

AGRICULTURE

Products from the Farm

A Presidential committee says the only practical solution to the problem of farm surpluses is to take the ordinary farm product and turn it into a product useful to industry.

► BEFORE WORLD WAR II Americans used 23 pounds of soap per person. Today they use eight pounds.

This does not mean Americans are dirtier now than they were 15 years ago. But it does mean the farmer has lost out along the line in his struggle for consumer acceptance of farm products. In 1956 we used soap made out of chemicals—15 pounds of detergents per person.

The replacement of the agricultural oils and fats used in soap-making by chemicals is only one of the more recent skirmishes between the farmer and what might be called scientific progress.

To mention just two others:

In 1950 we had to import leather hides because we could not meet the demands for them. Since 1955, however, cattle hides have become and are now surplus. Why? Today seven out of ten people walk on leather substitutes. That is one reason for the surplus leather.

Before the 1930's we used cloth woven from cotton, silk, flax, hemp and wool. Today, synthetics such as nylon, Dacron, Orlon and rayon cover our backs, our upholstered furniture, and our glass window panes.

These changes have cut 20% from the farmer's net income as a result of accumulated surpluses.

Paradoxically, industry loses too. Many of the imported crops used by industry—beans, oils, waxes—could be grown here. Or, research could be directed to finding domestic agricultural substitutes.

Less than a year ago, in August, 1956, President Eisenhower appointed a bipartisan committee with the title of Commission on Increased Industrial Use of Agricultural Products to investigate just what could be done about solving the problem of farm surplus.

The Nature of the Problem

The Commission, in its interim report recently published, finds there are really three problems facing the farmer:

There is the problem of surpluses—1,425 billion bushels of corn, and more than one billion bushels of wheat, for example.

There is the problem of creating a steady supply of agricultural products.

The problem of increasing the ability of the national economy to absorb the agricultural products on the market—at profitable prices.

Our growing population, which, it is estimated, will reach between 210,000,000 and 220,000,000 by the year 1975, will not be able to eat up the surpluses.

The answer to these three problems, which may be looked upon as one, is in-

creased research for finding new ways to use the "old" farm products and to find uses for new crops.

The 16 task groups set up by the Commission to study possible solutions to the problems have come up with some exciting proposals for new uses and new crops.

New Uses for Old Products

Cashmere from corn is one. U. S. Department of Agriculture scientists have developed a process for making a cashmere-like textile fiber from corn protein. It is now being commercially produced.

Fiber from poultry feathers, 300,000,000 pounds of feathers are "surplus" each year and improved, flame- and wrinkle-resistant cotton and shrinkproof wool could answer the challenge of the synthetic chemical fibers.

Antibiotics are being made from cereal grains by a fermentation process. Wheat gluten could provide the necessary amino acids for concocting potent hormone-type weed killers. Recent research by the U. S. Department of Agriculture has demon-

strated that combining amino acids with weed killing compounds increases their powers many times.

Even the detergent field has been invaded by the farmer: agricultural scientists have found a way to use agricultural oils and fats to make the chemicals that make the detergents!

Adhesives from lactose or milk sugar, hormones from wool grease, a hard carnauba-like wax from rice; the list is almost endless, bounded only by the skill, patience, and research of the scientist.

If the farmer does not feel like having his corn turned into cashmere, he can grow one of the promising new crops.

He can grow the Mexican yam. Dioscorea, its technical name, is a plant that can supply the hormone cortisone more economically and in larger quantities than the usual source, animal glands.

The farmer can raise jojoba or candelilla, both potentially useful for industrial waxes. It is estimated that industry can absorb 7,000,000 pounds of candelilla annually.

Guar, described as one of the oldest crops known to man, is another "new" crop with countless industrial applications.

A member of the legume family, the guar (pronounced gwar, like the second part of the name of the sports car, the Jaguar) plant has long flat pods which hold some six to nine "precious seeds." The



FABRIC FROM FEATHERS—The bowl on the right holds chicken feathers, destined to become fibers. R. A. O'Connell, of the U. S. Department of Agriculture, pours chemically treated poultry feathers, called "dope," into a pressure vessel. From the vessel the thick spinning dope will be forced through the tiny holes of a spinnerette and then given an acid-and-salt bath that sets the thin streams of dope into fibers.

seeds are "precious" because a unique gum, chemically a galacto-mannan, is derived from them.

Guar has been used as an ice cream stabilizer, as an appetite depressant — in colloid form it will swell in stomach juices—as a filter aid in mining uranium and potash, and as surface sizing for high quality paper.

Actually, guar, when it was introduced in Arizona in the early part of this century, was first planted because of its soil building properties. It thrives on sandy loams and light soils, apparently requiring little rainfall.

Pakistan and India now provide most of the guar used in the world today. The southwestern United States could greatly expand its production and the farmer would profit.

Research, finding new crops and new uses for the old ones, holds the key to an abundant and prosperous economy for the farmer, the consumer and industry.

Price for Research

How much will this research cost? The Commission on Increased Industrial Use of Agricultural Products recommends tripling the amount of money now appropriated by the Federal Government.

