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APPROPRIATIONS FOR THE DEPARTMENT OF AGRICULTURE

THE McKellar amendments to the 1933 Agricultural Appropriation bill will be long remembered, particularly in the bureaus devoted primarily to scientific research.

Senator Kenneth McKellar, Democrat, of Tennessee, set himself to reduce appropriations for many of the department's scientific activities. He bitterly assailed all items which were labeled with particularly scientific-sounding names, and in most cases McKellar's amendments were sustained by the Senate and by the Senate and House conferees on the bill.

Among the reductions which bear Senator McKellar's name are the following: White-pine blister rust control, reduced to $69,997 from $469,997 in the House bill; foreign plant introduction, to $28,325 from $203,325; horticultural crops and diseases, to $231,560 from $1,431,560; phony peach eradication, to $32,150 from $82,150; rubber, fiber and other tropical plants, to $38,932 from $113,932; color investigations, to $15,160 from $90,160; wild plant improvement and weed control, to $42,060 from $56,260; fruit and shade tree insects, to $47,645 from $447,645; cotton insects, to $72,820 from $272,820; taxonomy of insects, to $34,930 from $234,930; pink boll-worm of cotton, to $55,400 from $430,400; gipsy and brown tail moths, to $177,880 from $577,880; Japanese beetle, to $25,000 from $375,000.

A table showing the 1932 appropriations in various agricultural bureaus devoted primarily or in part to scientific research shows the following probable line-up for 1933. Conferees on the bill have not agreed on certain of the Senate amendments to the bill at the present writing, therefore the department bureaus are unable as yet to predict what the practical results will be —that is, how the scientific personnel in the department will suffer, and so on.

	1932 Appropriations	Probable 1933 Appropriations
Office of Experiment Stations	$ 399,410	$ 294,294
Weather Bureau	4,497,720	4,164,038
Animal Industry	16,085,195	15,324,947
Dairy Industry	796,990	717,448
Plant Industry	5,839,238	4,941,094
Chemistry and Soils	1,947,201	1,825,080
Entomology	2,863,740	2,471,700
Biological Survey	2,229,170	1,756,177
Agricultural Engineering	583,840	518,690
Agricultural Economics	7,241,136	6,649,841
Home Economics	246,700	233,363
Plant Quarantine	3,747,930	2,490,125
Food and Drug Administration	1,810,228	1,716,167
Soil Erosion Investigations	330,000	289,160

THE CONQUEST OF YELLOW FEVER

YELLOW fever will claim no more martyrs among scientists seeking to conquer it, and in time it will cease to be a dread peril to missionaries, explorers, business men and the general population in tropical sections of Africa and South America, as a result of the work of a research team of the International Health Division of the Rockefeller Foundation. Immunity can at last be given to protect people against this disease as it is given to protect against smallpox, diphtheria and typhoid fever.

Announcement of a successful method of protecting against yellow fever was made by Drs. W. A. Sawyer, S. F. Kitchen and Wray Lloyd, of the Rockefeller Foundation, at the meeting of the Federation of American Societies for Experimental Biology.

When Walter Reed, aided by brave volunteers who let themselves be bitten by yellow fever-infected mosquitoes, proved the rôle of the mosquito in carrying the disease, it seemed as if the conquest of yellow fever had been made. But it had only been begun. Yellow fever was cleaned out of the United States by warfare against the yellow fever-carrying mosquito, and it has been kept out by the vigilance of the U. S. Public Health Service's quarantine officers.

It still threatens in other parts of the world, however, and investigators have continued to work for years with the deadly virus or germ that causes it, in the effort to effect its final conquest. Fully as brave as Walter Reed's volunteers are these men who have carried on silently in their laboratories and in the tropics where yellow fever raged. Within the last four years thirty-two of them contracted the disease, five of them dying.

In Dr. Sawyer's own laboratory six members of his staff contracted the fever, but fortunately recovered. From these men he obtained the serum which, when injected with yellow fever virus recovered from mice, gives immunity to the disease in man.

The work hinges on a discovery of Dr. Max Theiler, formerly of Harvard University. It had never before been possible to give yellow fever to mice, but only to monkeys. Efforts to obtain a strain of the virus from recovered monkeys for immunization purposes were unsuccessful.

Dr. Theiler found that when he injected an irritating substance into the brain of a mouse at the same time that he injected the yellow fever virus, he could produce the disease in the mouse. When Dr. Sawyer heard about this he at once sent for Dr. Theiler to assist with the experiments he was conducting in laboratories provided by the Rockefeller Institute in a desperate effort to find a way of checking the disease that was taking such a dreadful toll of scientists and others.

Yellow fever virus from monkeys that have had the disease is too virulent to be used for immunization, but the mouse virus has been successfully weakened by passing it through two hundred mice. This weakened serum is then given together with serum from patients recovered from yellow fever. The two together give protection against the disease. The six members of Dr. Sawyer's staff who had contracted yellow fever in the course of their work furnished the serum for the first immuniza-

tions, but Dr. Sawyer finds that it is possible to use serum from the immunized persons also.

