ical nebulae would do much to destroy the idea, sedulously fostered by Jeans, Jeffreys and others, that our system is unique. It may be possible to demonstrate that stars of mass and density so high as to be capable of rupturing by gravitational power alone masses comparable with the sun, are extremely rare or non-existent; but there is no evidence that bodies small enough to be ruptured by approach to or contact with such stars as the sun have not existed in the past, or do not still exist, so that practically all large stars may have had, or may yet have, each its own planet-feeder. For the peace of the timid, it is to be hoped that nobody will suggest that the job in our system is not finished and that the remains of the sun's planet-feeder may be expected back to complete its disturbing mission.

OBITUARY

RUSSELL A. OAKLEY

DR. RUSSELL A. OAKLEY, principal agronomist in charge of the Division of Forage Crops and Diseases of the Bureau of Plant Industry, U. S. Department of Agriculture, died at Monrovia, California, on August 6. He was born on a farm near Marysville, Kansas, on September 7, 1880, and graduated with a B.S. degree from the Kansas State Agricultural College in 1903. After a short period of graduate work in the University of Chicago, he accepted an appointment as scientific aid in the Department of Agriculture and served continuously in that department from July 16, 1903, until the time of his death. Because of the excellent service rendered during the war period as chairman of the Seed Stocks Committee and of his recognized ability as an agronomist, the Iowa State College upon the recommendation of President Pearson conferred upon him in 1920 the degree of Doctor of Science. He was later elected fellow of the American Association for the Advancement of Science and of the American Society of Agronomy.

Those who knew Dr. Oakley best will remember him always as one who possessed to a remarkable degree the quality of making friends and as one endowed with almost superhuman courage and cheerfulness in long years of struggle with physical infirmities on account of arthritis. His associates never ceased to marvel at the indomitable will which enabled him to go about his work day after day uncomplaining and efficient. This heroic attitude toward his afflictions was not the result of any religious belief or any tendency toward asceticism; it came rather as the result of his unconquerable spirit refusing to surrender and always "playing the game."

This brief description of the personality of Dr. Oakley should add lustre to his achievements which are recounted in more detail in other journals. It also accounts for his recognized success as an administrator. The Department of Agriculture entrusted him with numerous assignments in the administrative field. From 1913 to 1926 he was in charge of the Office of Seed Distribution of the Bureau of Plant Industry, and in addition during the war period served as chairman of the Department Seed Stocks Committee; for several years he was assistant chairman of the Federal Horticultural Board and continued up to the time of his death as a member of the Advisory Federal Plant Quarantine Board. Since 1926 he has been in charge of what is now the Division of Forage Crops and Diseases. During much of the latter period he served as chairman of the Research Committee of the U. S. Golf Association Green Section. He also performed with credit to himself and the department several special assignments of the Secretary of Agriculture.

His research activities in agronomy were confined mostly to investigations with alfalfa and turf grasses. He is co-author with the late C. V. Piper of a book "Turf for Golf Courses," and with Dr. Piper originated and edited for many years the U. S. Golf Association *Green Section Bulletin*. Dr. Oakley is author of many department bulletins and articles in scientific journals. He leaves behind a splendid record of achievement.

H. N. VINALL

MEMORIALS

WE learn from *Nature* that in view of the approaching centenary celebration of Clerk Maxwell, the Cambridge University Press announces a book of essays written to commemorate the event by Sir J. J. Thomson, Dr. Albert Einstein, Dr. Max Planck, Sir Joseph Larmor, Sir James Jeans, Sir Ambrose Fleming, Dr. W. Garnett, Sir Richard Glazebrook and Sir Oliver Lodge.

A COMMITTEE, as reported in the London *Times*, has been formed to organize the appeal for a British national memorial to Sir Joseph Wilson Swan (1828–1914), who, apart from many lesser inventions, was the first to invent and introduce for practical purposes the electric incandescent lamp. Swan was also a pioneer in photography and the processes of photographic printing. The Institution of Electrical Engineers, of which Sir Joseph Swan was president in 1898, is presenting to the Borough of Sunderland a bronze tablet, designed by Mr. R. A. Ray, which will be erected in the entrance hall of the Sunderland Central Public Library, Museum and Art Gallery. In

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