodice insets, sashes, and so on.

But what about printing a large, computer-generated design onto all four sides of a shawl? Or as borders on several skirt lengths? Or a repeatable design printed on two yards of fabric that can then be cut and stitched into a blouse? For any of those operations you will need a wide-bed, or wide-format, textile printer. (See Figure 11–6 for a photograph of a wide-bed textile printer.) These printers are in use throughout the fabric and fashion industries but very few theatres or college and university theatre departments have one or have access to one. There are different brands and models but all of

Computer Aided Design

Costume technicians have been slow, however, to accept digital technology into the design and craft aspects of their work. This is understandable because the impact of computers has not directly affected the costume shop as much as the areas of scenery and lighting. As noted, there have been no technological leaps in costume shop hardware (comparable to computerized stage lighting systems) that would have forced costume technicians to use computers in order to operate their equipment. Very little costume-specific software has appeared (like the drafting and rendering programs widely used by scene designers and technical directors) that might have lured costume technicians to integrate digital technology directly into the planning and realization of costume garments and accessories. This status quo, however, may be changing.
When working with large pieces or several yards of cloth, most dyer/painters choose to begin with fabric that has already been prepared for the printer with a stiffening layer. Pre-prepared fabrics by the yard are available commercially. The ink supply comes from color sets that can be changed from one type to another for use on fabrics with different fiber contents. After printing, the fabric is steam-set in a commercial steamer.

A wide-bed digital textile printer, such as the one in Figure 11–7, that is manufactured and targeted toward small fabric or fashion design businesses, is an excellent choice for a costume shop. It requires only a moderate amount of space, is simpler to use than the massive digital textile printers found in major industries, and costs far less.

At the time of this writing, the digital hardware that will allow costume shops to generate computer aided designs and print them on large pieces of fabric seems well beyond the means of most theatre budgets. But remember,

1. Precut the fabric to the size of the printer tray.
2. Soak the fabric in a commercial setting liquid, available at craft stores. Allow the fabric to dry, then iron.
3. Cut a piece of freezer paper (Reynolds brand is widely recommended) the same size as, or slightly larger than, the dry, ironed fabric.
4. Place the wrong side of the fabric on the shiny side of the freezer paper; cover with a piece of thin craft paper and iron. In a few seconds the shiny side of the freezer paper melts just enough to bind paper to cloth.
5. Trim the stiffened fabric to exactly the same size as a piece of paper that fits into the printer tray.
6. Check to see that there is a small stack of regular printer paper in the tray. Place the fabric on top of the paper with the fabric side facing in the direction on which the printer will print. Make sure the fabric is straight in the tray.
7. Check printer setting. Choose the “special paper,” “highest quality,” and “darkest print level” settings.
8. Print and allow the fabric to dry completely. Peel off the freezer paper.

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At the time of this writing, the digital hardware that will allow costume shops to generate computer aided designs and print them on large pieces of fabric seems well beyond the means of most theatre budgets. But remember,
computers themselves were considered too expensive for costume shops in the early 1990s. Since then, because of improved technology and the volume of sales, every piece of digital equipment on the market has come steadily down in price. As this trend continues and sophisticated computer systems become increasingly integral to the work done in costume shops, the more desirable, and affordable, this equipment will become.

What are the major advantages of being able to create digital images and print them on fabric in your costume shop? There are two: The process takes much less time than silkscreening, stenciling, or block printing, the methods most commonly used by dyer/painters to transfer images to fabric. More important, however, is the presence of another tool to stretch and broaden creative potential, for costume designers and for costume technicians.

**Computer Pattern Drafting**

A faculty member in a university theatre department who has been using a commercial computer drafting program for several years, both in her classes and in the costume shop, describes her experiences:

*The benefits of computer use in the costume shop for pattern drafting have far outweighed the inevitable challenges and frustrations inherent in building and maintaining a computer lab for students and staff. As a tool, computer pattern drafting has reduced our overall cutting and fitting time by forty to fifty percent. What made this possible was finding a program for pattern drafting that “thinks” in the same way I was trained to think about the process when I*
had only paper, pencil, ruler, tape, and scissors for tools.

