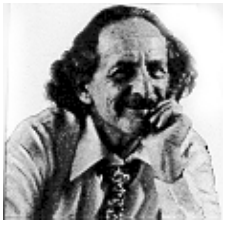
Essays of an Information Scientist, Vol:8, p.213-222, 1985
Current Contents, #22, p.3-12, June 3, 1985



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Drycleaning. Part 1. The Process and Its History: From Starch to Finish

Number 22 June 3, 1985

Readers often ask how we select topics for discussion in *Current Contents*® (*CC*®). Perhaps there is nothing unusual about curiosity among scientists, so I don't need to explain the diversity of topics we have treated in these essays. What I do enjoy particularly is to investigate those areas of human activity that affect most of us, yet somehow we take for granted. Often, such a simple human activity has surprisingly widespread ramifications in science and technology. As an example, consider drycleaning. The very term sounds contradictory, so it represents a linguistic challenge. That it is a topic rarely discussed in scientific circles is another attraction. And, as will be seen, its social, historical, and technical facets are far from ordinary.

Having traveled a great deal, I've learned that drycleaning is not to be taken for granted. Of course, if you are staying in a first-class hotel, you expect valet and laundry services to be available. But it is one of the unwritten laws of travel that you will arrive at some destination at the very moment when the valet service has closed. I usually pick up the phone to call the valet service 20 minutes after the deadline. And, unfortunately, such amenities rarely extend to Saturdays and Sundays. Like so many other activities in hotels, the valet service is organized around the lives of the employees rather than the guests.

In an informal survey of Preferred Hotels Worldwide, an association of independent, privately owned hotels in the US, Canada, Europe, and Asia, we found that very few of the hotels that responded offer laundry, drycleaning, or valet services on weekends. Indeed, the only hotels that did so were located in Bangkok, Hong Kong, and Manila. If most of us arrive in the evening, then why, pray tell, is cleaning service available only during the day? And if you have to spend a weekend somewhere, why should you be expected to do your own laundry?

What always perplexes me about hotels is that you would imagine they would be "dying" to clean your vestments, considering the prices of such services. But this just does not seem to be the case. For example, I've often arrived in Chicago to find I've missed the deadline at my hotel for same-day valet service. So I take a taxi or walk to the nearest one-hour cleaner in the Loop of downtown Chicago. As I walk, I ask myself, "Why is it that the half-dozen bellhops at the hotel who are anxious to carry my briefcase or small suitcases aren't equally anxious to walk a few blocks to the drycleaner and return my suit and shirt to me before dinner?"

By the same token, launderettes are open in some places 24 hours a day, seven days a week. But try to get your underwear and socks washed at the hotel over the weekend. Forget it! After all, the hotel even provides the Woolite to help you wash your clothes yourself.

But I guess we really should not expect hotel routine to be based on logic. In a previous essay, I discussed my grievances against hotels.[1] Naturally, all of this has a lot to do with different traditions, and tradition is very hard to over-

come. Just because you can get a suit *made* in 24 hours in Bangkok or Hong Kong doesn't mean you should be able to get it cleaned in Chicago or London, or anyplace else, on a Sunday.

I've always been curious about the drycleaning process. I thought it might be interesting to review it in some depth—to answer questions about what it is and where and when it was invented. Even more important, what are the consequences of this technology for our society, since we know that most technologies do have an impact on health and environment.

For most of us, our experience with drycleaning is limited to dropping off and picking up clothes at a local shop. With little knowledge about how drycleaners work their magic, we hand over our finest garments, soiled and limp. We expect to return to the shop and find them spotless and wrinkle-free, restored to their original freshness. We don't ordinarily question how this transformation occurs, until we find that a newly cleaned garment does not meet our expectations. For example, a light-colored suit mysteriously acquires a brown stain, the colors have run together on a silk print blouse, or a rayon skirt with supposedly permanent pleats comes back unpleated.

An expert on the subject of drycleaning is Bill Seitz, executive director, Neighborhood Cleaners Association (NCA), New York. Numerous writers in the popular press have interviewed Seitz, including Lucia Mouat in the *Christian Science Monitor*,[2] Lisa Belkin in the *New York Times*,[3] Mary Peacock in *Ms.*,[4] Ron Alexander in the *New York Times*,[5] and Gay Pauley in the *Philadelphia Inquirer*.[6] In these interviews, Seitz explains how your clothes might get ruined during the drycleaning process, and why such disasters occur. He also makes recommendations for preventing similar mishaps.

