emphasizes the valuable services rendered during the year by the following voluntary workers: Miss Margaret N. Robins, Miss Mary Allison Reed, Miss Virginia C. Beggs, Mrs. Emmett R. Dunn, Jean Piatt, Miss Betty Shryock, Mark H. C. Spiers, Joseph Wood, Jr., Miss Anne Harbison, Ernest L. Bell, Cyrus H. Chappell, Walter S. Cosgrove, J. W. R. Rehn, Russell M. Wood, Don M. Benedict, William R. Keeney, Mrs. Francis Harper, Edward R. Barnsley, Miss Anne Wistar Comfort, Horace J. Hallowell, Miss Josephine deN. Henry, Miss Mary G. Henry and George Vaux.

A total of 4,500 members and visitors attended the meetings of the seven natural history organizations associated with the academy—the Delaware Valley Ornithological Club, the Philadelphia Mineralogical Society, the Philadelphia Botanical Club, the Leidy Microscopical Club, the American Entomological Society, the Pennsylvania Fish Culturists' Association, and the Pennsylvania State Fish and Game Protective Association.

Fenimore Johnson was elected a member of the board of trustees.

REPORTS

MEDALS PRESENTED AT THE ANNUAL DINNER OF THE NATIONAL ACADEMY OF SCIENCES

THERE has been printed in SCIENCE the names of those to whom the medals of the National Academy of Sciences were presented at the Washington meeting. The following statement gives some information concerning the medallists and concerning previous awards of the medals.

Alexander Agassiz Medal for Oceanography: Awarded to Albert Defant, of the Institut für Meereskunde, Berlin, Germany, for his studies on atmospheric and oceanic circulation and his notable contributions to theoretical oceanography. This medal is provided through the Murray Fund, a gift from the late Sir John Murray to found the Alexander Agassiz gold medal for the awarding of medals to scientific men in any part of the world, for original contributions to the science of oceanography. Ten previous awards have been made, as follows: Johan Hjort, 1913; Albert I, Prince of Monaco, 1918; C. D. Sigsbee, 1920; Otto Sven Pettersson, 1924; Vilhelm Bjerkness, 1926; Max Weber, 1927; Vagn Walfrid Ekman, 1928; J. Stanley Gardiner, 1929; Johannes Schmidt, 1930; Henry Bryant Bigelow, 1931.

Public Welfare Medal: For eminence in the application of science to the public welfare—awarded to William Hallock Park, of New York City, for his work as head of the research laboratories of the New York City Department of Health as a pioneer and leader both in research and in the application of scientific discovery to the prevention of disease. This medal is provided for from the Marcellus Hartley Fund, established in 1913–14 through the gift of Mrs. Helen Hartley Jenkins, in memory of her father, Marcellus Hartley. Ten previous awards have been made, as follows: G. W. Goethals, 1914; W. C. Gorgas, 1914; Cleveland Abbe, 1916; Gifford Pinchot, 1916; S. W. Stratton, 1917; Herbert Hoover, 1920; C. W. Stiles, 1921; Charles V. Chapin, 1928; Stephen Tyng Mather, 1930; Wickliffe Rose, 1931.

John J. Carty Medal and Award for the Advancement of Science: Awarded to John Joseph Carty, a member of the academy, since deceased, in whose honor the medal was established for his distinguished accomplishments in the field of electrical engineering, particularly as they have influenced the development of electrical communication, and also his noteworthy influence on the introduction of fundamental science and of the methods of sound scientific research as an integral and powerful tool of industrial development. This is the first award of the Carty Medal, which was established by the American Telephone and Telegraph Company in November, 1930, in recognition of Mr. Carty's noteworthy contributions to science and as a testimonial of the esteem in which he is held by his associates in the Bell System. The terms of the gift provide that the awards shall be made to an individual, for noteworthy and distinguished accomplishment in any field of science coming within the scope of the National Academy of Sciences; either for specific accomplishment in some field of science, or for general service in the advancement of fundamental and applied science.

Henry Draper Medal: Awarded to V. M. Slipher, Lowell Observatory, Flagstaff, Arizona (a member of the academy), in recognition of his spectroscopic researches, among the most important of which may be mentioned: (1) The discovery of "stationary" calcium lines in stellar spectra; (2) the development of efficient methods of observations of the spectra of spiral nebulae and the securing of the first observations of their radial velocities; (3) observations of bright lines and bands in the spectra of the night sky. This medal is made possible through the Henry Draper Fund, established by gift of Mrs. Henry Draper in 1883, in memory of her husband, a deceased member of the academy. Twenty-one previous awards of this medal have been made, as follows: S. P. Langley, 1886; E. C. Pickering, 1888; H. A. Rowland, 1890; H. K. Vogel, 1893; J. E. Keeler, 1899; Sir William Huggins, 1901; George E. Hale, 1904; W. W. Campbell, 1906; C. G. Abbot, 1910; H. Deslandres, 1913; Joel Stebbins, 1915; A. A. Michelson, 1916; W. S. Adams, 1918; Charles Fabry, 1919; Alfred Fowler, 1920; Pieter Zeeman, 1921; H. N. Russell, 1922; A. S. Eddington, 1924; Harlow Shapley, 1926; William Hammond Wright, 1928, and Annie Jump Cannon, 1931.

