SCIENCE NEWS

Science Service, Washington, D. C.

POWER FROM THE NUCLEUS OF THE ATOM

WHILE science sees no immediate way in which power directly from the atom nucleus can be turned to useful and practical purposes it is "probable" that applications of existing knowledge to this goal will come within the lifetime of persons now living. This prediction, with its startling implications, was made by Professor E. O. Lawrence, of the University of California, in the commencement address of the Stevens Institute of Technology. Professor Lawrence has the world's most powerful atom-smashing cyclotron equipment in his radiation laboratory, and he and his students have transmuted most of the chemical elements known to man from one form to another. He said:

"But whether it will be possible to release subatomic energy on a practical and profitable basis for industrial purposes, whether perhaps it will be possible to realize conditions on this earth similar to those in the sun, is the question which of course interests the engineer. Indeed, it is a question of interest to every one and accordingly it has been the subject of much popular discussion and speculation. But speculation is hardly more than a game of fortune-telling and this is out of place here. It is only of interest to indicate the present state of knowledge with proper humility, with recognition that what the future holds forth only the future can tell. In this spirit I would say at this time that although we now know that matter can be converted into energy, we do not see any greater prospect of destroying nuclear matter for power purposes than of cooling the ocean to freezing temperatures and converting the heat released into profitable work. It does seem that the same considerations of the second law of thermodynamics govern the availability of energy in the hearts of atoms as in the Atlantic Ocean itself.

"Although I can not encourage the view that some day you will be running power plants by the release of subatomic energy, that you will be using the nuclei of atoms as fuel, I do not wish to emphasize that the establishment of the great principle of the equivalence of mass and energy is none the less of great practical importance. It is probable that in your lifetime and in mine this great principle will play a vital rôle in technical developments which you and I at the moment are not even dreaming of —for such has been the history of science."

THE FOURTEENTH ANNUAL COLLOID SYMPOSIUM

AT the fourteenth Annual Colloid Symposium of the American Chemical Society, held at the University of Minnesota, studies reported by Professor Ernst A. Hauser, H. E. Edgerton and W. B. Tucker, of the Massachusetts Institute of Technology, with a high-speed camera, showed that the basis of better cleaning with a weak soap solution rather than a strong solution is the formation of drops of a liquid and the accompanying phenomenon of surface tension. Ingenious silhouette pictures of falling drops were shown which reveal facts having applications in dyeing, tanning and other practical matters beside the washing behavior of soap in solution.

A tiny drum whirling in egg albumin is one of the new techniques used to measure the thickness of protein films, such as constitute the walls of the cells of living matter. Films only 86 billionths of a centimeter thick can be measured, according to the report of Dr. Henry B. Bull, of the Northwestern University Medical School. The drum, of exactly known dimensions, builds up a film at a known rate. The volume of protein film is calculated and divided by the total area of the drum to obtain the thickness of the film.

Drs. Arthur H. Sanford and Douglas B. Roxburgh, of the Mayo Clinic, stated that while it has been known that the proteins in the cerebro-spinal fluid reacted with colloidal gold solutions to cause a precipitation, the fundamental basis for this diagnostic reaction was unknown. The Mayo studies with synthetic spinal fluids that were pure and made from the three proteins in the spinal fluid (albumin, pseudoglobulin and euglobulin) gave the same color reactions as did natural spinal fluid. With the synthetic spinal fluids Drs. Sanford and Roxburgh were able to show that the diagnosis for mental disease by the gold colloid method depended on the delicate balance in the proportions of the spinal proteins present. Any increase in these, or in their various proportions, that may accompany the disease shows up in the changed color reaction.

THE ST. LOUIS MEETING OF THE SEISMOLOGICAL SOCIETY OF AMERICA

WILL the 41,518,125,000 tons of water backed up into Lake Mead by Boulder Dam cause earthquakes? This question was raised before a meeting in St. Louis of the Seismological Society of America by R. R. Bodle, of the U. S. Coast and Geodetic Survey. The Colorado River in its lower course flows through a region where many violent earthquakes have occurred in the past, some of them comparatively recently. Scientific men have wondered whether the vast weight of water that will be concentrated along the 115 miles of Lake Mead will put sufficient additional strain on the crustal rock layers to set off disturbances. Mr. Bodle has devoted much study to the question, but stated that the data available are not sufficient to justify a positive answer one way or the other. He suggested that several seismograph stations be set up in the region, so that a better informed watch over the earth's movements may be maintained.

Machine-made indoor earthquakes were used at the Massachusetts Institute of Technology to test instruments intended for use in earthquake regions, called accelerometers. They are so designed that they remain "asleep" until a strong earthquake wakes them up. Then they go into action and write a curve that records what happens. The accelerometers were tested on a

"shaking table," which is a platform so mounted that it can be moved back and forth in any horizontal direction, giving a very fair imitation of an earthquake. The tests were made by H. E. McComb, of the U. S. Coast and Geodetic Survey, and A. C. Ruge, of the institute. The records thus obtained will be useful for comparison with records made by the same instruments when they go through a real earthquake.

