addition, a committee representing the institute and Swan's native town is appealing for a sum of £5,000 with which to found National Swan Memorial Scholarships in electrical engineering science. The fund will be administered by the Institution of Electrical Engineers, the interest being devoted to the payment of the scholarships.

RECENT DEATHS

DR. NORMAN BRUCE CARSON, professor emeritus of surgery in the Washington University Medical School, died on August 9 at the age of eighty-six years.

DR. JOHN S. FULTON, formerly director of the Maryland State Department of Health, died on August 12. He was seventy-two years old.

SAMUEL TOBIAS WAGNER, consulting engineer of the Reading Railway Company and professor of engineering at the Wagner Free Institute of Science, died on August 7 at the age of seventy years.

MISS SARAH G. FOOTE SHELDON, for over twenty-five years a volunteer full-time assistant to the late J. H. Paarmann, curator of the Davenport Academy of Sciences, now the Davenport Public Museum, died on July 2 at the age of about seventy-five years.

DR. WALTER E. DIXON, reader in pharmacology at the University of Cambridge, previously professor at King's College, University of London, fellow of the Royal Society since 1911, died at Cambridge on August 16.

PROFESSOR RICHARD WETTSTEIN, of the University of Vienna, director of the Vienna Botanical Gardens, died on August 10 at his estate, Triene, in the Tyrol. He was sixty-seven years old.

A REUTER message reports the death at Montreux of Professor Auguste Forel, who retired from the chair of psychiatry at the University of Zürich in 1897. He was the author of the "Social World of Ants."

SCIENTIFIC EVENTS

MEDIUMS FOR THE ISOLATION AND CULTIVATION OF BACTERIA IN THE FILTERABLE STATE

THE Northwestern University Medical School has issued a bulletin by Dr. Arthur I. Kendall, professor of research bacteriology, giving full details for the preparation of K medium for the isolation and cultivation of bacteria in the filterable state.

In the James A. Patten lecture, given on July 22 and printed in the issue of SCIENCE for August 7, Dr. Kendall made the first announcement of the discovery of a new method for the isolation of bacteria which hitherto have remained invisible. This was the development of a culture medium, which will change bacteria from invisible to visible form.

In the new bulletin issued on August 9, Dr. Kendall describes in detail how the K mediums are made from the tissue of the animal or human body. Intestine has been used chiefly for this purpose, although Dr. Kendall states that brain, liver, kidney, spleen and heart have been used. "Hog intestine," he writes, "has been distinctly more suitable than rabbit intestine and rabbit intestine has appeared to be more favorable than dog intestine. Human intestine which was not available when early studies were made is under investigation at present."

After full details of the preparation of the mediums and commenting upon aspects of their use, Dr. Kendall gives the following conclusions:

The K mediums, protein rich and peptone poor, have afforded a direct method of approach to the purview of three highly important aspects of bacteriology which are mutually related and dependent:

First (theoretical), it appears to be a biological fact that many bacteria can, and do, exist in two states, filterable and non-filterable.

Second (clinical), bacteria may be isolated from the blood stream of patients suffering from diseases that have hitherto proved difficult or refractory to cultivation.

Third (intrinsic), homologous bacteria may be cultivated both from bacteriophage and from Besredka antivirus.

From the biological point of view, this demonstration of the filterable and non-filterable states of microbic existence not only opens new fields for exploration, it also offers reasonable explanations for many hitherto suspected, but unconfirmed phenomena of microbic activity. Thus, bacteria growing in K medium from stock cultures, thereby undergoing change from non-filterable to the filterable state, not only are separable by filtration into those not cultivable in ordinary mediums (the filterable forms) but also tend to differentiate rather readily into "smooth" and "rough" types (the non-filterable forms), which may be separated by plating directly upon agar mediums. Also, the filterable forms, recultivated upon agar, often may be separated into "smooth" and "rough" types.

Chemical studies already under way suggest that the respective activities of these filterable and non-filterable forms are quantitatively and possibly qualitatively unlike. It may be stated also that the first editions of non-filterable forms obtained upon agar are, or may be, materially less reactive than the fully acclimatized, non-filterable forms gained by repeated transfer.