It is now ten months since the first human beings were immunized in this way. By tests of their serum on mice, Dr. Sawyer finds that they still are immune. He has been able to test the serum of one of the original Walter Reed volunteers, and finds him also still immune, after thirty years.

The Rockefeller research team hopes that the immunity they are now giving will be equally lasting. It takes about seven to twenty-one days for the immunization to become effective. At the end of a year, they plan to re-test the sixteen persons immunized in their laboratories to see how much protection they will still have against the disease.

Sealed in glass tubes and frozen, some of the immunizing material was sent to Nigeria, in Africa, and to Brazil, where it was used successfully to immunize three other men. As yet not enough material has been produced to immunize large groups of populations, but some is already available for scientists, explorers, educators, missionaries, etc., going to yellow fever countries.

FUNCTIONS OF THE ADRENAL GLANDS

THE chief function of the vital adrenal glands is to regulate the body's use of sugar, Dr. S. W. Britton, of the University of Virginia Medical School, stated at the final session of the Federation of American Societies for Experimental Biology at Philadelphia.

These glands secrete two very powerful hormones: the familiar adrenalin, and cortin, which is now saving the lives of patients suffering from the once fatal Addison's disease. The part of the gland that secretes cortin is necessary to life. Dr. Britton thinks that it is through its control of the sugar metabolism that the cortex of these glands exerts its vital influence.

The sugar in the blood and the muscles and that stored in the liver is markedly decreased in amount when the adrenal glands are removed. In fact, removing the pancreas, which contains the insulin-secreting islands of Langerhans, and the liver, principal sugar storage organ, has no more critical effect on the sugar situation in the body than removing the adrenal glands, Dr. Britton said.

When the cortico-adrenal extract prepared by the method of Drs. Swingle and Pfiffner, of Princeton University, is given to animals whose adrenal glands have been removed, the animals recover, apparently through restoration of the normal sugar values in the body. Soon after giving the extract, the blood sugar returned to normal and even rose above the normal amount, at the same time that general symptoms of adrenal insufficiency disappeared. Cortico-adrenal extract also was found to increase the amount of sugar in blood, muscles and liver in normal animals.

Another group of investigators who produced an extract of adrenal gland cortex, Drs. Frank A. Hartman, Katharine A. Brownell and Julia E. Lockwood, of the University of Buffalo, reported experiments showing that the extract is necessary for the activity of various tissues of the body. This extract helps animals and men suffering from adrenal gland deficiency to resist fatigue, toxins and cold, and gives the human patients an increased sense of well-being.

At the same session, Dr. C. H. Greene, of the Mayo Clinic, told of the use of the cortical hormone in the treatment of Addison's disease. He and Dr. L. G. Rountree have been making a careful study of 72 patients who have been getting this treatment for two years.

The substance in liver effective in treating pernicious anemia is either absent from or present in low concentrations in the liver of the patient suffering from pernicious anemia, Drs. A. C. Ivy, O. Richter and M. S. Kim, of Northwestern University Medical School, reported. When liver extract is given to pernicious anemia patients, the patients' livers become saturated quite rapidly with the active substance.

The Northwestern University investigators were able to make these discoveries, which bear importantly on the cause of the disease, as the result of an unusual opportunity in which they had human liver extracts, from patients who had received varying amounts of ordinary liver extracts, to work with. Extract made from the liver of the pernicious anemia patient who had received 42 ounces of a potent liver extract was successful in treating other pernicious anemia patients. Extract made from the liver of another patient who had received only a small amount of commercial liver extract before he died was ineffective in the treatment of pernicious anemia.

In another study, the same investigators found evidence that the substances stimulating the glands of the stomach to secrete the digestive juices may be of the nature of hormones and also of secretion-stimulating substances called secretagogues.

FEMALE SEX HORMONES

THE question whether there are many different female sex hormones, or whether there is one mother-substance giving rise to all of the recently-discovered female sex hormones, was raised as a result of reports to the Federation of American Societies for Experimental Biology. Drs. J. B. Collip, J. S. L. Browne and D. L. Thomson, of McGill University, described the hormones which they have obtained in pure crystalline form.

This hormone, called emmenin, they have obtained from human placental material and also from the kidney secretions of expectant mothers. It appears to be very similar in gross chemical structure to the hormone, theelin, already reported by Dr. E. A. Doisy and associates of St. Louis University; to trihydroxyoestrin, another female sex hormone, reported by Dr. Marrian, of University College, London, and by Dr. Butenandt, in Germany; and to a female sex hormone reported by Dr. Doehrn, of Berlin. But while these substances appear to be the same chemically, they differ somewhat in the effect they have on the animal body.