Earthquake science, or seismology, has a number of practical aspects, and research in it must be pursued without let up because of the importance of certain unsolved problems. This was indicated in an address by Captain N. H. Heck, of the U. S. Coast and Geodetic Survey. Some companies refuse to write insurance in regions with an earthquake history. Insurance rates are always calculated on the statistical chances of a certain type of trouble happening at a given definite place within a unit time period. But although it is possible to say that earthquakes are likely to happen in a given general region, say the Andes or southern Italy, it is impossible to pin them to a definite locality, say Lima or Naples. And guessing at time is even worse; it is absolutely impossible to make an honest and accurate time-forecast of an earthquake. Nevertheless, the data accumulated by earthquake research even now has value in practical affairs. Knowledge that a region is "seismic," that sooner or later a severe earthquake is likely to occur, enables government officers and Red Cross workers to concentrate durable relief supplies at strategic transportation centers and to formulate "plans of battle" to go into effect when the attack comes. Study of instruments and of skyscraper models set up on "shaking tables" in engineering laboratories have enabled architects to correct certain weaknesses in specifications for buildings to be erected in earthquake regions. These researches are still in active progress, so that further advances may be expected.

THE "LANGUAGE" OF THE GIBBON

THE first photograph records of the "language" of the gibbon, key animal in the evolution of man, have been made this spring in the mountain forests of northern Siam by an expedition from Harvard University, the Johns Hopkins University and Bard College.

They are expected to constitute one of the more important aspects of the expedition's first-hand study of the natural behavior and physical character of the Asiatic anthropoids. From the expedition as a whole the group hopes to glean important new clues to man's early development and the jungle origins of his social systems that will aid in unraveling some of the more puzzling problems of human evolution.

To this end the seven American investigators comprising the party are applying modern psychology, sociology and anatomy to their examination of the gibbon's home life, testing primarily the position of the gibbon on the family tree of the anthropoid apes and even on man. Similar to man physically, the gibbon is gregarious and monogamous as well, facts that lead authorities to believe that in his natural habitat they may find traces of the origins of man's most firmly established institutions, his family and group life.

According to Harold J. Coolidge, Jr., of the Harvard Museum of Comparative Zoology, leader of the group, despite numerous difficulties, including a brush fire that nearly wiped out the base camp on Mt. Angka, investigations have thus far been very successful. It left this country in January and has been in the field since March.

Judicious use of blinds and screens have enabled the scientists to approach within close range of the animals without disturbing them. Detailed photographs of their activities have been obtained in addition to the pioneer phonograph records. These records are unusually clear and are so accurate that when they were played back to the gibbons, the animals responded immediately, varying their reactions as each new call came from the loudspeaker. The expedition hopes to continue these valuable recordings until a complete catalogue of all the major vocal patterns of the gibbon is obtained.

Dr. C. R. Carpenter, of Bard College, who made the recordings, has also conducted detailed observations of sixteen family groups of wild gibbons as well as a dozen captive animals in the camp. Other members of the party, assisted by native hunters, have collected a series of gibbons for study of anatomical and morphological problems. Some of these specimens were obtained in prenatal stages and are expected to be especially valuable in comparative embryology.

Dr. Carpenter is still in Siam and will remain there until the rainy season sets in in July, but the rest of the group have now gone to British North Borneo to study orang-utans, gibbons and proboscis monkeys. Members of this group are Professor Adolph H. Schultz, of the Johns Hopkins University; Sherwood H. Washburn, of Cambridge; J. A. Griswold, of the Harvard Museum; Andrew Wylie, of Washington, and John T. Coolidge, of Milton, Mass., photographer. Various members will later visit Java and Sumatra.

Cooperatively financed by the Carnegie Institution, the Milton and Sheldon funds of Harvard, the Columbia University Council for Research in the Social Sciences, and from several private donations, the studies are expected to provide a much-needed control for laboratory observations made of these animals. Thus the expedition will play an important part in a comprehensive research calling for comparative studies to interpret man's social and physical evolution and those of other important primates.

PRONTOSIL

PRONTOSIL, the new chemical remedy that has already saved thousands of lives and promises to conquer four of mankind's major germ enemies, and its chemical relative, sulfanilamide, were discussed at the meeting of the American Medical Association at Atlantic City. The latest disease to be treated with sulfanilamide is pyelitis, serious and troublesome urinary tract infection for which there has hitherto been no very successful treatment. Cases of pyelitis which were completely cleared up by treatment with sulfanilamide were reported by Dr. Henry F. Helmholz, of the Mayo Clinic, Rochester, Minn. This

was the first report of the use of the new chemical remedy for this disease. Dr. Helmholz was to have reported results of treatment with mandelic acid, but his results with sulfanilamide were so much better and so spectacular that he made a last-minute change in his paper in order to report the sulfanilamide treatment.

