lum ultimately as the need and demand become imperative through the diffusion of knowledge.

R. BENNETT BEAN

UNIVERSITY OF VIRGINIA

SCIENTIFIC EVENTS

THE FILM PHOTOPHONE [1]

THE announcement in the *Times* of September 24 of the successful synchronization of speech and action in kinematography by means of photographic films bearing suitable sound records is the natural outcome of the work expended on this problem in numerous different countries. Sweden, through MM. Bergland and Frestadius, has apparently been fortunate enough to reach success first. It is indeed surprising that the achievement has been so long delayed. Speaking-films, apart from synchronization, have been in existence for a long time, having been first made by Ernst Rühmer about 1900, and called by him the "photographophone." Rühmer made his films by photographing upon them the fluctuating light proceeding from a "speaking arc," and the reproduction was effected by making use of the well-known property of selenium of controlling a telephonic current when actuated by variable illumination. More recently Professor A. O. Rankine has made speaking-films by a different method, in which the voice imposes fluctuations of intensity on a beam of light issuing from a constant source, the reproduction from the film record again being by means of selenium. The whole problem is closely related to telephony by light. In photo-telephony the speech is transmitted by light and reproduced immediately; in speaking-films a photographic record is made for future reproduction. The *Times* article does not make quite clear by what process M. Bergland makes the sound-film, but it probably does not differ fundamentally from those previously used. The novelty of M. Bergland's work appears to be the successful realization of synchronism between the picture-bearing and the sound-record-bearing films. This has been done by the obvious method of running the two films on the same shaft, both during the taking of the double record of action and speech and during reproduction. In addition, sufficient valve amplification to actuate a loud-speaking telephone has been successfully applied to the selenium-controlled currents.

[1] From *Nature*.

RADIUM FOR ENGLAND

DR. FREDERICK SODDY, professor of chemistry in Oxford University, travelling as a King's Messenger, has arrived in London from Prague, bringing with him the largest quantity of radium, valued at about £70,000, ever brought into England. The consignment consists of two grams and is the first to be received under the terms of the recent agreement between the Imperial and Foreign Corporation of London and the Czecho-Slovakia Government. The radium was deposited at the Foreign Office and will remain there for the time being, its exact future, according to Professor Soddy, being a matter for negotiation.

Professor Soddy is reported in the London *Times* from which we obtain this information to have said that while on holiday with his wife in Czecho-Slovakia he visited the Joachimsthal mines and was given every facility for inspecting them and the various processes by which the radium was extracted from the uranium obtained in the mines. The agreement mentioned above having been concluded, he was asked by the Corporation, to whom he is the expert scientific adviser, to make arrangements for the transport of the radium to England, a task of considerable responsibility and some danger, in view of its malignant penetrative properties. The two grams were distributed in nine glass phials, packed in a lead case 3 in. thick and weighing about 70 lb. This was contained in an ordinary Foreign Office dispatch-bag, which was finally sealed by an official of the Czecho-Slovakia Government.

"I am sure," Professor Soddy added, "that this radium will be an enormous help to British science and medicine. It is of exceptionally pure quality. The cry of the

medical profession has hitherto been, 'We can not get enough.' The greatest amount I have so far ever had to work with has been 30 milligrams. There will be more shipments of radium from Czechoslovakia, but not necessarily to England."

It was explained that the radium will be lent freely for hospital purposes, and rented out to private practitioners. It will also be used for the production and sale of radio-active water in bottles, for use at radio-sanitoria, the production and sale of radio-active fertilizers, and for its by-products, such as polonium. The company expects to derive its first profits from the renting out of the radium emanations contained in capillary tubes, the price for the use of which at present is six guineas for 24 hours. One gram of radium supplies 4,500 of such tubes.

The Czecho-Slovak Legation in London has made public the following in regard to the contract entered into by the Czecho-Slovak Government, as the owners of the Radium State Mines in Jachymov (Joachimsthal), and the Imperial and Foreign Corporation of London:

Under this contract the Radium Corporation of Czecho-Slovakia, a private limited company, has been established, the Czecho-Slovak state and the Imperial and Foreign Corporation holding equal interests. The Radium Corporation will obtain the loan for a period of 15 years of the radium production of the state mines, less a certain portion which is to be reserved for public use, especially for curative and scientific purposes. The radium so lent to the Corporation will remain the property of the Czecho-Slovak state.

The contract does not contain anything relative to the working of the radium mines, which will be, as before, exploited by the Czecho-Slovak state.

BIOLOGY IN SOUTH CHINA

Friends of Charles W. Howard, according to a report in *The Cornell Alumni News*, have lately received an account of the work in biology which he and his associates are doing in the Christian College at Canton, China. The work began in 1917 with a one-year course in introductory botany and zoology, taken by eleven students. By 1920–21 these had increased to 163 in seven courses, including plant physiology, plant pathology, evolution and heredity, economic zoology (entomology and parasitology) sericulture, and bacteriology.

The students taught are of three classes: those in arts and general science; those in agriculture; and those in medicine. All are required to take a course in general biology, which is popular and suited to the needs of those who will not go on. This is followed by a more technical course in botany, zoology and other branches as a foundation for further special work.

It has been the policy of the staff to keep as close as possible to research work and the practical applications of biology, for this is the way to make the students in the highest degree useful to their country. Much is yet to be learned about the insect pests and fungus diseases of crops in China. And Chinese farmers will soon be anxious for this information and ways of fighting their pests.

During the vacation trips the staff have begun a biological survey of the Canton Delta region. About a thousand species of insects have been collected, some of which are of economic importance. A herbarium of South China plants begun in 1916 by students of agriculture has been turned over to the department and is now one of the most important projects under its direction. While the herbarium has already over four thousand specimens, including more than twelve hundred species, only a beginning has been made. Expeditions must be made into the interior, and the whole of south China must be covered. Funds are needed for larger equipment.

Another line of work which has fallen to the department is sericulture. Silk is the largest industry of South China, forming forty per cent. of the export trade. Many things have held back the development of the industry. The filatures did not reel the raw silk in skeins of a size suitable for foreign manufacture. This has now been changed and modern methods have been introduced.

Later the department hopes to effect im-