Finally, perhaps the most transpicuous argument at

the present time against the plea of "leaky filters" as being an explanation for the existence of the filterable state of bacteria, is to be found in the oft repeated cultivation of homologous bacteria from various kinds of bacteriophage. Bacteriophage has been a subject of investigation in innumerable workshops. Two facts are quite universally agreed upon. First, that phage in an active state is filterable through the finest stone filters. Second, attempts to cultivate homologous bacteria from phage filtrates have been almost axiomatically unsuccessful. It is, however, a comparatively simple matter to obtain growth of the homologous "phaged" microbe in the filterable state in K medium. From this growth in K medium, direct cultivation at the proper time upon agar will yield colonies of re-phagable organisms.

THE LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

ACCORDING to the regular London correspondent of the *Journal* of the American Medical Association, the London School of Tropical Medicine, founded in 1899, has undergone great development in recent years, largely in consequence of the munificent gift of $10,000,000 from the trustees of the Rockefeller Foundation to enable the University of London to establish a center of postgraduate teaching and research in the science and art of preventive medicine. The idea that preventive medicine should embrace not this country alone but the whole world led to the incorporation of tropical medicine in the scheme. Hence the palatial buildings which were opened in 1929 by the Prince of Wales are called the London School of Hygiene and Tropical Medicine. The school is probably the most complete institution of the kind in the world. The staff is organized in six main divisions: public health, biochemistry, bacteriology, medical zoology, epidemiology and vital statistics, tropical medicine. The students form three main groups. A number varying between 70 and 100 come for a course of six months in tropical medicine and hygiene. Most of these are already in or desire to enter a public medical service in the British Empire or foreign countries. In a paper read before the Royal Society of Arts, Major Greenwood, F.R.S., professor of epidemiology and vital statistics, states that the course of instruction, partly clinical, partly laboratory training, makes considerable demands on their energy because much ground has to be covered in the time. The next largest group consists of students seeking to enter public health service and intending to sit for the diploma examination in public health of the University of London. This course is longer and takes a whole year, and it is possible to present the different aspects of a problem of disease more completely—the chemical, bacteriologic, parasitologic, epidemiologic and administrative sides one after another. Thus a sound knowledge of, say, the prevention of plague is obtained from various specialists. The third group consists of students specializing in one branch, such as bacteriology or epidemiology. It is said to include some of the best students, many of whom are foreigners. The division of epidemiology has already had students from thirteen countries.

THE RETURN OF "THE DISCOVERY"

THE London *Times* reports that *The Discovery,* Captain Scott's old ship, returned to London on August 1 and berthed at the East India Docks after two years in the Antarctic. Sir Douglas Mawson, the leader of the expedition, was not on board, having left the ship in Australia.

Captain K. N. Mackenzie, who is a native of Oban, said that a fine film of the voyage had been made, including many interesting scenes of penguins and icebergs. On arrival at Sir Douglas Mawson's 1910 camp in Cornwath Bay they found a tin of tobacco which had been lying there for over 20 years. It was in perfect condition, and with much amusement they watched Sir Douglas enjoy his first puff of this old mixture. The expedition had a number of dangerous experiences with icebergs in discovering seven hitherto uncharted regions. These new regions are Princess Elizabeth Land, MacRobertson Land, Bansarctic Land, Sabrina Land, Knox Land, Kemp Land and Enderby Land. Altogether, the expedition charted 1,000 miles of new coast line, which they flagged and claimed for Britain. One third of the whole of the Antarctic Continent was circumnavigated and 4,800 miles of Arctic water plied. The expedition collected data which has been left at Adelaide University, from which it is expected that several scientific discoveries of importance will be made. The slump in the whaling industry had given the whales a much-needed chance to survive, and the expedition discovered two new whaling grounds of first-rate importance.

Navigating Officer W. R. Colbeck, speaking of the blizzards experienced in the Antarctic, said that on one occasion the expedition encountered a hurricane off Adelie Land. The engines could not face it, and as a heavy sea was running they were drifting on to the edge of an ice pack. The sides of the vessel were badly battered. Later, the vessel was jammed in an ice pack for several days. The expedition went as far south as 68½ degrees, when they came to land and could go no further. Some special broadcast programs were sent out from Sydney on a short-wave length and were enjoyed very much. The expedition did a great deal of oceanographic work as a result of which 20 tons of specimens were obtained.