SCIENCE NEWS

GRAVITATION AND MAGNETISM

Science Service

IF Einstein in his latest work has connected gravitational force and the electro-magnetic field of the earth by a mathematical relationship, he has accomplished a very difficult thing in the opinion of American scientists.

Dr. Louis A. Bauer, director of the department of terrestrial magnetism of the Carnegie Institution of Washington, considered the cabled announcements of Einstein's new achievement too meager for comment, but he said to a Science Service representative that he and Einstein discussed such problems when Einstein lectured at Princeton in 1921.

For many years Dr. Bauer and his staff of experts have made the magnetism of the earth and the electricity of the atmosphere their special study. As a result they find that the earth's magnetic and electric fields change markedly at relatively short intervals in a more or less systematic manner. In an adequate discussion of the cause of the earth's magnetism, Dr. Bauer states that it is necessary to take into account both the marked geographical variations in the intensity of the magnetic field, as well as the comparatively large changes from year to year. Thus Dr. Bauer finds that at the equator the intensity of magnetization is about seventeen per cent. greater than at parallels 60 degrees north or south. He further states that the earth's magnetic moment, or its intensity of magnetization, has been diminishing during the past forty years at an average rate per annum of about one thousandth part, or one tenth of a per cent., but it can not be stated at present how long this diminution may continue or whether at some future time an increase may not take place.

As the result of its accumulated data, and its theoretical and experimental investigations, the department of terrestrial magnetism has at present the most complete information for testing any theory concerning the cause of the earth's magnetism.

Gravitation, the force that holds everything to earth and gives everything its weight, varies only by exceedingly small amounts at different parts of the earth, and no such large regular variations with time have been found as in the case of magnetism. The Einstein mathematical relation must take into account these differences betweeen magnetism and gravitation. Dr. Bauer states, however, that the relation may be of such a character so that if, for example, the earth's intensity of magnetization diminishes at the average rate of one thousandth part per annum, as above stated, the earth's gravitational force may change annually only by the square of one thousandth part, or one millionth part—a quantity too small to be readily detected with the appliances at present in use for measuring gravity.

The statement of Einstein that he owes the basis of his new theory to Professor A. S. Eddington, director of the University of Cambridge Observatory, England, is especially interesting, for it was Eddington who first made Einstein known to the English-speaking world by his "Report on the relativity theory of gravitation" in 1918. After the memorable eclipse of May 29, 1919, it will be recalled that the astronomer royal of England, Sir Frank Dyson, and Professor Eddington, announced the confirmation of the predicted amount of deflection of the rays of light passing through the sun's gravitational field, as called for by the Einstein relativity theory. The scientific world is now awaiting with eagerness to learn if the results of the British astronomers are substantiated by the eclipse expedition that was sent from the Lick Observatory, under the charge of the director, Professor W. W. Campbell, to Australia last September.

THE ORIGIN OF LIFE

Science Service

THE production of typical organic compounds, such as are found in green leaves, through the action of ultra-violet light upon air, water and carbon dioxide, was announced by Dr. Oskar Baudisch to the American Chemical Society on April 4, as a process which is believed to give a clue to the origin of life on the earth.

The first step was the formation of an unstable substance called formaldoxime which in the presence of sunlight unites with formaldehyde to form more complicated organic products. Formaldehyde may be made directly from carbon dioxide and water by the action of light. Formaldoxime has the property of uniting with iron and some other metals to form substances in which the metallic character of the iron is masked by the organic character of the compound.

Dr. Baudisch suggested that since iron and magnesium were foremost in the processes of the chemistry of living things, iron being present in the red corpuscles of the blood of all the higher animals, while magnesium is present in chlorophyll, the green coloring matter of leaves, this power of ultra-violet light to build up organic

compounds which will unite with these metals may give a hint as to how life first came to exist.

The iron of the blood carries the oxygen to the tissues, a process which modern medical science has shown to be greatly influenced by light, while Dr. Baudisch stated that the magnesium in leaves possessed a similar power to activate hydrogen in the presence of light. It is his theory that life may have been caused through the direct action of sunlight upon water, air and carbon dioxide in the ancient geologic past when, he believes, sunlight was more intense and contained more ultra-violet light and the air contained more water vapor and carbon dioxide than at the present time.

YEAST AND DIABETES

Science Service

AN extract of yeast that may take the place of insulin, the specific for diabetes, is reported to have been obtained by L. B. Winter and W. Smith in the biochemical laboratory at Cambridge.

Great similarity to the pancreatic extract for treating diabetes which was isolated last year at the University of Toronto has been shown by the newly discovered solid substance from yeast.

According to their preliminary report, "When a solution of this substance is injected into rabbits, a very definite lowering of the blood sugar occurs, in every way comparable to that which we have found after injections of insulin."

Messrs. Winter and Smith, with Dr. Devereux-Forrest, recently showed that there is present in the blood of normal persons a sugar that is not present in those suffering from severe diabetes mellitus. From the effects that extracts of pancreas and liver were found to have on this sort of sugar, and because phosphates which occur abundantly in yeast were found to activate the extracts, the possibility was suggested that yeast would yield a substitute for insulin.