As a teacher of costume design and technology, it is important to me that my students have a working knowledge of efficient problem-solving methods that will enhance the accuracy of their work and protect the precious commodity of time. I have reached a point where I cannot live without the computer as a drafting tool. I see this tool as a positive addition in any shop and to every cutter/draper’s bag of tricks.

While discussing the pros and cons of using digital pattern drafting in a professional theatre costume shop, another costume director commented: “I’d be all for it if I thought it would save on fitting time. I mean, I figure about half of every fitting is taken up with making things fit the actor’s body, not with scale and proportion or the style and period of the costume. If we could mostly eliminate fitting problems . . . well, wouldn’t that be great?”

There are a host of commercial software programs for generating garment patterns on your personal computer. Most are based on garment industry methods and focus on standard sizing and grading pattern pieces from one size to another. Many come with previously defined contemporary pattern shapes and do not allow for much in the way of design alteration. These programs are not particularly useful to cutter/drapers working in the theatre who have to create pattern shapes for all historical periods, as well as for all the “way-out” costumes that might emanate from a designer’s overactive imagination. What is needed is a program that “thinks” the way theatre-trained cutter/drapers think. The program used by the costume design and technology teacher whose comments opened this section is called Custom Pattern Maker; its strength lies in the freedom users have to “draw” one-of-a-kind pattern shapes on a defined body block, much like the flat pattern drafting methods described in Chapter 4. The developer of Custom Pattern Maker is still refining the program, and in all probability, there are other software developers at work on similar projects.

To print out a full-scale pattern generated on a computer, you will need a plotter to draw the shapes you’ve created onscreen. Plotters are expensive but a great many scene shops already have one on site and you might be able to share it with a cooperative technical director, particularly when you’re still experimenting with the program. One shop manager said she was able to get an architectural firm to donate a plotter to the costume shop when the firm was upgrading its equipment. “It’s an old one,” she says, “but it works perfectly.”

No single tool can do every job and digital pattern drafting is only a tool. If it is well integrated into the costume shop, however, it can save time and allow the cutter/draper ever more flexibility in his or her ways of working.

The Learning Curve

No sane person expects to get behind the wheel of a car for the first time, drive directly onto the highway, proceed into the city, and parallel park on a narrow side street. And yet, this very same sane person often expects to sit down at a new computer, open a powerful software application, and negotiate it immediately. This is, in part, because the advertising for computers and computer software all too often leads users to expect instant mastery. “User friendly.” “Draw like a professional!” “Take easy control of the basics.” “Create one-of-a-kind custom designs easily!” This is nonsense.

A graduate student in costume technology holds up a paper pattern piece to show her classmates. She explains, “I made this on the computer. It took a week out of my vacation, forty or fifty hours just to get there.” She holds
up another. “I did this one earlier today. Same computer. Fifteen minutes.”

Fewer people would give up on using digital technology, particularly computer aided design programs, if they knew and had accepted from the outset that the learning curve is quite steep and it will take many hours to achieve competence (additional hours if the person has limited computer skills at the outset). Costume technicians already know it takes a considerable amount of time and practice to use a sewing machine skillfully and even more time to become proficient as a cutter/driver using traditional methods. Understanding and using a digital pattern drafting program is like doing both of the above at once. The technician must learn to operate the machine itself, and then to negotiate the program, to “think” in the appropriate steps. Like driving a car, however, once the “apprentice” has learned to drive and has put in a sufficient number of practice hours behind the wheel, many parts of the process become automatic and the driver is then free to take that car anywhere a person might want to go.

FIGURE 11–8. A corner of the computer design lab used by all theatre design and technology students at the University of Cincinnati College-Conservatory of Music. Photograph by Rosemary Ingham.

A Note to Teachers of Costume Design and Technology

In the twenty-first century, freshman students come into costume technology classes with more computer skills than many of their teachers have managed to acquire in ten to fifteen years of struggling with and learning to integrate digital technology into their professional lives. These students are more than ready to accept the computer as an additional tool (along with books and lectures, sewing machines and dye vats, life drawing and drafting classes) for learning about theatre and building costumes. As these young costume technicians leave school and move out into the future world of theatre, their computers will already be fully integrated into their personal lives. It’s up to today’s theatre teachers to see that they will also bring the potential of digital technology into their professional lives as well—into costume shops.
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