The NCA is a trade association with nearly 3,800 members from nine different states (New York, New Jersey, Connecticut, Rhode Island, Massachusetts, Pennsylvania, Delaware, West Virginia, and Florida). The NCA garment analysis center tests 7,000 garments a year to determine how the damage occurred, where the responsibility lies, and whether the damage can be corrected.[3]

Seitz estimates that 65 percent of the problems reviewed by the center result from poor manufacture, misleading care instructions, or both. Only 20 percent are the fault of the cleaner, while about 15 percent are the customer's fault.[2] However, it is important to remember that the garments seen at the NCA lab do not constitute a random sample of drycleaning complaints. Although anyone can send a garment to the lab for analysis, Seitz points out that the overwhelming majority of the garments analyzed by the lab come from NCA member cleaners.[7] Seitz observes that most cleaners, when they are clearly at fault, are not likely to send a garment for analysis, but will probably settle with a customer right away. Also, how probable is it that the customer will send a garment to the NCA lab? Consumers are not only less likely to know of the lab's existence, they may be unwilling to pay the $35 fee charged to them for an analysis. (The cost to a drycleaner who is a member of the NCA is considerably less—about $7.00.) These factors must be taken into account when you consider the statistics from the NCA. However, despite these reservations, there is much to learn about preventing drycleaning mishaps from the examples Seitz discusses.

In the case of the mysterious brown stain, did you tell the cleaner that a spill had occurred? Stains from fruit juice (containing sugar) may be invisible when dry, but turn yellow or brown with age or exposure to heat.[2] If such a stain is pointed out in advance to the drycleaner, preventive measures can be taken. The best advice is to take preventive action yourself; if the stain is water-soluble and the garment can be treated with water, flush the stain with plain water as soon as possible after the spill occurs.

The colors that "ran" together on your printed silk blouse are most likely the re-

sult of poorly set dyes used by the manufacturer. Jerome B. Schapiro, Dixo Company Inc., Rochelle Park, New Jersey, defines a "poorly set" dye as one that has not been adhered properly to the fibers.[8] Unfortunately, some manufacturers still use fabrics with poorly set dyes; this is particularly common in bright-colored silks or linens.[2] The culprit in this case may even be a famous designer. Seitz warns consumers to be especially wary of *haute couture* clothes. Sometimes they are completely unserviceable, despite a "Dry Clean Only" tag.[5] *Ms.* suggests wryly that such garments be tagged, "Wear till dirty, then throw away."[4]

As for the unpleated "permanent" pleats, Seitz notes that it is not possible to heat set permanent pleats into natural fibers or rayon, which is made from cellulose.[6] Permanent pleats can be made permanent by heat setting of the fibers only if the garment is at least 50 percent nylon, acetate, or polyester.[2] However, Schapiro points out that it *is* possible to permanently pleat natural fibers and rayon by heat setting a chemical, such as a resin, onto the fabric. Indeed, he indicates that much of the permanent pleating done today is done by this method. However, if the heat setting is improperly done, the pleats may not be as permanent as they should be, and this can cause a problem for the drycleaner. A pleated skirt that needs to have its pleats re-creased requires quite a bit of hand work; each pleat has to be pinned in place before it can be pressed. This can be costly for the client, who has to pay for the labor involved.[8]

What kind of mishaps are caused by drycleaner error? To understand what might go wrong, it is important to learn what really happens to your clothes in the drycleaning process. There are many opportunities for disaster in the hands of an inexperienced, unknowledgeable, or sloppy practitioner. Sound familiar? Drycleaning, like medicine, law, or teaching, is subject to human limitations.

Definition

The dictionary defines drycleaning as "the cleansing of fabrics with substantially nonaqueous organic solvents...to which special detergents and soaps are often added."[9] This may sound fairly straightforward, but today, drycleaning requires the attention of skilled professional workers at every stage of the operation. The Federal Trade Commission has defined drycleaning as "a process by which soil may be removed from products or specimens in a machine which uses any common organic solvent.... The process may include moisture addition to solvent up to 75% relative humidity, hot tumble drying up to 160°F (71°C), and restoration by steam press or steam air finishing."[10]

The process is much the same at all drycleaners. Remember that many local establishments are simply pick-up and delivery points; the work is done centrally. And terms like "French Cleaning" (in the US) and "American Cleaning" (abroad) really have no meaning. The term "French Cleaner" has been compared to that of "garden vegetable." "...The implication is that of higher quality, but it doesn't mean a thing. All vegetables come from the ground."[4] The only special connection between the French and drycleaning is historical: the first commercial drycleaning plant was opened in France in 1845.