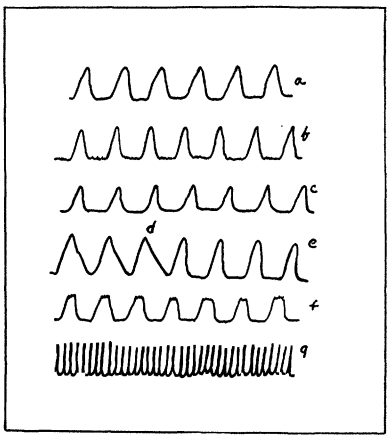
Mary Clark Thompson Medal: Awarded to Francis Arthur Bather, of Wimbledon, England, for his distinguished services in the fields of paleontology and geology. His principal scientific contributions are his Crinoidea of Gotland, published in Stockholm in 1893, his work on the Triassic echinoderms of Bakony in 1909, his chapters on echinoderms in Lankester's treatise on zoology, his contribution on the Cystidea from Girvan in 1913, and his studies in the Edrioasteroidea in 1915. These are in addition to many other papers on geological and biological subjects covering the field of fossil invertebrates though relating mainly to crinoids. He also has made important contributions on museum technique. The Mary Clark Thompson Fund, which makes the award of this medal possible, was established by gift of Mrs. Thompson in 1919. Seven previous awards have been made as follows: To Charles Doolittle Walcott, 1921; Emmanuel de Margerie, 1923; John Mason Clark, 1925; James Perrin Smith, 1928; William Berryman Scott, 1930; Edward Oscar Ulrich, 1930, and David White, 1931.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

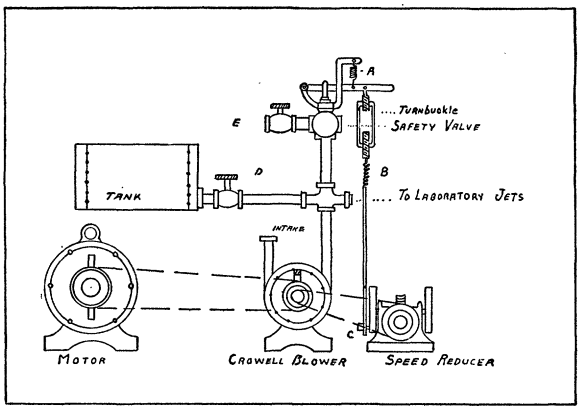
AN APPARATUS FOR MAINTAINING ARTIFICIAL RESPIRATION IN LABORATORY ANIMALS

SOME mechanical device for carrying out artificial respiration in laboratory animals is practically an indispensable piece of equipment in the physiological laboratory. It has not been long since experimenters resorted to hand or foot bellows for the performance of this necessary procedure. These have been gradually replaced by more elaborate mechanical machines, in which the volume and rate of the output may be varied as desired. One of the most popular methods particularly for student experiments, employs an ordinary wind-shield wiper as a means of interrupting a current of air. In some laboratories motor-operated rotary valves are inserted in the air-line leading to the laboratory tables. Still others find it practical to equip each mammalian group with special apparatus for instituting artificial respiration. As desirable as this seems, the facilities of many laboratories do not permit such an expenditure, and therefore, recourse is made to some of the simpler and less expensive methods, except where certain research problems are involved.

For more than eight years the simple device described in this article has been in use in this laboratory, and having given most satisfactory service with practically no attention, it is reported here for whatever value it might be to other laboratories. The Crowell blower, designed for volume output, is probably more desirable than other types of air pumps which are capable of higher pressures. There is little danger of rupturing the lungs from the full pressure exerted by many of these rotary blowers. The tank placed in the line acts as a buffer and serves to regulate the degree of lung inflation, as well as governing the rate of inflation with respect to the total duration of the respiratory phase. As a means of interrupting the current of air an ordinary safety valve, in the line, as shown in the accompanying diagram, is readily adapted. This valve is mechanically operated by a rod connecting to cam C on the speed-reducing gear. The tension of spring H is so adjusted that the



safety valve is held open when the cam is in the "up" position, and the air output of the blower escapes through valve E. The turnbuckle, by adjusting the tension of spring B, regulates the time of closing and opening of the safety valve. By increasing the tension on this spring the safety valve remains closed through a greater arc in the revolution of the speed reducer, and therefore prolongs the inspiratory phase. Valve E regulates the rate of de-



flation or the duration of the expiratory phase. No special valves in the main air line leading to the laboratory tables are necessary, since the resistance of this line is so much greater than through the safety