Dr. Collip and his associates reported that when their emmenin is tested on baby female rats, its potency is from ten to twenty times as great as when it is tested on the usual test animal, a castrated female rat. He raised the question whether the method of testing these hor-

mones is responsible for the different effects they are reported to produce on the body. He also asked whether one of these very hormones which are already known might not be the mother-substance, the real female sex hormone itself.

The hormone extracted by the McGill University investigators has been used to treat cases of female disorders with generally good results. It has been successful in nearly three fourths of selected cases. Dr. Collip emphasized the fact that it should only be used in certain selected cases. For instance, it would not be suitable for disorders due to cancer or cysts.

ITEMS

CARRASCO'S comet, discovered on April 25 by an astronomer of that name at Madrid, Spain, has been observed from the U. S. Naval Observatory by principal astronomer H. E. Burton. He sighted it with the observatory's 26-inch refracting telescope on the evening of April 26, shortly after word of its discovery was received from the astronomical clearing house at the Harvard College Observatory. The comet was photographed at Harvard College Observatory on April 13, an inspection of photographic plates has revealed. The comet has now been located by Heidelberg observatory, the U. S. Naval Observatory and on the Harvard photographs. It is faint and of twelfth magnitude. The observations made will allow the computation of its path from which astronomers will be able to decide whether it is likely to grow brighter.

AN earthquake of moderate severity occurred somewhere near the coast of Chile, in latitude twenty-six degrees south, at 2:55, on the morning of April 26, according to the indication of instrumental data from three seismological stations transmitted through *Science Service* and interpreted by scientists of the U. S. Coast and Geodetic Survey. The longitude could not be determined exactly from the data available, so that it is not known whether the epicenter was on land or under the ocean. The quake does not seem to have been connected in any way with the volcanoes that erupted recently, for these are several hundred miles farther south. The stations reporting were those of the Jesuit Seismological Association at St. Louis University, St. Louis, Mo.; Fordham University, New York, and Georgetown University, Washington, D. C.

MOTION pictures of the circulation of the blood vessels that nourish the heart muscle itself were shown by Drs. R. L. Stehle and K. E. Melville, of McGill University, Montreal, at the Philadelphia meeting of the Federation of American Societies for Experimental Biology. The pictures were made in connection with research into the question of whether the blood flows into these coronary vessels of the heart muscle when the blood has been pumped out of the heart chambers into the rest of the body, or when the heart is expanded to receive the blood from the body. Hardening of these coronary vessels is an important form of heart disease which scientists are trying to learn more about.

TINY flecks of hazy light around the borders of one of the most famous of the spiral nebulae, the one in the constellation Andromeda, are now believed to be great globular clusters of stars—literally swarms of suns crowded like clouds of gnats that hang over the marshes at twilight. This provisional identification was made by Dr. Edwin Hubble, of the Mount Wilson Observatory, of the Carnegie Institution of Washington, after a careful study of 140 objects. Their astronomical behavior led him to the conclusion that they are probably star clusters, similar to the easily identified clusters that belong to our own particular part of the starry universe. The Andromeda nebula is one of the most famous of these great "pinwheels of the sky," whose spiral structure can be discerned only by means of the most powerful telescopes. Although it consists of so many thousands of stars that the 140 probable clusters on its border are mere incidents of its structure, it can barely be seen as a bit of light by the naked eye. This is because it is so immensely distant from the galaxy to which our own solar system belongs. Its distance has been measured as 900,000 light-years.

HALF of the patients in hospitals for mental disease owe their illness to definite changes in the tissues of their brains brought about by chronic infections of teeth, tonsils, sinuses or digestive tract, in the opinion of Dr. Henry A. Cotton, director of research at the New Jersey State Hospital in Trenton. By eliminating the chronic infections in these patients, Dr. Cotton and associates were able to double the number of recoveries at the hospital during the last thirteen years. Two thousand instead of one thousand patients recovered during that period. Incidentally the state saved, for at least six years, $1,000 a day for the maintenance of these patients, leaving out of consideration the large amount saved in cost of construction of a new building to care for that number of patients. In order to prevent the occurrence of mental disorders as well as many physical disorders Dr. Cotton advocates searching for and cleaning up chronic infections in children between the ages of twelve and fifteen.

A NEW kind of copper has been discovered by Professor Edna R. Bishop, of the Alabama Experiment Station, in a further application of the magneto-optic method of analysis which was recently used in the discovery of the new chemical elements virginium and alabamine. Professor Bishop was herself one of the discoverers of the new element alabamine. The new copper is an isotope differing only in weight from the usual type of copper atoms. Isotopes of weights 65 and 63 had already been discovered by Professor F. W. Aston, of Cambridge University, England. Analyses of copper salts from various sources and of different combining powers have all now shown a third isotope in the Allison apparatus. It is not yet possible to say what is the weight of the new kind of copper atom beyond the fact that it is less than 63. This discovery fits the prediction by Professor Harold C. Urey, of Columbia University, of a new copper isotope of weight 61.