There are, nonetheless, significant differences in the quality of work performed by different drycleaners. Ruth J. Katz, Home Service Editor, WNEW-TV, New York, and a consumer affairs consultant specializing in textiles and fiber, investigated the quality of drycleaning workmanship in New York.[11] She took the same or similar clothes, comparably soiled, to be cleaned at a number of Manhattan drycleaning establishments. Katz discovered that the level of knowledge and experience varied widely from one cleaner to another. So did the amount of care taken by the individual cleaner, and the fee charged

did not necessarily correspond with the quality of service provided.

Incidentally, it has been my experience that if you want to locate a good, reasonably priced, one-hour cleaner, don't look in an expensive neighborhood. Go to a working-class neighborhood, where you will find a large concentration of such establishments catering to people who cannot afford anything but quick, reliable service.

The Process

Eleanor Young, assistant director, Extension Home Economics Department, University of Maryland Cooperative Extension Service, College Park, has prepared a comprehensive Fact Sheet that outlines the steps that should be (but are not always) followed in the drycleaning process.[12] According to Young, the standard procedure at a modern drycleaner is a very orderly affair. The person to whom you hand your garments inspects each item for spots and stains. The cleaner should note any potential problems, such as special trims or ornaments, loose buttons and hems, or unusual fabric or colors. By discussing these concerns at the outset, the cleaner can warn you of any risks involved and take special precautions if needed. Forewarned of risks, you can decide whether or not to have the garment cleaned. Take care that this initial inspection is done carefully, or you may be courting disaster.

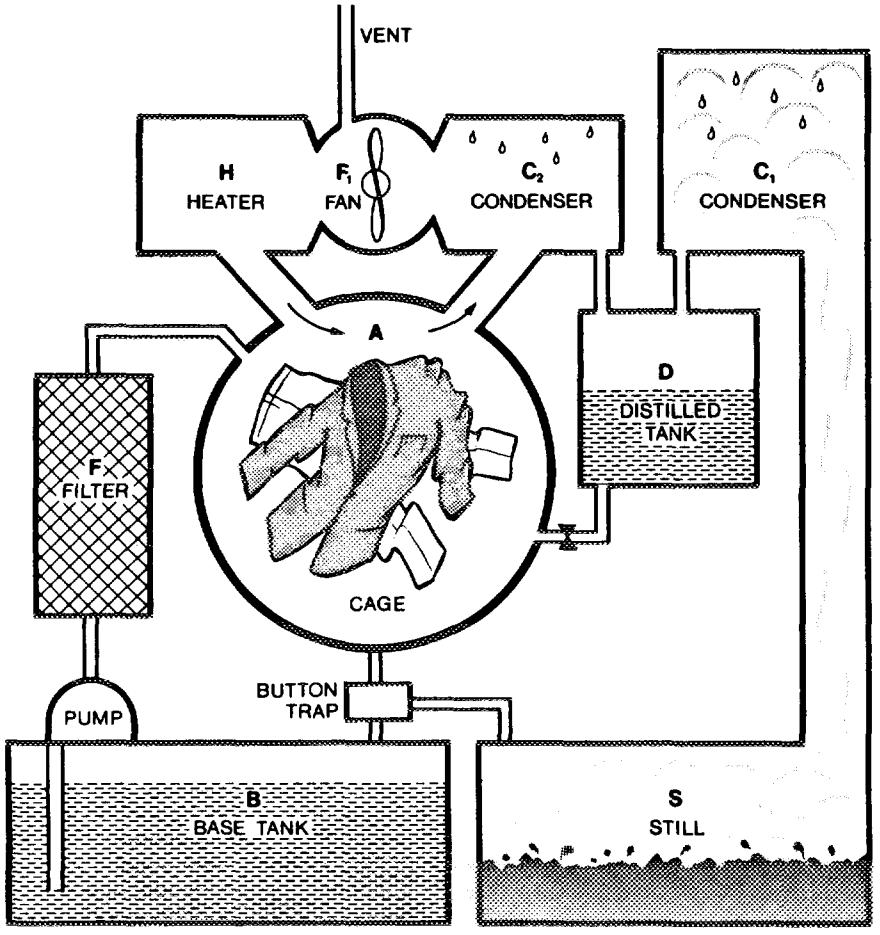
Once you have decided to proceed, your clothes are tagged for identification. Even this seemingly harmless step is potentially dangerous to your clothes. I have seen clothes ruined by careless stapling. And beware when you try to remove tags left on your clothes. If you pull at a drycleaning tag instead of taking the time to unfasten it, which is not always easy, you may tear your clothing. A good drycleaner will remove all tags before returning your clothes.

