biennially at the final exercises of the university, beginning in June, 1927, by a committee consisting of the dean of the medical school and the professors of pathology, physiology, biochemistry, histology, embryology and surgery.

Trustees of the estate of the late Sir William Dunn have allotted $10,000 a year for five years for cancer research, which has been assigned to the extension of experiments with filtrable viruses following the recent discovery of Dr. William E. Gye and Dr. J. E. Barnard. The British Medical Association, heard Dr. Gye's report on his cancer discovery and the subsequent debate behind closed doors.

UNIVERSITY AND EDUCATIONAL NOTES

The University of Pennsylvania has plans in preparation for the erection of a new laboratory for physiological chemistry to cost about $1,000,000, with equipment. The work will be carried out in connection with an extensive building program at the institution, including an anatomical laboratory, for which foundations are being laid, to cost approximately $1,300,000.

The board of administrators of the Tulane University of Louisiana has decided to reorganize completely the Graduate School of Medicine. A committee has been appointed to work out the plans of reorganization, and it is expected that the school will be fully organized and ready for work by the beginning of the 1925–1926 college year.

Dr. John J. Keegan, a member of the faculty of the College of Medicine of the University of Nebraska, at Omaha, has been appointed dean of the college to succeed Dr. Irving S. Cutter, who recently accepted appointment as dean of the Medical School of Northwestern University.

At the University of California the professorial title of Dr. C. B. Lipman has been changed from professor of plant nutrition to professor of plant physiology and dean of the graduate division.

Dr. A. G. Worthing, for fifteen years a physicist at the Nela Research Laboratory, has become professor of physics in the University of Pittsburgh and head of the department, succeeding Dr. L. P. Sieg, dean of the college. Dr. Sieg retains a professorship in the department.

The National Research Council announces the following appointments of holders of fellowships under the council: Dr. (Minnie) Jane Sands (M.D., Woman's Medical College of Pennsylvania), who has been studying since October, 1923, at the Royal Infirmary, Edinburgh, Cambridge, England, and at Western Reserve University, Cleveland, professor of physiology at the Woman's College of Medicine, Philadelphia. Dr. Clifford S. Leonard, Ph.D. (Wisconsin), since October, 1923, at Yale University, instructor in pharmacology at Yale University. Homer W. Smith, D.Sc. (Johns Hopkins), who for the past two years has been working at the Harvard Medical School, acting professor of physiology at the University of Virginia. Dr. Louis N. Katz, M.D. (Western Reserve), who has been studying at the University of London since August, 1924, senior instructor in physiology in Western Reserve University.

Maynard F. Jordan, instructor of astronomy in Harvard University, has been appointed associate professor of astronomy at the University of Maine.

Dr. Alfred P. Lothrop, professor of chemistry at Queen's University, Ontario, has been appointed associate professor of chemistry at Oberlin College.

Dr. T. F. Wall has been appointed head of the department of electrical engineering in the University of Sheffield.

DISCUSSION AND CORRESPONDENCE

THE SIZE OF SEA WAVES

A photograph of a large sea wave was published in the New York *Times* of December 7, 1924. This picture so impressively indicated the enormous size of the wave that the writer made special inquiries to establish the authenticity of the picture, realizing that the wave shown was far out of the ordinary even in great storms. The photograph was taken from on board the S. S. *Leviathan* and shows a wave advancing upon the bow of the ship and towering high above it. The top of the wave appears to be higher than the position of the camera. A special request brought the following letter:

I have made an exhaustive inquiry concerning the making of this photograph which was published in the New York *Times* of December 7. I hope that the information I am able to give you will prove of some value.

The photographer made this picture from "B" deck of the *Leviathan,* 60 feet above the waterline of the vessel and 224 feet from the bow. He informs me that at the moment the exposure was made the *Leviathan's* bow was in the trough of the wave and that he shot down at an angle to get the picture, the wave breaking immediately after the exposure was made. The photographer is not sure of the day on which the picture was taken, but he believes it to be Thanksgiving Day or the day following. At that time the *Leviathan* was encountering full gales, reported at approximately 100 miles an hour. The ship was headed west and into the wind.

I understand in talking with officers that during this part of the storm one wave would be leaving the *Leviathan's* stern, another would be under her amidships and she would be entering on a third.

The *Leviathan* is 950 feet long.

