SCIENCE NEWS

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THE SESQUICENTENNIAL CELEBRATION OF THE UNITED STATES PATENT OFFICE

THE nation is now celebrating the anniversary of an event that has grown steadily in importance down through the succeeding decades.

On April 10 in 1790 President George Washington approved the first United States patent law. With the enactment of that statute which, by the way, he had urged as a help to inventors, our present patent system had its beginning.

That system, in turn, has spurred our advancement and not only has promoted our industrial welfare, but has also brought us social and political benefits great in number and significance. It has faithfully and fruitfully served the democracy that begot it.

There were inventors, of course, before 1790, and man's inventiveness long preceded our patent system. Down through the ages his ingenuity produced many useful contrivances. But for these there was no reward but their makers' sense of achievement. There was no material return, no protection; scarcely was there renown for the creators of these new mechanisms and methods.

Gunpowder has been for centuries both a beneficent and a baneful influence in the world, but the true identity of its discovery is hotly disputed.

The American patent system has encouraged the use of good means to worthy ends. It has succeeded in profiting the whole nation by safeguarding and recompensing the individual. It has fulfilled the purpose which the authors of our Constitution had in view when they empowered Congress "To promote the progress of science and useful arts by securing . . . to inventors the exclusive rights to . . . their discoveries."

We owe to that incentive, I believe, the invention of the cotton gin only four years after the passage of the first patent law. As this stimulus became more widely known through the inventions it fostered and recognized, it prompted more and greater efforts and accomplishments.

Within a little more than fifty years after President Washington's approval of the law of 1790 came the telegraph, the reaper, the vulcanization of rubber, the revolver, the sewing machine and the rotary printing press.

In the 104 years since the revision and refinement of the patent system in 1836, there have been granted 2,196,000 patents to many thousands of individuals, the vast majority of them citizens of the United States. Only 9,957 patents were issued before July, 1836.

Many of the inventions covered by these 2,196,000 patents supply our needs and serve our convenience every hour of every day. Such marvels as the telephone, the incandescent electric lamp, the phonograph, motion pictures, the submarine, the linotype, the airplane and the radio, including television, are covered by patents granted in the last 65 years, that is, since the birth of six or seven millions of Americans still alive.

In the first century following the establishment of our patent system 405,262 patents were issued. More than four times that number, that is to say, 1,799,000, have been granted in the last fifty years alone. And it will be conceded, I think, that the inventions patented in the last five decades are no less important than any that went before.

The use of these inventions presupposes their production, distribution and operation. To make and merchandise them requires the investment of capital and the employment of labor. Many of our greatest industries are founded on inventions. It is reasonable to believe that without these inventions we should not have the industries they created.

The word invention means to many people simply a machine that reduces or wholly displaces manpower and by that reduction and displacement raises economic problems and difficulties.

This subject is too big for complete discussion here, but I can give a generalization. We are not yet blessed—or cursed—with machines that make themselves. Those now in service had to be constructed of raw materials which had to be produced and transported and fashioned to requirements. All of these processes necessitated human effort.

In short, man is prior and indispensable to the machine. You can have man without a machine, but you can never have a machine without man.

The moral which this anniversary impresses on me is that patents have put a premium on genius, and all of us have shared the gains. Every successful invention becomes a new inspiration. While that impetus continues we may count on progressive improvement in our way of life.—CONWAY P. COE, *Commissioner of Patents.*

GERM-KILLING CHEMICALS

DR. RENÉ J. DUBOS, of the Hospital of the Rockefeller Institute for Medical Research, predicted at the meeting in Cleveland of the American College of Physicians that chemical curing of disease, widely practised since the discovery of sulfanilamide, can develop along rational and presumably more effective lines as a result of discovery of the most powerful known germ-killing chemicals, substances produced by bacteria that live in the soil.

For his discovery of potent germ-killers produced by soil bacteria, Dr. Dubos received at this meeting the John Phillips Memorial Award of the College.

The new germ-killing chemicals can protect mice against pneumonia and against streptococcus infection, but it may be many years before they are ready for use in treating human patients. In the test-tube, the soil bacteria chemicals can kill pneumonia germs, streptococci, staphylococci, diphtheria bacilli and numerous other dangerous germs. One of the chemicals, gramacidin, is so powerful that less than one grain of it (0.002 milligrams) can protect a mouse against 10,000 fatal doses of pneumonia germs or streptococci.

While the soil bacteria chemicals are potent killers of one class of germs, called Gram positive, they are less effective against the Gram negative class of germs to which belong the gonococci and meningococci. For dealing with the general problem of antisepsis, it is important that the differences between these two classes of germs which make them respond differently to Gram's stain and to the new chemicals should be understood. Meanwhile, chemical studies now in progress of the structure of the new germ-killers from soil bacteria may "suggest new lines of investigation for the development of chemotherapy on a rational basis."—JANE STAFFORD.

