

From Page 364

stitute of Technology, was large enough to house the large Van de Graaff generator. Col. Green offered his airship dock on his estate at Round Hill, Mass., a structure 140 feet long, 75 feet wide and 75 feet high, with railroad track running into it and doors that weigh over 23 tons.

The 10,000,000 volt Van de Graaff generator consists of two large hollow columns, 25 feet high and six feet in diameter, which are surrounded by a heavy polished aluminum sphere 15 feet in diameter. Each column is mounted on a heavy four-wheeled truck running on a railway track 14 feet wide. The spheres, which act as reservoirs into which electricity is poured by relatively small static generators at the base of the columns, rise to 43 feet above the ground.

Even while the generator is running at full potential, scientists can stay and work within the 15 foot diameter aluminum spheres, surrounded by high potential electric fields.

The giant aluminum spherical terminals are unique in construction, the largest such structures of this metal ever produced. They were made by fabricating orange-peel sections which were welded and then polished to a bright finish so as to eliminate projections that would cause the electricity to spark

away. Although built of light metal a half inch thick, each hollow ball weighs a ton and a half.

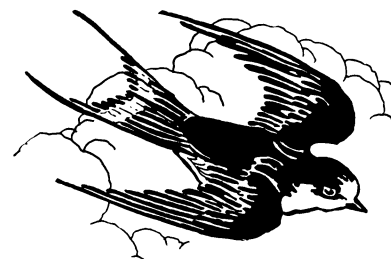
The spheres are charged with electricity by a process not unlike the old-fashioned method of raising water from a well by means of small buckets on an endless chain, each bucket dumping its load as it turns over a pulley at the top. Paper belts, four feet wide, convey upward the electrical charges sprayed upon them at the base at the comparatively low pressure of 20,000 volts. Or the giant generator can actually be operated without any artificial source of electricity, as it can draw the necessary electrical charges from the earth. The picture on the cover was taken with the camera pointed up one column. It emphasizes the paper belt.

When the real work of the Van de Graaff generator begins, there will be no spectacular electrical fireworks. A large vacuum tube, a foot in diameter and 40 feet long, designed by Dr. L. C. Van Atta, made not of glass as is usual but of laminated paper, will extend from one sphere to the other and the electricity will discharge through it, creating the most powerful X-rays ever known by hurling millions of electrical "bullets" against a metal target. Each of these "bullets" will be moving at velocities 100,000 times greater than the speed of any rifle bullet.

Science News Letter, December 2, 1933



ORNITHOLOGY



Specialists in Feathers

BIRDS seem to be about the most plastic of all the backboneed animals, in their ability to develop adaptations to special requirements of their environments. Practically alone among vertebrates, they have completely conquered that most difficult of all the elements, the air; and yet they can be found competing successfully with mammals, reptiles and fish on the earth and in the water. Every environmental niche has a bird species that fits it exactly: the swallow to the air, the duck to the water, the ostrich to the desert, the stork to the swamp.

The race of birds began, apparently, by the hardest conquest of all, the conquest of the air. For this the extension of the forelimbs and the practical loss of the fingers. For this the development of long quill-feathers, at once marvelously light and marvelously strong as little sails. For this the lightening of all the bones, the deepening of the breastbone into a great keel for the attachment of the wing muscles, the heightened rate of basic physiologic processes releasing energy. For this the streamlining coat of body feathers, the remarkable steering tail.

Yet, having made this conquest, some birds abandoned it almost immediately, and became swimmers par excellence, swimmers good enough to beat fish at their own game and make them their prey by simply outswimming them. The flying wings lost their flying feathers and became paddles for the penguin. The light, grasping feet became heavier and stronger, webbed for goose and duck and gull, paddle-toed for grebe; the keel was reduced or lost where flight was no longer important; but among the birds that fly long journeys, the keel was usually kept.

PHYSIOLOGY

"Sensitivity" to Cold May Cause Death by Drowning

PERSONS who are sensitive to cold risk their lives bathing in cold water," states the editor of the American Medical Association.

Sensitive, however, is used here in a very special sense. Certain persons, it has been found, are "sensitive" to cold, or to heat, just as hay fever sufferers are sensitive to the pollens of some plants.

These cold-sensitive persons may have hives, swelling of the skin, pain in the joints, sneezing and irritation of the nose, asthma, headaches and many other disturbances when they are exposed to cold air, cold water or cold objects.

More serious is the fact that bathing in cold water or walking in a cold, moist wind may cause severe "shock." Apparently this cold-sensitiveness may lead to death while bathing in cold

water. It may be the cause of drownings that are otherwise unexplainable.

Several European physicians have reported cold-sensitiveness both in themselves and in patients which caused nearly disastrous bathing accidents.

One of these physicians has attacks of sneezing and running of the nose when he puts his foot out of the warm bed. His hands swell and become itchy when in cold water. Several times when swimming he has suddenly become so weak that he could scarcely reach the shore before collapsing. At the same time, giant hives appeared around his joints. He had a similar reaction once in a cold air bath. He is of the opinion that such hypersensitiveness to cold may be present only at times.

Science News Letter, December 2, 1933

Other birds that gave up flight to live on land instead of in the water stressed the evolution of legs: powerful implements in the ostrich, ending in stump toes that are almost hoofs; wide-toed feet among the swamp-dwellers like the crane, operating snowshoe-fashion on the soft, yielding muddy bottoms.