From this you may be able to figure the length of the waves or their height.

Very truly yours,
DAVID A. BURKE,
Assistant General Manager,
United States Lines

On November 28, Thanksgiving Day, the S. S. *Leviathan* was about 1,300 miles (nautical) from Cherbourg and about 1,000 miles from American shores; on the following day she was about 300 miles nearer land. Long ago Stevenson pronounced a formula connecting the maximum height of waves with the "fetch" of the wind in deep water for distances from shore between 100 and 1,000 miles. The formula is as follows: $H = 1.5\sqrt{f}$. "H" is height of wave and "f" is the fetch of the wind. On November 28 the fetch of the wind was 1,000 miles, and on the next day it was 700 miles. Of course we have no assurance that the wind blew actually over the whole fetch from the mainland to sea, but on that supposition on November 28 the waves might have been 50 feet high and on the 29th 40 feet high. It happens that on the 27th the wind was from the north, which caused waves rushing transverse to the great storm waves here considered and which persisted in spite of the new series of waves. Consequently there were probably peaks and troughs upon the main waves which might well increase their height 10 or 15 feet.[1] As a result of these considerations the waves may have been as great as 60 feet in height from trough to crest, although it is generally agreed that in the North Atlantic Ocean forty-foot waves are of extreme size. Another line of attack arises from the length of the waves. According to the ship's officers these waves were commonly 475 feet long. Judging from critical reports of other storms it is likely that some waves were over 600 feet long. Waves of such a size are between 35 and 45 feet high irrespective of cross waves or breaking peaks. If the wave peak was actually as high above the trough as the camera when the photograph was taken the wave must have been considerably over 60 feet high, because although the camera was pointed down from the 60 foot elevation above the ship's water-line it was considerably more than 60 feet above the bottom of the trough of the wave.

From another of Stevenson's formulae the velocity of the wave may be computed. Although waves commonly run almost as fast as the wind which makes them, the extreme speed of the wind, 100 miles per hour, caused a departure from this common rule. The velocity of the wave is related to its length as follows: $V = \sqrt{5.123L}$.

Putting the value of 475 feet for "L" the velocity of the waves becomes 50 miles per hour.

It is a significant commentary on modern naval architecture and marine operation that the S. S. *Leviathan* was able to advance 300 miles in twenty-four hours, steaming against a wind of 100 miles per hour and plowing against waves which were running on an average 475 feet long and 40 feet high with a velocity of 50 miles per hour.

An examination of the evidence available indicates that this was one of the most violent storms ever recorded on the North Atlantic Ocean as far as size of waves is concerned.

T. T. QUIRKE
UNIVERSITY OF ILLINOIS

[1] Wm. Scoresby, British Association for the Advancement of Science, 1850.

HEARING BETTER IN THE PRESENCE OF A NOISE

Do certain hard-of-hearing persons hear better in the presence of a noise? Much has been spoken and published supporting the affirmative and negative answers to this question.[1] Yet, for some reason, no one has answered this question definitely and adequately on the basis of experimentation. Otologists, physicians and many other people, including those who have hearing impairments of a fixative type—usually called otosclerosis—quite generally have believed that otosclerotic hard-of-hearing people actually do hear better in the presence of a noise. Some very scholarly otologists have attempted to explain this phenomenon by supposing that the gross vibrations of the noise act upon the ossicular chain in such a manner as to set it into vibration, which makes this conductive mechanism of the middle ear a more efficient vehicle for transmitting speech or music to the internal ear. The noise, they claim, is supposed to increase the sensitiveness of the ossicular chain in much the same way that tapping or jarring the old form of "coherer," used for the detection of radio waves, increased its sensitiveness.

Kranz[2] and Fletcher[3] recently have advocated that these hard-of-hearing people actually do not hear better in the presence of the noise, but that the noise

[1] Three notes regarding this question have appeared in SCIENCE during the past six months: G. W. Boot, Oct. 17, 1924; F. W. Kranz, Dec. 12, 1924; B——, March 6, 1925. See also H. Burger, ''De la Paracusie de Willis,'' *Rev. de laryngol d'Otol. et de Rhinol.*, 38: 561, 1917.

[2] F. R. Kranz, *Laryngoscope*, March, 1924.

[3] H. Fletcher, *Volta Review*, September, 1924.