A NEW B VITAMIN AND PERNICIOUS ANEMIA

AT the Cleveland meeting of the American College of Physicians it was stated that investigators are on the trail of a new B vitamin, an unknown substance in yeast which cures pernicious anemia in some cases.

Uses of the new, still unidentified B vitamin came out at a clinic on pernicious anemia held at the Cleveland Clinic. Discovery of the new substance was made by Drs. M. M. Wintrobe and Arnold R. Rich, of the Johns Hopkins University, who experimented with swine. The fact that yeast extract will cure some cases of pernicious anemia in man was mentioned by Dr. C. P. Rhoads, of Memorial Hospital, New York City, although he emphasized that he was not responsible for its discovery.

Pernicious anemia, it was explained, is due to lack of a dietary factor plus lack of a substance present in normal stomachs. Neither of these alone cures the disease, but the combination, found in liver, does. If the anemia is due only to lack of the diet factor, as in somes cases of the tropical disease, sprue, the unknown substance in yeast will effect a cure. Investigations are being made to determine what this anemia-curing substance, chemically unlike other parts of the B vitamin, is.

The dangers and benefits of sulfamethylthiazole, the new chemical remedy related to sulfanilamide, and other new chemical remedies including synthetic sex hormones and the new epilepsy drug, dilatin, were discussed.

Sulfamethylthiazole appears to be easier on the kidneys than sulfapyridine, the older pneumonia remedy, but is reported to have caused some cases of multiple neurosis. This is a drawback but not a catastrophe, Dr. M. A. Blankenhorn, of Cincinnati, said, since the neuritis can be cured by vitamin B. He said that the new drug had been used in about 50 cases at his hospital without any neuritis developing. The new remedy, however, has not yet been released for general use by the federal food and drug authorities.—JANE STAFFORD.

THE VITAMIN CONTENT OF GRASS

SCIENTISTS have discovered how to put the rich vitamin content of grass into palatable foods for man, according to a report made at the Cincinnati meeting of the American Chemical Society.

W. R. Graham, G. O. Kohler and C. F. Schnabel, of the American Butter Company, Kansas City, Mo., who performed the experiments, said that their work was "the first successful scientific effort to transmit the unique properties of grass directly into human nutrition."

The vitamin content of grass leaves is much greater than the vitamin content of the four standard classes into which fruits and vegetables are divided. Grass leaves, known as cerophyl, on an equal weight basis contain 280,000 international units of vitamin A, whereas potatoes and sweet potatoes contain only 1,000 units. By the same rating tomatoes and citrus fruits contain only 2,000 units; leafy, green and yellow vegetables 12,000 units. Other fruits and vegetables contain 1,290 units on the same scale. In crucial vitamin B_1 content, grasses contain 1,300 international units, about ten times the amount obtainable from any other vegetables and fruits.

"These new grass products," the report continued, "recommend themselves as food constituents not only because of their wealth in supplying the better known vitamins but because animal assays have shown vitamin A, B, C, E, G, K, nicotinic acid, grass juice factor, B_4, B_6, R, U, and Factor W to be present in significant quantities. Recent experiments have shown that the processed product contains sufficient vitamins both known and unknown to support the normal rapid growth of laboratory animals when fed only cerophyl and water."—ROBERT D. POTTER.

THE GERM-KILLING EFFECTIVENESS OF SULFANILAMIDE

MEDICAL chemists are now matching their ingenuity against human blood. Their goal is the creation of a new type of sulfanilamide compound with double effectiveness against the germs which cause pneumonia and deadly streptococcus infections.

Drs. Ralph R. Mellon and L. E. Shinn, of the Institute of Pathology, Western Pennsylvania Hospital, Pittsburgh, told members of the American Chemical Society how the human blood has so far circumvented their efforts to increase the germ-killing effectiveness of their double-acting sulfanilamide drug.

They have the compound and know its structure. Current research is being directed toward stabilizing it, so that the patient's blood will not change its composition before it can attack the deadly germs.

It was Dr. Mellon and his research colleagues who advanced the theory which probably explains how sulfanilamide works in the human body. Experiments have shown that sulfanilamide destroys disease germs by letting them kill themselves with the hydrogen peroxide they themselves create. Ordinary living material contains catalase, a substance which has the job of destroying hydrogen peroxide as it is formed in the cells of the human body during growth. It is believed that sulfanilamide destroys catalase in the germ cells, allows them to build up an excess of germicidal hydrogen peroxide and kill themselves. Sulfanilamide is thought to be broken down by the germs into an anti-catalase and the search has been made for this new chemical. Such a substance has been found by Drs. Mellon and Shinn, but it has been discovered too that the human blood quickly breaks it down so that it can not effectively reach the germs.

Drs. Mellon and Shinn reported that they had changed the location of one of the chemical units in the complex sulfanilamide molecule and "preformed" it as the germs themselves might do. They left intact the part which the organisms convert into the anti-catalase and, at the same time, moved the new preformed part of the molecule so that much greater stability against the human blood is obtained.

