BASF

Electron micrograph of cross section of a cast fabric sample and a bolt of the material with its developers.

Synthetic fabrics cast in molds

A process developed in West Germany promises fabrics directly from monomers and threatens a textile revolution

The word textile originally meant a woven material. Weaving is still a major part of the textile industry. This is especially true of synthetic textiles, where the raw material cost is low and the processing expensive. One kind of nylon, for example, starts out as caprolactam monomer at 20 cents a pound and ends up as a fabric that sells for about $3.75.

A textile-making method developed in Germany threatens to short-circuit these expensive steps and in effect belie the word textile. In the process a synthetic fabric is cast directly from monomers, avoiding such steps as drawing of fibers and spinning of yarn as well as the weaving.

Developed at the Badische Anilin- und Soda Fabric under the leadership of Dr. Carl Heinrich Krauch, the process could mean a textile revolution in which spinning and weaving will cease in large parts of the synthetic fabric industry, if questions about strength and texture are answered. Some segments of the industry are not convinced that existing investments in equipment ought yet to be scrapped.

Monomers are molecules that can be strung together in extremely long chains to form polymers such as synthetic rubber, plastics and synthetic fibers. In the usual procedure the polymers are extruded to form fibers, the fibers are spun into yarn, and the yarn is knitted or woven into cloth.

The BASF process takes a liquid monomer, mixes it with a catalyst to hasten polymerization and a solvent such as water, acetic acid, urea or tioxan. The mixture is then deposited on a cryogenic surface where the solvent freezes, and its crystals form a matrix of capillary spaces that as Drs. Krauch and Axel Sanner put it, "orders the material to be polymerized in fiber-like form with single fibers spatially separate."

The monomer is then polymerized by bathing it in ultraviolet light. Afterward the solvent is melted away, and what results is a porous cloth that is off-white in color and looks like a cross between suede and felt.

If the matrix material can be made to order itself in such a way that the single fibers maintain a particular relationship to one another, say Drs. Krauch and Sanner, then one comes from the monomers "direct to 'textile' patterns of any desired form."

Officials of BASF are enthusiastic about the new process. Dr. Guenther Daumiller, director of BASF, expects the cast cloth to have a rejuvenating effect on West Germany's textile industry. Competition from low-price textile producing countries need no longer be feared, he says, if the new material goes into mass production.

The firm refuses to be specific about prices. A spokesman says laboratory work can't produce meaningful information on full production costs. Application of the new process, BASF says, is a matter for textile firms to decide.

Meanwhile, there is a certain skepticism in the industry. Monty Montagna, vice president of Union Carbide, is quoted in the March 17 CHEMICAL AND ENGINEERING NEWS as saying, "While there are strong economic incentives to develop new technology, there seems to be one hole in the concept: that is, fabrics cast from monomer, or polymer, would lack the strength that fabrics woven from highly oriented fibers have."

A BASF statement says the product shows "exceptional tear strength," but repeated questioning could not persuade a company spokesman to back the statement with figures.

If the new process does come into use, losses are foreseen for companies that concentrate on spinning and weaving, such as Burlington Mills and J. P. Stevens and Company, and firms that supply them with synthetic fibers, such as Du Pont and Monsanto.

The gainers are likely to be the so-called integrated textile companies, those that make everything from fiber to cloth, like Japan's Toyo Rayon and Britain's Courtauld's, as well as chemical companies with strong positions in plastics, such as BASF and Union Carbide. ◇

DRUGS

The physician as addict

Although the typical drug addict in the United States is from the lower socioeconomic level, unmarried, city-bred and 18 to 25 years of age, the physican addict is different. He is about 38 years old, married, may or may not come from a city, and is of the higher income group.

The rate of drug abuse or addiction among physicians is from 30 to 100 times that of the general public, a California attorney told the Federation of State Medical Boards recently. The American Medical Association estimates that some 60,000 of the country's 316,000 doctors misuse drugs of various kinds.