Once tagged, your clothes are sorted into compatible loads: lights, darks, synthetics, wools, and fragile clothing. Noncleanable parts, such as belts, some plastic buttons, and trims, are removed. If this initial sorting is not done, results can be disappointing. For example, some kinds of plastic buttons might dissolve or a vinyl belt might stiffen when immersed in drycleaning solvent. And dark clothes mixed in with light ones can emerge with lint on them.

In his book *Drycleaning*, Albert E. Johnson, now retired from his post as director of textile trade relations, International Fabricare Institute, Silver Spring, Maryland, a worldwide textile trade association, notes that soiled areas are usually treated with prespotting preparations so that the garments will respond more fully to the cleaning process.[13] (p. 23) In prespotting, the cleaner is primarily concerned with water-soluble stains, such as soft drinks, milk, and so forth, that would normally come out in home laundering, but not always in drycleaning.[8]

Once the preliminaries are complete, each batch of clothes is loaded into a drycleaning machine that resembles a front-loading washing machine. Figure 1 illustrates a drycleaning machine that might be used for large-scale, industrial drycleaning (e.g., for hotel linens, industrial uniforms, and so forth). Although the drycleaning machines used by neighborhood cleaners are usually less complex than the machine illustrated, they operate on the same principle. In most drycleaning machines, the clothes are soaked and tumbled, exactly as they would be in a front-loading washing machine, for 8 to 12 minutes with an appropriate organic solvent from a base tank. The optimum temperature for this process ranges from 70°F to 85°F, depending on the solvent used. Some drycleaning machines include a mechanical refrigeration device in the circulation system to keep the solvent within this temperature range.[13] (p. 16) However, the exact temperature is not critical, and, in a typical drycleaners, clothes are cleaned at room temperature. The solvent most commonly used in the US is perchloroethylene. Usually, a small

Figure 1: A drycleaning machine used for large-scale, industrial drycleaning. (Published with permission of Shirley Institute, Manchester, England, from *Textiles* 10(2):49, 1981.)



quantity of detergent is dissolved in the solvent to help suspend dirt particles. The solvent removes greasy dirt, and the detergent can be activated by a small, carefully controlled amount of water to dissolve water-soluble dirt.[4]

The solvent is continuously filtered during the cycle to remove soil and lint.[13] (p. 10) According to Schapiro,[8] a filtering system that contains fresh activated carbon or absorptive powders will also absorb color and odor-causing particles that build up in the solvent. In the system illustrated in Figure 1, solvent used in the wash cycle is deposited in a still, where it is boiled and condensed into a distilling tank. Once clean, the clothes are rinsed in freshly distilled solvent. The rinse solvent is then filtered and returned to the base tank. However, in a typical drycleaning process, there is no distilling step nor any rinse cycle. The solvent is simply filtered and recycled during the cleaning process. In fact, according to Schapiro, there is a distinct advantage to eliminating the rinse cycle.

The detergent in the solvent leaves a residue that actually softens the fabric and gives a better result than when clothes are rinsed with detergent-free solvent.[8]

As in a washing machine, clothes are spun, and then they are tumbled dry in a "reclaimer," where warm, dry air circulates through the clothes, extracting the last of the solvent.[12] Some drycleaning machines do both cleaning and drying in one bin, while some do only cleaning or only drying. In the latter case, garments must be transferred by hand from the cleaner to the dryer. The drying temperature of the garments should not rise above 160°F.[13] (p. 13) The extracted solvent is filtered and reused. Schapiro points out that the solvent is never discarded; as the chemical is used up, more is added to the system, and it is continually recycled.[8]