So far the results have been only partially successful in this attempt to make a stable "preformed" anti-catalase, but the report states that "These findings . . . lead to the hope that it may be possible to produce prechanged sulfonamide drugs capable of reaching the infecting bacteria."—ROBERT D. POTTER.

THE MALARIA-CARRYING MOSQUITO IN BRAZIL

DR. RAYMOND B. FOSDICK, president of the Rockefeller Foundation, in his annual report, announced that a determined defense against a foreign invader, malaria-spreading gambiae mosquitoes, more to be feared than yellow fever, is being waged in Brazil with American support.

This African insect, first discovered in South America in 1930, now infests 12,000 square miles of territory. It is said to threaten all American countries, the United States included, with a catastrophe in comparison with which ordinary pestilence, conflagration and war would be but small and temporary calamities. Even penetration of yellow fever into the Orient might be a lesser evil.

The malaria-carrying mosquito was pushed back in 1939, although some 114,000 people were treated for the disease. Two thousand doctors, technicians, scouts, inspectors, guards and laborers were used in the campaign. The mosquitoes were pushed back to their central strongholds in the main river valleys and on the narrow coastal shelf. If held there during the coming rainy season, eventual eradication of the mosquitoes from the whole region may be attempted.

"The plans of the campaign against gambiae sound like the plans of an army on defense," Dr. Fosdick explained. "The frontiers of the infested region are defined by fumigation posts on all the outgoing roads. These are the forts of this new kind of Maginot Line.

"A 10-mile zone beyond the gambiae's limit of advance is to be kept non-infectible, which from the mosquito's point of view is the 'scorched earth' policy. Within this zone, as well as within the area already infected, all breeding places of the mosquito must be eliminated or treated with Paris green or other larvicide.

"The whole area is being mapped from the air so that no pools, ponds or other collections of water will be overlooked. The adult mosquitoes are being sought and killed in the houses with insecticide sprays to diminish the chances of their laying eggs and thus perpetuating the species in the region.

"Every automobile and train that leaves the infested area is being stopped, inspected and fumigated. A maritime service has been organized at points along the coast to disinfect every boat or plane bound for clean ports.

"It is war in a very real and grim sense, and, unlike other types of war, its purpose is the preservation of human life."

ITEMS

A NEW spray for killing insects, extracted from leaves of the castor bean plant, was described at a meeting in Washington of the Agricultural Chemical Association by Dr. Richard Holzcker, chemist for the Woburn Degreasing Company of New Jersey. The new insecticide is claimed to be highly effective against all kinds of insect pests, operating both as contact and stomach poison. The spray has been used in large-scale experiments, principally in Florida, for the protection of garden truck and citrus fruits. Dr. Holzcker stated that fewer sprayings were needed with the new material than with commercial sprays now in use. He said also that the castor-leaf spray appears to have a stimulating effect on the trees, hastening the ripening of the fruit. Leaves of the castor bean plant have long been known to be poisonous. They contain one of the most extremely toxic of all known compounds, said to be far more deadly than cobra venom. Hitherto, however, no attempt has been made to put it to any practical use.

DR. S. I. FRANKEL, of St. Louis, working at the State Hospital for Epileptics, Parsons, Kans., reports in the *Journal* of the American Medical Association that by use of the drug dilantin sodium, the convulsions in epilepsy are prevented and the personality of the patient treated is remarkably improved. Of 48 patients treated 39 per cent. showed entire control of the convulsions, another 39 per cent. showed little or no benefit, while 21 per cent. showed definite alleviation.

BABIES born prematurely are less able to absorb fat than their full-term brothers and sisters, and should therefore be given a "leaner mixture" in feeding, was the advice of Dr. Harry H. Gordon, of the Children's Bureau, U. S. Department of Labor, and Helen McNamara, of Cornell University Medical College. They found that a diet based on half-skimmed milk could be handled by the stomachs of prematurely born babies with more satisfactory results than one built on whole milk, with undiminished cream content.

NEW disinfectant treatments for ridding imported hides of the virus of dangerous hoof-and-mouth disease, developed in joint research by investigators of the U. S. Department of Agriculture and the University of Cincinnati, have been officially approved for use by the Bureau of Animal Industry. Because of their greater effectiveness and lower cost, it is expected that they will be widely employed. The new treatments consist of immersing the hides for 24 hours or more in a 1-to-10,000 solution of sodium bifluoride, or in a 1-to-7500 solution of sodium silicofluoride. The disinfectant treatments hitherto in use have depended mainly on corrosive sublimate, which is many times more expensive, and also has a deleterious effect on the hides. The research work was done by Dr. Adolph Eichorn, director of the Animal Disease Station of the Bureau of Animal Industry, situated at Beltsville, Md., and by Dr. Fred O'Flaherty, director, and E. E. Doherty, bacteriologist, of the leather research laboratory maintained at the University of Cincinnati by the Tanners' Council of America.