SCIENCE NEWS

Science Service, Washington, D. C.

NEW HORMONES FROM THE PITUITARY GLAND

NEW hormones from the pituitary gland, some just discovered and others not yet found but predicted, were described at the Congress of American Physicians and Surgeons at the recent Washington meeting.

One of these new hormones is an entirely new substance, different from any other obtained from the pituitary gland, according to an announcement made by Dr. Herbert M. Evans, who is working at the Rockefeller Institute, New York City. This substance greatly increases the effect of one of the female sex hormones and apparently has a sex-stimulating effect of its own. But it is so new that Dr. Evans was not yet ready to discuss its significance. Another new pituitary hormone apparently presides over the vitally important cortex of the adrenal glands.

When the pituitary, by a very delicate operation, is removed from its protected location in the center of the head, the cortex of the adrenal gland wastes away. Without this part of the adrenal gland, or the hormone it produces, cortin, life can not go on. A certain extract of the pituitary gland, however, restores to normal the adrenal cortex that had wasted away upon removal of the pituitary gland.

Dr. Evans stated that if the research of the next few months shows this pituitary extract to be distinct from all the other pituitary hormones, it will be the new adrenalotropic hormone of the pituitary. The relation of this pituitary-adrenal situation to the adrenal cortical hormone essential for life is not yet clear.

Another dramatic development of the anterior pituitary story is the relation between this gland and the body's use of sugar. Dr. B. A. Houssay, of Buenos Aires, showed that the death which usually occurs soon after the pancreas is removed either can be prevented or averted for a long time if the pituitary gland is removed at the same time as the pancreas. The latter organ is the one that contains the insulin-producing islands of Langerhans. When this organ does not produce enough insulin, diabetes follows.

Now Dr. Evans and his associates at the University of California have found that a true diabetes can be produced in dogs merely by giving them a certain extract of the pituitary gland. This together with the work of Houssay and other investigators seems to establish the fact that there is a relation between the pituitary gland and the body's use of sugar. Dr. Evans and associates are now at work on the task of distinguishing this possible new hormone, the diabetogenic hormone, from the others of the pituitary gland.

The tendency toward the coinage of new pituitary hormones is being vigorously resisted by Dr. Evans and by other scientific workers. It would have been preferable, he said, to have considered many of the effects he described as shared by the two or three hormones now so well established as coming from this portion of the pituitary gland. At the present time four substances can be considered as separate hormones endowed with specific effects. These are the growth hormone, the gonadotropic or sex hormone, the lactogenic hormone and the thyreotropic hormone which has recently been shown to have a profound influence on the thyroid gland.

The chemistry of these pituitary hormones was discussed by Dr. J. B. Collip, of McGill University. Their application in the treatment of disease in women was discussed by Dr. Emil Novak, of the Johns Hopkins Medical School.

ONE-CELLED ANIMALS GROWN ON AN INORGANIC DIET

ANIMALS feeding and growing new generations of themselves, on a wholly inorganic diet of a type hitherto considered suitable only for plants equipped with the green synthesizing pigment chlorophyll, have been reared in the zoological laboratory of the Johns Hopkins University by Professor S. O. Mast and Dr. D. M. Pace.

The animals were the one-celled primitive species known as *Chilomonas paramecium*. They were "planted" in a sterile culture medium containing sodium acetate, ammonium chloride, magnesium sulphate and potassium phosphate. Under normal conditions the animals reproduce rapidly by division into two parts, and they usually contain relatively large quantities of starch and fat. In the culture solution they gave rise to 3.4 new generations a day. When sodium silicate was added their reproduction rate went up to 3.9 generations a day.

When the solution was made up minus the organic salt, sodium acetate, the reproduction rate went on at the same level for three or four days, but then the animals died. But in the same totally inorganic solution with a heavy increase in carbon dioxide in the air over it—20 per cent. instead of the normal .3 per cent.—growth and reproduction went on indefinitely and specimens produced were well filled with starch and fat.

A hint of the cause of death when both the acetate and the carbon dioxide were low is contained in the fact that under these conditions the individual animals are very small, containing little starch and fat. Death under these conditions is therefore probably due to starvation.

For some unknown reason, the silicate salt seems to be necessary in the all-inorganic culture solution. If it is omitted, the animal divides a few times and then dies. Silicon is not usually an indispensable element to either plants or animals. The Johns Hopkins investigators suggest that in this case it probably acts as a catalyst, that is, as an agent for producing chemical transformations without itself taking part in them.

The results obtained, they state in conclusion, indicate that only eight chemical elements are necessary: nitrogen, carbon, hydrogen, oxygen, potassium, magnesium, phosphorus and sulphur. But they hold that traces of a number of other elements are probably also necessary.