Even among the fliers, greater specialization: long wings and short tails among the great ones that brave the upper winds, like albatross and eagle; short wings and long, frequently ornamental tails among the flitters through treetops and bushes, like the macaws and the magpies.

And so the tale might be continued indefinitely: excellent fitting to the task before them, of beak, feather, claw, wing and tail. Truly, the birds must be voted biological successes!

Science News Letter, December 2, 1933

GENETICS

"Like Attracts Like" May Explain Childless Couples

THE OLD saying that "like attracts like," which has been verified by statistical studies of marriage selection, may be the explanation of some childless marriages.

A study of 107 childless couples conducted by C. M. Pomerat, of Clark University, and reported by him to *Science* reveals that the men and their wives were unusually alike in height and trunk length. These couples all desired children but remained infertile.

Mr. Pomerat is continuing his research. These initial findings, if confirmed, are eugenically important because they suggest a possible relation between the similarity of man and wife and the possibility of bearing children, he pointed out.

Science News Letter, December 2, 1933

More than two million children of school age, up to 16 years, are not receiving education during this education crisis, a government statement shows.

Ten thousand bushels of pine cones and other seeds are being harvested by civilian conservation corps workers for tree planting in the Tennessee Valley.

The problem of dust as a health hazard in industry is shown by the case of a contractor who had more than 400 damage suits for silicosis, totalling \$4,000,000, filed against him by workers boring a three-mile tunnel.

● First Glances at New Books

Additional Reviews on Page 368

Psychology-Heredity

HEREDITY AND ENVIRONMENT—Gladys C. Schwesinger—*Macmillan*, 484 p., \$4. A comprehensive review of studies bearing on the moot question of which contributes most to human intellectual ability, the inherited ability the infant brings into this world with him or the many varied experiences he encounters after his arrival. The author concludes that extremists on both sides of the question are wrong, and the question still awaits a conclusive answer.

Science News Letter, December 2, 1933

Mechanical Engineering

MODERN ELECTRIC AND GAS REFRIGERATION—A. D. Althouse and Carl H. Turnquist—*Goodheart-Willcox Co.*, 265 p., \$4. A practical handbook and text which should be of great service to those undertaking to prepare themselves to service mechanical household refrigerators. It will also interest any individual who wishes to know what makes it cold in his modern kitchen refrigerator.

Science News Letter, December 2, 1933

General Science-Education

SCIENCE STORIES, BOOK ONE—Wilbur L. Beachamp, Gertrude Crampton and William S. Gray—*Scott, Foresman*, 144 p., 60c. Simple stories on seasons, weather, animals, plants, sun, moon and stars written for easy reading and understanding by first-graders. The illustrations in full color are attractive.

Science News Letter, December 2, 1933

Mathematics—Education

GEOMETRY PROFESSIONALIZED FOR TEACHERS—Halbert Carl Christofferson—*George Banta*, 204 p., \$1.50. This book is designed to give a teacher or prospective teacher a mastery of the subject matter of geometry and simultaneously to train him in the method of teaching demonstrative geometry in the high schools.

Science News Letter, December 2, 1933

Biology

LA PALEONTOLOGIE & LES GRANDS PROBLEMES DE LA BIOLOGIE GENERALE, Part I, L'Evolution Adaptations et Mutations—Charles Fraipont and Suzanne Leclercq—*Hermann & Cie*, 38 p., 9 fr. Part II, Adaptations et Mutations—Charles Fraipont—*Hermann & Cie*, 24 p., 6 fr.

Science News Letter, December 2, 1933

Hygiene

PHYSIOLOGICAL HEALTH—ed. by Jay B. Nash—*Barnes* 308 p., \$2. Fourth volume in the New York University School of Education series on Interpretations of Physical Education. Physiological health is defined, its relationship to other educational objectives discussed, and methods of attaining it are described. The book is written by specialists in health education and physical education, mental hygiene and psychiatry, and medicine. It is somewhat surprising not to find, in a book on physiological health, any contributions from physiologists.

Science News Letter, December 2, 1933

Psychiatry-Psychology

DEMENTIA PRAECOX—Harriet Babcock—*Science Press*, 167 p., \$3. As the subtitle indicates, this is a psychological study, not a medical work. In the modern hospital for the insane, the psychologist and the physician are of mutual assistance in solving the great enigma of mental disease. In the study here reported, 216 sane persons of widely diverse mental age are compared with 206 persons suffering from dementia praecox. The results show that the patients with this type of mental disease have a mental defect even in the earliest stages, and the author concludes that "it is unwarranted to attribute this inefficiency to any but physiological causes, although the exact nature of these causes may not be known."

Science News Letter, December 2, 1933

Education

PROGRAMS OF GUIDANCE—William C. Reavis—*Govt. Print. Off.*, 144 p., 10c. Monograph No. 14 of the National Survey of Secondary Education describing what is being done by the schools in the way of vocational and educational guidance.

Science News Letter, December 2, 1933

Peace-Education

INTERNATIONAL UNDERSTANDING THROUGH YOUTH—International Institute of Intellectual Co-operation—*World Peace Foundation*, 200 p., cloth \$1.85; paper \$1.50. A report of an inquiry into present practices with regard to the exchange of school pupils between nations and the visiting of families in foreign countries for the purpose of giving their children understanding of other peoples.

Science News Letter, December 2, 1933