After the main cleaning process, each item should be carefully inspected by a skilled "spotter," who determines whether any spots remaining on a garment can be removed without damaging the garment. Armed with a whole array of spot-removal preparations, stiff brushes, cheesecloth, blotters, and a steam gun, the spotter can carefully remove stubborn spots.[13] (p. 24-5) Again, the opportunities for error abound. If the wrong solvent is used or if rubbing is too vigorous, the fabric might become discolored around the spot, creating a worse problem than the original spot. As Schapiro points out, the most important thing for a spotter to know is when *not* to try to remove a spot.[8] The spotter needs to have a basic knowledge of fabrics and dyes, as well as a thorough understanding of spot removal. Although some of the trade associations, such as the International Fabricare Institute, do have schools for teaching these skills, many practitioners probably learn them through experience.

Each garment is "finished" individually by a presser, who uses pressing machines as well as special steam and air equipment that prevents heat damage to fabrics and does not leave press marks. The quality of workmanship is very important in finishing a garment, because sloppy work is immediately apparent. After finishing, each garment is inspected, and belts or other parts of the garment that were removed earlier are attached. Some cleaners will make minor repairs, such as restitching a hem, if necessary; most cleaners will at least tell the client when repairs are needed, and some will do repairs for an extra fee. Clothes are often, but not always, padded with tissue paper before they are bagged and prepared for pickup.

In addition to being clean, spot-free, and properly finished, *a freshly drycleaned garment should be entirely free of chemical odors.* According to the Coin Laundry Association (formerly National Automatic Laundry and Cleaning Council), any odor remaining on the clothes may be due to unevaporated solvent or to contaminants, such as fatty acids, that have accumulated in the solvent.[14] To clean clothes properly, the solvent and the filters in the drycleaning machines must be kept very clean. Dirty solvent can redeposit dirt as well as odors on clothes, and garments may look even worse after cleaning than they did before. The care and maintenance of drycleaning equipment is a very important part of the drycleaner's job.

Obviously, drycleaning was not always done with machines. The process of drycleaning surely existed before automation. When were organic solvents first used, and how did drycleaning evolve? How did people clean woolens and silks before drycleaning techniques were developed?

History

You may be surprised to learn that the use of nonaqueous substances for cleaning textiles may have been practiced in Greece as early as 1600-1100 BC by the Mycenaeans. C.M. Bowra, a scholar of classical studies at Oxford University, has reported that the term "dry cleaner" is included in a list of over 100 occupations inscribed on Mycenaean clay tablets.[15] According to Van Sigworth, Na-

tional Institute of Drycleaning, these "dry cleaners" probably used grease-absorbent earths and sands to remove spots from clothing.[16] John Spomar, proprietor of a drycleaning shop in Dalton, Illinois, a suburb of Chicago, has studied the history of drycleaning extensively. He notes that these grease-absorbent earths are sometimes called "fuller's earth," in reference to the tradesman who used them.[17] (A fuller was a textile worker who washed and brushed newly woven cloth to clean it, swell the fibers, and "fill in" the weave.[16,17]) Johnson mentions that these natural cleaning agents have been used since before Roman times, and suggests that the term "drycleaning" was coined in reference to cleaning with these powders.[13] (p. 1) Today, drycleaning is done with organic solvents, which are certainly not "dry" in the sense we usually consider something to be dry. That these solvents are nonaqueous (that is, contain no water) is no doubt why we continue to use the term "drycleaning."

Throughout the centuries, formulas for removing spots from cloth were guarded as trade secrets. Sigworth notes that in 1716, a French book mentioned turpentine as a "...special secret for removing grease and oil spots from silk...."[16] Despite the early knowledge of organic solvents as spot removers, their use did not become widespread until the nineteenth century. With the birth of the chemical industry in the 1800s, solvents such as camphene, benzene, benzol, naphtha, and gasoline first became available.[16]