THE PRODUCTION OF HELIUM

CHEMICAL evidence of the production of helium gas from paraffin and similar carbon-hydrogen compounds, by bombardment with the mixed radiation from thorium is adduced by Professor Fritz Paneth and his associate, Dr. P. L. Günther, of the University of Königsberg, and reported in a letter to *Nature*. The rays given off by thorium B and thorium C themselves contain some helium in the form of alpha particles, but after passing through paraffin, there is a surplus of helium amounting sometimes to 1000 per cent.

Helium is one of the "rare" gases, although it is now used to fill airships. It is at present obtained mostly from natural gas in America, which country has practically a monopoly on its production.

A practical method for the manufacture of helium would be of great commercial value, but the method described by Professor Paneth and his associate can not as yet be used for this purpose. The amounts they obtained were very small and were detected only by improved methods of analysis.

Nevertheless, their experiments are extremely important because this is the first indication that the transmutation of elements may be effected in amounts large enough to be chemically detectable. Until now, proofs of artificial transmutation depended upon the physical detection of single atomic destructions, observed as scintillations, or by electrical methods. Only when the new atoms formed were expelled with a large amount of energy could the transmutation be detected by these physical methods.

SOUND WAVES AND MOLECULES

RECENT investigations carried out in the University of California at Los Angeles suggest that the excessive absorption of sound in air of certain humidities is due to collisions between oxygen and water molecules. Professor Vern O. Knudsen described, at the recent meeting of the Acoustical Society of America, the Los Angeles experiments, in which Dr. H. O. Kneser, visiting physicist from the University of Marburg, cooperated.

Sound travels freely through chemically dried air, particularly at low temperatures, according to the electrical recording instruments of the California laboratory. Perhaps this accounts for the common opinion that audibility is keen on a clear, cold night. The introduction of small quantities of moisture promptly damps off the sound, especially tones of high pitch. Peculiarly, this phenomenon does not occur when pure nitrogen is substituted for the air, in spite of the fact that air is nearly 80 per cent. nitrogen. A shift to pure oxygen in the experiment reveals this latter gas as the guilty party. But oxygen alone is rather ineffective. Water vapor must also be present to affect the sound waves.

Drs. Knudsen and Kneser find their experimental records in agreement with the theory that the water molecules catalyze, or inspire oxygen molecules to pick up sound waves, convert them into heat or other motion, and thus destroy the sound. The extent to which all this occurs varies greatly with the frequency or pitch of the sound. Peculiar results may thus turn up. For example, the consonants in spoken words, which in general are of high frequency, are damped off more than the vowels of low pitch. Or in the symphony orchestra concert, if the humidity is at a certain value—not too high or too low—the message from the piccolo gets lost before it gets to the rear of the hall. Thus arises one more good argument for the new art of air-conditioning in public buildings.

More important, possibly, than the acoustic applications lies the possibility of interpreting molecular chemical reactions from the behavior of sound waves. Heretofore the vibrational responses of atoms have been supposed to require the enormous frequency values of light—whence the modern science of spectroscopy. Now it appears that even sound waves, counting but a few score or a few hundred per second, have a definite relation to intra-molecular forces. Preliminary experiments by Dr. Knudsen on ammonia, hydrogen sulfide and other gases show decided variations in behavior of the different chemical species. Thus we have a new mode of attack on the age-old mystery of molecular composition and the behavior of objects too small to be seen individually.

THE WINTER WHEAT CROP

WINTER wheat in the United States will be a short crop this year, according to the U. S. Crop Report for May. The estimated yield will be 337,485,000 bushels, as compared with 464,151,000 bushels in 1932, and a yearly average of 539,436,000 for the five-year period 1926–1930. This represents a decrease of 27 per cent. from the 1932 figure, and of 43 per cent. from the five-year average.

This is due partly to a decrease in total acreage and partly to a decline in yield per acre. This year's crop will come from 27,096,000 acres, as compared with 33,656,000 acres in 1932 and 28,560,000 acres for the 1926–1930 period. The yield per acre is expected to be 12.5 bushels, as against 13.7 for 1932 and 14.7 for the five-year average.

Figures for spring wheat are still fragmentary, because the wet spring has interfered with sowing. The spring wheat crop may also be below average in both acreage and per-acre yield. Foreign winter wheat acreage in 24 northern hemisphere countries is reported as slightly below last year's sowings, though a little above the 1931 figures. However, inasmuch as Russian wheat plantings are still largely an uncertain quantity, nothing very definite can be forecast about foreign wheat production.

The Food Research Institute at Stanford University has been conducting a survey of the wheat situation, and has a report in preparation which will be issued within a few days.

GORILLA WITH AN EXCEPTIONAL BRAIN

WHAT appears to be in many respects the "best" animal brain ever studied has recently been given an exhaustive examination by Dr. C. J. Connolly, of the department of psychology of the Catholic University of

America. His report was made to the Smithsonian Institution.