Meningitis, including the particularly deadly variety due to streptococcus infection of the brain membranes, as well as pneumonia, gonorrhea, childbed fever and other diseases caused by streptococcus infection, all yield to treatment with sulfanilamide or Prontosil. Reports of hundreds of similar cases are now ready for publication in the *Journal* of the American Medical Association, according to the editor, Dr. Morris Fishbein.

The chemical is not an antiseptic and does not kill the disease germs. Its action apparently is to keep the germs from growing and multiplying in the patient's body. The body's own fighting forces are consequently able to overcome the infection, and the patient recovers. Sulfanilamide is apparently particularly effective in checking the growth of the round germs of the great "coccus" family. These include streptococci, pneumococci, meningococci and gonococci. These bacteria are the causes of Type III pneumonia, for which there has been no such satisfactory serum treatment as there is in Types II and I; streptococci meningitis, which up to now has always been fatal; gonorrhea, for which there has never been the specific treatment that there is for syphilis; childbed fever, which has killed thousands of mothers every year in spite of all efforts to check it; and the distressing and painful disease erysipelas. All have now been successfully treated by sulfanilamide or Prontosil.

This new chemical remedy was developed by a German chemist, A. Domagk. It was first brought to the attention of physicians generally by the English physicians, Leonard Colebrooke and Meave Kenny. Its first use in the United States was by Drs. Perrin Long and Eleanor Bliss, of the Johns Hopkins University. Drs. Bliss and Long described the precautions necessary in the use of the remedy.—JANE STAFFORD.

THE EFFECT OF VITAMIN B_1 ON BONES

A VITAMIN discovery that sheds new light on gout and may prove a remedy for that ailment was reported by Dr. Martin G. Vorhaus, of New York, before the meeting of the American Medical Association. Cases of this disease were improved by doses of vitamin B_1. Pain and swelling disappear, and even more striking, x-ray pictures of the affected joints show that new bone tissue is apparently formed. Dr. Vorhaus pointed out that this is the first time that any one has ever discovered any effect of vitamin B_1 on bones. Hitherto this vitamin was known only to affect nerves and the utilization of sugar. The discovery of its effect on bones is so new that Dr. Vorhaus and his associates have not yet decided exactly what is the relation between the vitamin and bones. They are reporting sixteen cases observed for longer than three months in order to stimulate others to investigate the problem.

The discovery was made accidentally in treating neuritis with this vitamin, which is sometimes called the anti-beriberi vitamin because lack of it causes the oriental nervous disease known as beriberi. Some of the neuritis patients, instead of being helped by the vitamin as others had been, experienced severe reactions and were for a time much worse. The uric acid content of their blood rose, and this discovery led Dr. Vorhaus to continue the vitamin treatment in order to learn why the vitamin produced this effect. It turned out that all the patients had gout along with the neuritis, though the gout had not been suspected until its symptoms became acute after the vitamin dosage. With more vitamin dosage, the patients improved greatly, and the uric acid content of the blood dropped back to normal.—JANE STAFFORD.

ITEMS

THE prickly pear, considered a public nuisance in India because of its prevalence, is now being used to create a combustible gas having a heating value nearly half as great as ordinary coal gas. Two chemists, B. S. Shrikantan and S. Rangachari, of the Andhra University, are now "cracking" the dried plants to obtain its combustible gases. This means that it is possible to secure a gas almost half as efficient as coal gas whose heating value is generally considered to be about 5,700 calories per cubic meter.

THE enormous bulge in the earth that has its crest in the Himalaya Mountains is responsible for the terrific earthquakes that sometimes rock interior Asia, according to Professor D. Mushketov, of the Leningrad Mining Institute, after extensive expeditions in which thousands of observations were taken. The deep-seated forces pushed up the crust of the earth in this region as a man in bed pushes up the covers with his knees. Like the covers pulled over the knees, the thick blankets of rock are under tension. They give way from time to time, and that starts the earthquakes. Accurate measurements made by Professor Mushketov show that in the Pamir region the curvature of the earth is much in excess of the average curvature of the earth as a whole.

SOVIET aviation engineers are pushing to completion a semi-rigid passenger airship an eighth of the size of the *Hindenburg*. They are planning to inflate it with helium obtained from natural gas wells in the central districts of the USSR. Construction of a plant for the extraction of helium will begin this year. Prospecting has revealed more gas wells carrying helium in other parts of the union. The new airship will have a volume of 880,000 cubic feet (25,000 cu. meters). It will contain sleeping accommodations for sixteen people, salon, buffet and smoking room.

BY dropping steel balls through holes in a steel plate, investigators at Queens College, Ont., are testing the theory of probability by actual experiment. The idea is to see how many of the balls will pass through the plate without touching the sides of any of the holes. Theory says that the probability of this happening should be .3554. For the first half million balls dropped, 177,785 of them passed through without touching which yields .35557 by experiment.