Legend has it that the founder of the first commercial drycleaning establishment, Jean-Baptiste Jolly of France, accidentally "discovered" the efficacy of nonaqueous solvents in cleaning by noting that camphene from an overturned lantern removed grease spots from a tablecloth. This story is reported in slightly different versions by various authors, including Spomar[17] and M.A. Shepley,[18] Research and Development Department, Mond Division, Imperial Chemical Industries, Ltd., England. Sidney M. Edelstein, president, Dexter Chemical Corporation, Bronx, New York, argues convincingly that "...the drycleaning industry is not the result of some crude accident which took place in the middle of the 19th century...," but rather, "...the result of developing skills over a long period...."[19] Whether or not the anecdote about Jolly is true, Sigworth[16] does credit him with opening the first drycleaning plant in Paris about 1845. According to Sigworth, similar plants soon opened throughout Europe. Although we are unable to determine the precise date the first drycleaning establishment opened its doors in the US, Seitz reports that at least one Manhattan firm began operations as early as 1879.[7] Sigworth notes that by 1910 drycleaning technology was widespread in America. Mechanization of the process followed soon after drycleaning was first commercialized when the firm Pullars of Perth, Scotland, introduced the first power machinery for drycleaning in 1869.[13] (p. 3) This innovation made it possible to clean clothes even faster and more efficiently.

Drycleaning offered several advantages over previous cleaning techniques. Johnson notes that before commercial drycleaning was available, textile cleaners washed clothing and fabric in hot water.[13] (p. 2-3) It was often necessary to dismantle a garment prior to cleaning. The cleaner took apart the garment at the seams, cleaned, dyed, and blocked each piece, and reassembled the garment in what was a very time-consuming and expensive procedure. Spomar[17] notes that, in those early days, garments were cleaned infrequently, sometimes after a year or more of use, and often dyed at the same time.[17] Johnson points out that with drycleaning, a garment could be cleaned without being dismantled.[13] (p. 3) Labor costs were lower. It was not necessary to dye the garment, because drycleaning did not affect most of the dyes and finishing agents that were removed by water. In addition, pressing and finishing were easier after garments had been drycleaned. Incidentally, if you scan the yellow pages of a

telephone directory, you will note that many drycleaning establishments are still called "Cleaners and Dyers," even though most of them would be shocked if you asked them to dye something.

Today, drycleaning technology is virtually the same throughout the world, although there are a few international differences worth noting. As I have already mentioned, the hours when drycleaners are open for business vary from country to country and depend very much on local traditions. A recent conversation with Nate Becker, executive director, Association of Professional Drycleaners of the Delaware Valley, Wynnewood, Pennsylvania, confirmed that there are vast differences in cultural perceptions of drycleaning throughout the world. For example, Becker points out that drycleaning is more popular in the US than it is in other countries, where it is considered a luxury and is used primarily by the wealthy.[20]

Another international distinction that is sometimes mentioned is the preference for one solvent over another. For example, in the US, the solvent most often used is the chlorinated hydrocarbon, tetrachloroethylene, while in Europe, fluorinated-chlorinated hydrocarbons are becoming particularly popular.[13] (p. 6-7) Solvents are such a key ingredient in the drycleaning process that it is worthwhile taking a closer look at them.

Solvents

The solvents that are used in the drycleaning industry today are largely nonflammable, synthetic chemicals, but in the early days, the most common solvents were turpentine, benzene (from petroleum), benzol (from coal tar), naphtha, and gasoline.[16] A major problem with these early solvents was that they were highly flammable and even explosive. Johnson notes that the first major breakthrough in solvent research came in the early 1920s, with the development of the Stoddard solvent, a much safer petroleum product with a minimum flash point of 100°F (38°C).[13] (p. 4) The flash point is the lowest temperature at which a solvent will become volatile and mix with air to form an inflammable gas.[21] Although Stoddard solvent is less common today, having been replaced by nonflammable synthetic solvents, Johnson reports that this solvent is still used by some drycleaners, usually to clean drapes, suedes, and leathers.[13] (p. 6)

Johnson traces the history of the synthetic solvents used today in the drycleaning industry.[13] (p. 5-8) The first nonflammable solvent, trichloroethylene, was introduced in Germany in 1920. Johnson notes that trichloroethylene is a very powerful solvent that can damage certain fibers and synthetic substances, and that today it is used largely for degreasing industrial overalls, machinery, wool, and so forth.[13] (p. 5)

In the 1930s, carbon tetrachloride and tetrachloroethylene were introduced. Carbon tetrachloride has not been used in drycleaning machines since the 1940s because it was found to be highly toxic.[8] Indeed, the use of this chemical has been banned in some countries.[13] (p. 5) In 1968, *Consumer Bulletin* published a strong recommendation that carbon tetrachloride be banned in the US;[22] although the Environmental Protection Agency has recommended that it carry a label warning that it may be carcinogenic in humans, this chemical has not been banned.[23]

According to the Laundry-Cleaning Council, an organization of textile trade associations, tetrachloroethylene, more commonly known as perchloroethylene or "perc," has become the most widely used solvent in the US drycleaning industry.[24] Shepley points out that the popularity of this solvent is due to the fact that it is less harsh than trichloroethylene and has proved more satisfactory for cleaning synthetic fibers because it does not damage them.[18]

More recently, synthetic fluorocarbons, such as trichlorotrifluoroethane, have been introduced. Trichlorotrifluoroethane is even milder than perc and can be evaporated from fabrics at lower

Table 1. Selected list of international trade periodicals reporting on the drycleaning industry. A=title of periodical. B=first year of publication. C=frequency of publication.