This would mean spending more than \$48,000,000 a year.

Tripling any amount of Government spending in these days of Congressional economy drives would seem to be a doubtful procedure especially since appropriations administered by the Department of Agriculture last year totalled \$5.3 billion.

However, less than one-fiftieth of this amount actually goes for research directed at the problem of eliminating agricultural surpluses. Most of the funds go for price support programs.

Each of the research programs proposed by the Commission's task groups can be achieved in the very near future. USDA scientists have accomplished near-miracles with projects in the past and the nation as a whole has benefited. They are responsible, for instance, for the large scale development of penicillin and frozen juice concentrates.

In contrast to the amount invested for agricultural research, American industries are currently investing at least \$3 billion annually, and probably more, in research to create new consumer products, improve old ones, and improve raw material uses.

Secretary of Agriculture Ezra T. Benson reports that the nation's farmers have lost about one-fifth of their net income, or \$2 billion a year, as a result of accumulated surpluses and excessive output.

Changing some of the farmer's surplus wheat into weed-killers, some of the milk into adhesives and improving such products as wool and cotton can turn this loss into profit.

An increased investment in agricultural research directed at finding new uses for "old" farm products—not only bigger and better yields of already surplus crops—can work magic with the farmers' products.

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BIOCHEMISTRY

Hormone from Whales

► WHALES MAY be the long-sought source of a growth hormone for the effective treatment of disease in man, Dr. C. H. Li, professor of biochemistry at the University of California, has reported.

Dr. Li spoke at the International Congress of Pure and Applied Chemistry meeting in Paris, France.

Growth hormone might be used in the treatment of cancer, dwarfism and other metabolic diseases.

The trouble is that no form of the hormone was found to be effective in man until last year. Then, Dr. Li and other scientists found that growth hormone taken from the pituitary glands of humans and monkeys is effective in man. But there is little likelihood that human and monkey hormones could be obtained in very large quantity.

In his experiments last year, when he isolated the human and monkey secretions, Dr. Li also noted a startling structural difference between the anthropoid and cattle hormone molecules. The cattle hormone, which is available in quantity, is effective in rats but not in man. Dr. Li suggested that this difference in structure might account for the difference in effectiveness in man.

PSYCHOLOGY

Experience Affects Vision

► A ZULU lives in a round world. If he does not leave his reserve, he can live his whole life through and never see a straight line or a square corner. For this reason Zulu herd boys have been useful to American scientists in studies of the effect of experience on our ways of seeing things.

Drs. Gordon W. Allport and Thomas F. Pettigrew of Harvard University decided to find out how a certain striking optical illusion would look to a Zulu boy who had never seen a rectangle.

To present this illusion, a frame that looks like a window divided into six "panes" is rotated at a short distance from the observer. It looks like a window, that is, to anyone familiar with windows. It is really a trapezoid with only two sides parallel.

As it rotates, American eyes tend to see it as swinging back and forth instead of going round and round.

The Harvard scientists wondered how it would look to Zulu herd boys who had never seen a window. Would they be fooled about its motion?

They showed the rotating "window" to a group of herd boys who had never been off the reserves or gone to school and also to boys of the same age in the city who had seen some buildings of European type architecture. A comparison group of European boys in the city were also tested.

A very significant tendency was found

The recent isolation of the whale growth hormone by Dr. Li and his colleague, Dr. Harold Papkoff, shows this secretion has a structure similar to that of the monkey and human hormones. Therefore, Dr. Li said, this structural kinship may mean that the whale hormone may be effective in man. Tests of this are now being made in the United States at the National Cancer Institute, Bethesda, Md.

If whales produce a hormone effective in man, they would provide a quantity source. Each humpback whale—the species from which Dr. Li's preparation comes—yields ten times as much hormone as a human pituitary. And the blue whale would yield glands weighing 50 times as much as the humpback.

Dr. Li also reported success in chemically removing large chunks of various growth hormone preparations without reducing their potency. This was done for cattle, sheep, whale, monkey and human growth hormone.

He said that, although there are differences in size and structure of the various hormones, this work supports a theory that all of the hormone molecules may have a common structural core that is responsible for the growth properties.

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for the city boys, whether European or African, to see the illusion more often than the herd boys, especially when the window was viewed with both eyes and at a ten-foot distance. These are the conditions when binocular cues to true rotation are most plentiful. It is under these conditions that previous experience with rectangular windows seems to make more of the city boys mis-perceive the "window" as swinging back and forth.

The word "zulu" means heavens or firmament and the aesthetic ideal of round rather than angular styles affects native art, architecture and even speech. It is possible to say "round" in Zulu, but there is no word for "square." There is a word for "circle" but not for "rectangle."

Huts in Zululand are invariably round. They have no windows and doors are merely round entrance holes. They are arranged in circles with round stockades to fence in animals. Fields follow the irregular contours of the rolling land; there are no rectangular plots.

It is commonly said in Natal that Zulus fresh from reserves cannot plow a straight furrow and are unable to lay out a rectangular flower bed.

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Exercise builds additional paths of blood circulation to the heart which could offset the effects of narrowed arteries.