The brain studied by Dr. Connolly is that of a three-year-old mountain gorilla, which died in the National Zoological Park a few months ago. It was turned over to Dr. Connolly because he has made a specialty of comparative cerebral anatomy.

The brain of this little gorilla, which weighed only forty pounds at his prime, was larger than the brains of many adult gorillas which have been studied, and indeed is one of the largest great-ape brains on record, in spite of its late owner's extreme youth. It is the first brain of a mountain gorilla studied in detail; all other gorilla brains which have been examined were those of the coast gorilla subspecies.

The brain weighed 466.6 grams, a little over a pound. The average weight of the brains of six adult female coast gorillas reported by Dr. Connolly was 379.3 grams, about three quarters of a pound. The average brain weight of three young male coast gorillas, comparable in age, was only 318.3 grams.

If the gorilla's brain grows at the same rate as that of a human being, this baby mountain gorilla, had he lived, would eventually have had a brain weighing more than 600 grams. The lightest normal human brain weighs about 1,100 grams. If the assumption of an eventual 600-gram adult brain-weight for the male mountain gorilla is correct, this represents substantially more than half the human brain-weight; and hitherto apes have been allowed less than half. The mountain gorilla may therefore set a new record for animal brains.

However, Dr. Connolly points out that this estimate may be upset by other factors; it is even possible, he says, that the little three-year-old gorilla may have had as heavy a brain as he would ever have possessed had he lived to full growth.

The brain is described as "typically anthropoid." The cerebellum, which is concerned with balance and muscular coordination in general, is relatively massive, as in all ape brains. The cerebrum, where the higher sense organs have their centers, and which seems to be the seat of consciousness and thinking, has a relatively high development, distinctly in advance of the coast gorilla brains examined. Dr. Connolly found a rich pattern of convolutions, especially in the frontal lobe, which some authorities believe most closely associated with intelligence.

In spite of his seemingly exceptional brain, however, the gorilla was in life no ape genius. His movements were deliberate, and even clumsy. He always seemed, said Director William Mann, of the National Zoological Park, "just a normal gorilla."

ITEMS

IF we could see the earth from a distance out in the heavens it would appear as a bluish planet, Professor V. M. Slipher, of Lowell Observatory, Flagstaff, Arizona, stated in the George Darwin lecture delivered in London before the Royal Astronomical Society. The gold medal of this leading astronomical organization was presented to Professor Slipher in the presence of a distinguished scientific audience that included Dr. Willem de Sitter, Sir Arthur Eddington and Sir James Jeans. Professor F. J. M. Stratton, president, made the presentation. The blueness of the earth was determined by Professor Slipher from spectrograms made photographically of the earthshine on the moon. Light from the earth was reflected by the moon back to Professor Slipher's delicate instruments. Pluto, the most recent of the planets to be discovered, which was found at Lowell Observatory, is a reddish planet which is brighter to the eye than it is on a photographic plate.

COSMIC rays smash into the atmosphere of Mexico City with more intensity from the west than from the east, Dr. Thomas H. Johnson, of the Bartol Research Foundation, has found in the course of an expedition arranged with the cooperation of the Carnegie Institution of Washington. His experimental results presented to the American Physical Society on Dr. Johnson's behalf by Dr. W. F. G. Swann, director of the Bartol Research Foundation, uphold the idea that cosmic rays are composed principally of positively charged corpuscles or particles. With three cosmic ray counters arranged in line so that a record was made only when all three were coincidentally discharged by cosmic radiation, Dr. Johnson pointed his instrument at various elevations. Comparing the intensities of cosmic radiation on the east and west sides of the magnetic meridian of Mexico City, percentage differences were found between east and west ranging from 1 per cent. at 25 degrees distance from the zenith to 25 per cent. at 65 degrees distance to the zenith. "These results are just those to be expected on the basis of the theory of the latitude variations of Lemaitre and Vallarta," Dr. Swann explained, "and they show that the principal corpuscular component of the primary cosmic radiation is positively charged."

COAL is now being mined with a saw instead of being broken loose with explosives. The development of the coal saw to its present highly practical state has improved quality and value of coal, according to C. D. McLaughlin, superintendent of the Pioneer Coal Company, speaking before the American Mining Congress. It has also improved working conditions and safety in mines without any change in organization and supervision, and without displacement of labor. Large lump coal that stands handling and transportation well results from saw mining.

PIGMY chimpanzees, constituting an animal race entirely new to science, were described before the meeting of the American Society of Mammalogists by Harold J. Coolidge, Jr., of the Museum of Comparative Anatomy, Harvard University. The species, known zoologically as *Pan paniscus*, is found south of the Congo River in Africa. It is the smallest chimpanzee in the world, and is characterized by small teeth, close-set eyes, small, almost covered ears and narrow back and shoulders. The only specimen thus far brought to this country is in the American Museum of Natural History, New York City.