A	B	C
American Coin-Op (Chicago, IL)	1959	monthly
American Drycleaner (Chicago, IL)	1934	monthly
American Dyestuff Reporter (New York, NY)	1917	monthly
Australian National Drycleaner (Sydney, Australia)	1950	monthly
Canadian Cleaner & Launderer (Montreal, Canada)	1955	bimonthly
Clean Magazine (Glenview, IL)	1979	bimonthly
Drycleaners News (Waterbury, CT)	1951	monthly
Fabricare News (Joliet, IL)	1972	monthly
Laundry and Cleaning (London, England)	1885	fortnightly
National Clothesline (Philadelphia, PA)	1961	monthly
New Era Laundry & Cleaning Lines (Huntington Beach, CA)	1959	monthly
Tintoria, Lavanderia e Pulitura a Secco (Milan, Italy)	1952	monthly
Tvaettnytt (Sollentuna 1, Sweden)	1956	10/year
Waescherei- und Reinigungs-Praxis (Herford, FRG)	1952	monthly

temperatures, making it especially useful for cleaning delicate fabrics.[18] Some authorities predict increasing popularity for the fluorocarbons, because, although more volatile than perc, these solvents do not damage painted fabric, polystyrene, polyvinyl chloride fibers, some pigment colors, furs, and leathers.[13] (p. 7) One such solvent is particularly popular in Europe, and is used more widely there than in the US. However, special equipment is required when using these solvents because of their higher volatility.[13] (p. 6)

A list of drycleaning trade periodicals is provided in Table 1, and a list of professional drycleaning organizations in Table 2. For a free pamphlet entitled "Consumer Guide to Clothing Care," send a stamped, self-addressed envelope to Neighborhood Cleaners Association, 116 East 27th Street, New York, New York 10016.[25] In addition, you can order a chart for tips on spot removal (for washables) by sending 25 cents to the MAYTAG Company, Newton, Iowa 50208.[26] And for 50 cents, you can order a booklet called "What's New About Care Labels," from the US government (Consumer Information Center, Department 79, Pueblo, Colorado 81009).[10]

This review may have given you a new appreciation of your local drycleaner. We hope that you are now better prepared to prevent the common drycleaning mishaps. It is said that "clothes make the man (or woman)." This saying may not be true in the typical academic or research institution, but even researchers do not live by bread alone, and do occasionally need to be concerned with appearance. I am reminded that one person's fantasy may be another's nightmare. In his classic role in "The Man in the White Suit," Alec Guinness portrays a chemist who encounters the wrath of the

Table 2: Professional and technical laundry and drycleaning organizations.

Coin Laundry Association
1315 Butterfield Road
Suite 212
Downers Grove, IL 60515

Fabric Care Research Association, Ltd.
Forest House Laboratories
Knaresborough Road
Harrogate, North Yorkshire HG2 7LZ
England

International Drycleaners Congress (Laundry) (IDC)
P.O. Box 8629
San Jose, CA 95155

International Fabricare Institute (Laundry) (IFI)
12251 Tech Road
Silver Spring, MD 20904

Laundry, Dry Cleaning & Dye House Workers' International Union
360 North Michigan Avenue
Chicago, IL 60601

Neighborhood Cleaners Association (NCA)
116 East 27th Street
New York, NY 10016

Textile Care Allied Trades Association (Laundry) (TCATA)
543 Valley Road
Upper Montclair, NJ 07043

textile and garment manufacturers for having invented a suit that never wears out. But just think of the drycleaning bills he would have run up!

In the second part of this essay, I will review the evolution of the drycleaning industry and such issues as occupational safety and environmental hazards of toxic solvents.

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My thanks to Cecelia Fiscus and Marsha Hall for their help in the preparation of this essay.

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