Science News-Letter

The Weekly Summary of Current Science

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GENERAL SCIENCE

Free Geniuses, Says Hoover

"The day of genius in the garret has passed, if it ever existed," declared Secretary Herbert Hoover in addressing the honorary scientific society Sigma Xi at the Philadelphia meeting of the American Association for the Advancement of Science during Christmas week. Nowadays as he pointed out, "discovery must be builded upon a vast background of scientific knowledge, of liberal equipment. It is stifled where there is lack of staff to do the routine and valuable time must be devoted to tending the baby or peeling potatoes or teaching your and my boys. The greatest discoveries of the future will be the product of organized research free from the calamity of such distraction. Yet the whole sum we have available to support pure science research is less than ten million a year with probably less than four thousand men engaged in it." But in the application of science to industry we are spending probably two hundred million with perhaps thirty thousand men engaged. Yet fundamental research in pure science is the basis of its applications.

"Faraday in the pursuit of fundamental law discovered that energy could be transformed into electricity through induction. It remained for Edison, Thompson, Balle, Siemens and many score of others to bring forth the great line of inventions which applied this discovery from dynamo to electric light, the electric railway, the telegraph, telephone and a thousand other uses which have brought such blessings to all humanity. It was Hertz who made the fundamental discovery that electric waves may traverse the ether. It was Marconi and DeForest who transformed this discovery into the radio industry. It was Becquerel who discovered the radio activity of certain substances and Professor and Madame Curie who discovered and isolated radium. It was Dr. Kelly who applied these discoveries to the healing art and to industrial service. It was Perkins who discovered the colors in coal tar by-products. It was German industrial chemists who made the inventions which developed our modern dye industry. It was Pasteur who discovered that by use of aniline dyes he could secure differentiation in colors of different cells, and this led to the discovery of bacilli and germs, and it was Koch and Ehrlich who developed from this fundamental discovery the treatment of disease by antitoxins."

PHYSICS

Radio Death-Force

A new investigation of a radio death-force has been made by Prof. R. W. Wood of the Johns Hopkins University and A. L. Loomis of Tuxedo, N. Y., who recently startled the scientific world by the so-called "death whisper" consisting of rays of inaudible sound waves. Their new results have been obtained in a quite different field. They arranged two metal plates a couple of inches apart, and connected them with an electrical oscillator like the ones used in radio sending sets but much smaller. This drives into the plates an intense electric current, alternating at the rate of approximately one hundred million times a second, and giving rise to extremely short radio waves, about three meters long. A mouse placed between the plates, though not touching either one of them, was killed by the intense electromagnetic field. It died in about half a minute, and its blood was found to be all coagulated in its veins. A test tube containing several insects was next tried. The insects were likewise quickly killed, and their bodies became dry and brittle. Professor Wood stated that the experiments were begun only a few days ago, and that the near future is likely to bring some startling results, but he pointed out emphatically that a devastating death-ray to kill at great distances is not to be looked for from this apparatus.

MATHEMATICS

Beyond Einstein

Mathematics lies at the basis of all the other sciences and a science is regarded as becoming most scientific when it can be treated by mathematical methods. Astronomy and physics reached the mathematical stage first, chemistry is rapidly following suit and recently biology and psychology are making use of mathematics. On account of the fundamental importance of mathematics any advances in this field are welcomed by investigators in every field of research.

Consequently it is not surprising that the thousand dollar prize offered for a notable contribution to the Christmas sessions of the American Association for the Advancement of Science at Philadelphia, is awarded this year to Prof. G. D. Birkhoff of Harvard for his mathematical paper entitled "A Mathematical Critique of Some Physical Theories." Although the committee contained no representative of the Mathematical Section it picked his paper from the two thousand that were read during the week.

Only professional mathematicians will understand its significance and it is impossible to present its formulas in ordinary type. So all that can be done here is to show what the paper is about and why it is considered important by experts.

Geometry was developed into a perfect logical system by the Greeks and until the nineteenth centruy was taught exclusively as the last work in this science. But recently it has been found possible to develop other systems of geometry, equally consistent within themselves. This raised the question whether the Euclidean geometry or some of its newer rivals, the non-Euclidean geometries, best fitted the world as it is. When Einstein pointed out that the non-Euclidean geometry gave a better explanation of other physical phenomena, mathematicians plunged into the new field with greater zest.

Professor Birkhoff has taken a step

(Just turn the page)

Beyond Einstein

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beyond Einstein. He accepts the four dimensional view of space and time embodied in the theory or relativity as "reasonably correct qualitatively" but points out that no way has yet been found to account for all the lines of the spectrum of light, which are ascribed to the frequency of vibration of various parts of the atom. The atom was formerly regarded as simple, but is nowadays regarded as composed of positive and negative electrical particles, called protons and electrons, the unlike bodies attracting and the like bodies repelling each other.

But Professor Birkhoff proposes the use of a new type of elastic body and the "new assumption that the electrical forces between the charges on one and the same proton or electron are attractive instead of repulsive." The laws of space and time in the atomic domain seem irreconcilable with the known statistical laws that can be directly verified but he hoped that "the mathematicians would develop various types of mathematical universes which might subsequently be of aid to the physicist."

For the second time in its four years of existence, the thousand-dollar annual award given at the winter meeting of the American Association for the Advancement of Science has gone to a mathematician.

Dr. Birkhoff was born in Michigan in 1884. He first entered college at the Lewis Institute in Chicago, but received his bachelor's degree at Harvard, in 1905, followed by an M. A. in 1906. He returned West, however, for his doctorate, receiving it at the University of Chicago in 1907. He taught at the University of Wisconsin and at Princeton, until Harvard called him back in 1912; since 1919 he has held full professorial rank there.

He has written much on mathematics, especially on relativity, and has been editor of two mathematical journals. He is president of the American Mathematical Society, and has received recognition abroad by the Circolo Matematico di Palermo, the Royal Danish Academy of Science and Letters, the Göttingen Academy of Sciences and the Royal Institute of Science, Letters and Arts of Venice.

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A device for weaving without a shuttle has been exhibited in Germany.

Sirius, the dog star, gives off about 48 times as much light as our sun.

STUDY HELPS FOR SCIENCE CLASSES

These articles will be found to be especially useful in class work

GENERAL SCIENCE

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BIOLOGY—

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PHYSICS

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(This will fit on a 3 x 5 card.)

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News-Letter Features

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