The drug abuser among physicians has a pre-disposing personality for addiction, and suffers from overwork and fatigue. Since drugs are readily available, they are an occupational hazard. Usually the doctor has been in practice some years before he takes up the habit.

The encouraging thing about this group of addicts, however, is that in many cases they can be rehabilitated. Richard K. Turner, deputy attorney general of California, says the earlier that state medical boards can prove cases against such doctors, the better the chances for rehabilitation.

About 95 percent of the first offenders are placed on probation, Turner says. About 85 percent of the second offenders have their licenses either suspended or revoked.

One study of 68 physicians discharged from the Public Health Service Narcotics Hospital in Lexington, Ky., reveals that morphine and demerol are the most commonly used drugs. Many of these doctors also used barbiturates and alcohol in addition to the narcotics.

I.Q. DISPUTE

Genetics vs. headstart

The embers of the oldest dispute in psychology—nature versus nurture—have been fanned to white heat once again, this time by a Berkeley professor. And the flames are beginning to lick through the academic woods, creating heat and even a little light.

The pyrotechnic scholar is Dr. Arthur R. Jensen, a psychologist at the University of California's School of Education.

His view of the overwhelming primacy of nature—or heredity—as a determinant of intelligence is set forth in a 123-page article in the Winter 1969 issue of the prestigious HARVARD EDUCATIONAL REVIEW.

After arguing that environmental factors are not nearly as important in determining the Intelligence Quotient as genetic factors, Dr. Jensen analyzes the environmental influences which may be most critical in determining I.Q. He concludes that prenatal influences may contribute the largest environmental factor, but genetics dominate nevertheless.

A basic finding of Dr. Jensen's research is that environment acts as what he calls a threshold variable. Extreme environmental deprivation can keep a child from performing up to his genetic potential, but an enriched educational program cannot lift him above this potential.

Dr. Jensen emphasizes the point that new educational methods must be developed which take advantage of the mental abilities of children from deprived backgrounds.

But there is more to the Jensen study than just another vote for heredity in its ancient struggle with environment for the allegiance of behavioral scientists. Dr. Jensen also contends that the Federal Government's widely publicized effort at compensatory education for the children of deprived minority groups is a failure.

He attacks what he sees as the central notion upon which these programs are based: the idea that I.Q. variations are almost completely a result of environmental differences and the cultural bias of the tests themselves (SN: 3/8, p. 243). He also argues that it would be better to teach specific skills to the children born into poverty than to try to raise their I.Q. scores through emphasis on abstract learning.

As though all this were not enough to bring the intellectual pot to a boil, Dr. Jensen speculates that social class and racial variations in intelligence cannot be accounted for by differences in environment.

"The idea that the lower average intelligence and scholastic performance of Negroes could involve not only environmental, but also genetic factors has indeed been strongly denounced," Dr. Jensen says, "but it has been neither contradicted nor discredited by evidence." And, he adds, "the fact that a reasonable hypothesis has not been rigorously proved does not mean that it should be summarily dismissed."

Asked whether he was concerned that racists might seize upon portions of his research and, by quoting them out of context, belabor those who seek to improve race relations, Dr. Jensen says: "I don't want to give these people the power of censorship over my research. I know many fine scholars who didn't submit research because of the fear that it might be misinterpreted. I think it is important that people read my article before making interpretations of it."

He observes that the part of his study that dealt with racial differentials on I.Q. scores constituted less than five percent of the total research, although this was the part that has received the most attention. Dr. Jensen was also careful to note in his paper that "since, as far as we know, the full range of human talents is represented in all the major races of man and in all socioeconomic levels, it is unjust to allow the mere fact of an individual's racial or social background to affect the treatment of him."

Dr. Jensen's genetic explanation for intelligence variation does not satisfy Harvard's Dr. Jerome Kagan, who is among those invited by the REVIEW to counter Jensen's points in the upcoming spring edition. Dr. Kagan illustrates his objections with an analogy to physical stature:

Harvard

Dr. Kagan: Nurture does it.