The production of a substitute for insulin from yeast is considered a great step in advance, for it is expected that it will greatly reduce the cost of preparation of an anti-diabetic drug. Insulin is almost prohibitive in cost, since it is difficult to prepare and must be taken continually. Furthermore, yeast is a source far less likely to furnish along with the desired extract such dangerous toxic substances as have caused trouble in the case of the pancreas extract.

Yeast is to-day the source of a number of interesting and possibly valuable substances which are being studied at various laboratories in America and abroad. Dr. Atherton Seidell in Washington at the Hygienic Laboratory and others are preparing from this substance one of the important vitamins and making studies of this life-factor in its effect upon pigeons. At Cambridge a year ago Professor Hopkins, the English biochemist, isolated from yeast a substance which was named glutathione. This is receiving much attention because it is one of the necessary factors in the respiration of living cells. By means of studies with it our knowledge of the chemical mechanism of cell-life is being greatly increased.

ICE AND TRANSATLANTIC TRAFFIC

Science Service

TRANSATLANTIC steamer routes have been shifted south of the usual summer tracks because of the unusual number of icebergs and ice fields south and east of the Grand Banks of Newfoundland, according to an announcement made by the U. S. Hydrographic Office. The decision was made by the steamship companies which are parties to the Transatlantic Track Agreement. It became effective March 30 for eastbound traffic and will be effective April 6 for westbound.

Bergs and field ice have been reported close to the usual summer westbound track which crosses longitude 47 in latitude 41 degrees 30 minutes, and this track will be shifted south a full degree of latitude at that point, or more than sixty miles; the eastbound track being shifted a corresponding distance. Bergs have also been sighted unusually far east, bringing them again close to the normal summer westbound track.

The Hydrographic Office believes that this change is distinctly in the interest of safety of life at sea. It is also in accord with the frequently expressed opinion of the Hydrographic Office that these extra-southerly tracks should be adopted each year not later than April 1.

The Hydrographic Office strongly urged that all other steamship companies not parties to the above agreement also adopt the extra-southerly tracks, to and from the United States, on the dates specified, namely, March 30 and April 6. Unless this be done grave danger of collision will exist between eastbound shipping on the normal summer track crossing longitude 47 degrees west in latitude 40 degrees 30 minutes north and westbound shipping on the extra-southerly track crossing longitude 47 degrees west at the same point, and this menace will be greater than that of ice.

SPRING FLOODS

Science Service

ALTHOUGH damaging local floods, due to ice gorges, are reported from a few sections of the country, there is no prospect for any disastrous or wide-spread floods this spring unless a period of abnormally rainy weather should set in, ac-

cording to Dr. H. C. Frankenfield, in charge of the river and flood division of the U. S. Weather Bureau. The general outlook, in spite of heavy winter snowfall in some northern sections, is, he said, very favorable for no more than moderately high stages along the principal rivers.

A moderate flood is now in progress in the lower Ohio valley and middle Mississippi valleys between Evansville and Memphis, but this will not assume any alarming proportions and will pass down the Mississippi valley without causing any great damage.

Over northeastern sections and especially in New England, where the snowfall has been of almost unprecedented depth, no trouble is looked for unless there should be a heavy, warm rain. About half of the snowfall has already gone off without causing any trouble. Frost is out of the ground beneath the snow and the water is soaking into the ground. A week or two of moderate thawing weather with normal rainfall will remove all possibility of danger. The recent heavy snows over Iowa, Minnesota and Wisconsin are melting without flood conditions, except where ice gorges have formed. In the southeastern states rivers have been at or near flood stages for some time and the possibility of damage is thereby lessened.

Ice gorges have caused floods at Sioux City, Iowa, and along the Delaware River near Port Jervis, N. Y. These are not dependent on the general height of the rivers, the water backing up behind the gorge as behind a dam. Widespread floods are due to long continued rains or to warm rains on snow. Most of the snow is now melted and unless a prolonged rainy spell sets in, or heavy warm rains fall in New England, the dwellers along river valleys are not likely to have to take to the second stories of their homes.

Conditions this spring are decidedly in contrast to those of last year when the biggest flood on record of the whole Mississippi system was recorded.

LEAD PENCILS

The New York State College of Forestry Press Bulletin

MANUFACTURERS of lead pencils are having trouble in finding wood for their factories. The lowly lead pencil requires a special kind of wood and the source of it is becoming remote and limited.

A light, strong, smooth, soft grained wood free from knots, a wood pliable to the knife and patent sharpener, is necessary. The red cedar of the South Atlantic states has supplied pencil wood for half a century. It was so plentiful at one time that farmers built their fences of it. To-day this supply is exhausted and the old fences are sold for pencil wood at a premium. Most of the wood from which pencils are now made is obtained from the Pacific coast.

The California incense cedar is in great demand. Western juniper is also utilized for this purpose, but is knotty and a large portion of the tree has to be made into fence posts and cordwood.

The importance of the supply of wood for lead pencils is better understood when it is known that about one billion pencils are manufactured from American woods every year. Some of the product is exported, but every person in the country, it is estimated, uses approximately seven pencils annually.

One billion pencils represents a product that will probably bring on the average five cents apiece or a total of $50,000,000 annually. This is an astonishing development since the time Romans used metallic lead with which they made marks—whence comes the name of the pencil. Graphite was not utilized in pencil making until the middle ages in Germany. During the reign of Queen Elizabeth a graphite mine was opened in England which gave that country a monopoly of the trade. Later Nuremberg, Bavaria, assumed the lead. In those days turning out pencils was considered part of the cabinet worker's business. A French chemist, Nichols Jaques Conte, discovered how to mix graphite with clay and produce any required degree of hardness. In 1861 the first pencil factory was established in the United States. Southern cedar was so plentiful then that the idea of having to go to the Pacific coast for pencil wood was preposterous. But, like all wood products, the source of the raw material has been retreating westward at a rapid rate. It is predicted that within twenty-five years there will be a timber famine in this country.

A PSYCHO-EDUCATIONAL INSTITUTE

Science Service

ESTABLISHMENT of a psycho-educational institute to provide a central agency where professional services by reliable psychologists, educators, physicians and psychiatrists may be combined on problems relating to the mental development of children, was proposed by Dr. L. L. Thurstone, of the Institute for Government Research, at a meeting of the Washington Branch of the Psychological Corporation on March 31.

Just as parents now take their children to the dentist for examination of their teeth, he pointed out, they might take them to this institution where recommendations as to their mental development will be made from a series of more intensive individual intelligence and educational

tests and physical examinations than can be given by the public schools, together with the combined findings of specialists in the different fields.

"If it is proposed to induce a child to cover two grades in one year, or three grades in two years, there are several facts to be considered in making the recommendation," Dr. Thurstone said. "First, the child's mental development compared with its age should be determined by means of the Binet and other intelligence tests. If the child is found to be bright for its age, it will be necessary to consider its physical condition. The physical examination will be made with this particular problem in mind, either by the family physician or by one of the consultant physicians of the institute. If the child's health warrants the additional task, it might still be questionable if the child would be associating with children who are very much older. Consequently, the emotional and social development should be taken into consideration in making such recommendations. This institute will make it possible to get the advice of the different specialists combined in one central agency which, after considering all the factors that entered into the situation, would make the best possible recommendations to the parent."

The institute would also be prepared to give advice regarding the various forms of speech defects so as to combine the recommendations of physicians with the experience of educators and psychologists.

"Such an organization could also give vocational advice," he explained. "Psychologists at work in the college laboratories have developed several lines of technique for vocational advice which the institute can utilize for practical work. It should be the purpose of this institute to make generally available, in the form of professional service, the results of these scientific studies in the psychological laboratories of the college. One field in which reliable service can now be given is that of musical talent. The methods are available for measuring this talent with considerable reliability."

The plan as outlined by Dr. Thurstone further called for careful records to be kept of each child examined, so that the success of the recommendations may be determined from time to time. He proposed that the institute be organized not for profit, but that fees be charged so that it will be self-supporting, while all surplus funds should be devoted to scientific study. A committee was selected to work out more detailed plans of organization.

ITEMS

Science Service

A DOUBLE waterspout, apparently consisting of one spout within another, was observed from the American steamship *Warwick*, about one hundred and eighty miles northeast of Haiti, according to a report made by officers of the ship to the Hydrographic Office. A sketch accompanying the report showed the phenomenon to be of a most unusual character. The spout was seen late in the afternoon of February 22 and was described as "close aboard" so that with glasses its peculiar structure could easily be observed. The inner spout was apparently darker than the outer and at times it would be withdrawn into the heavy globular appearing cloud above, leaving the outer spout still "drawing water". The compound spout was something of the shape of an S, extending in a nearly horizontal direction to near the horizon, where it descended vertically to the water. After about fifteen minutes the inner spout was suddenly withdrawn and ten minutes later the whole mass moved eastward and a heavy rain set in.

MANY reports have come in from all parts of the Punjab of an immense meteor or fire-ball seen about sunset on December 28, 1922. It passed from the north northwest to the south southeast, and was seen generally over northern India. It seemed to travel slowly, left a long white streak, and in one place was followed by a sound like distant thunder. Astronomical calculations give the height of the meteor above the earth at from fifty-four to twenty-nine miles and its speed about twenty-five miles a second.

AN outbreak of epidemic typhus fever among Greek refugees at Constantinople is reported to the health section of the League of Nations. Reports from relief organizations give a total of slightly more than four hundred cases among the refugees since the first of the year. This is more than twice the number officially reported. There are approximately twenty-five thousand Greek refugees in Constantinople and the mortality among them is heavy, 829 deaths from all causes having been reported in five weeks from camps housing about thirteen thousand persons.

A FRENCH astronomical expedition to the upper Amazon in 1731 made a report on native rubber manufacture which first aroused European scientific and commercial interest in rubber.

NAPHTHA and quicklime are supposed to have been the principal ingredients of the liquid fire invented by the old Greek architect Callinicius in 678 A.D. for use in warfare.