received a small quantity of the gas. I was, however, unable to pursue the intended experiments because of press of other duties, and submarine disasters suggested that delay in the development of this use of helium might result in loss of life which would otherwise be saved; realizing, furthermore, my own inability to carry on the large scale experiments that would be necessary, I decided to lay the matter before the Bureau of Mines. On January 29, 1924, I accordingly wrote to Dr. S. C. Lind as follows:

You have probably heard of caisson disease and the theory that it is caused by the release of dissolved gases in the blood as pressure is removed on coming out of the caisson, or, in the case of a diver, in coming up from a considerable depth of water. There is considerable physiological evidence in favor of this theory. This is the trouble which limits the depth at which diving operations are practicable.

Inasmuch as helium is only about one-half as soluble in water as is nitrogen, it has occurred to me that a diver breathing a mixture of oxygen and helium would be able to work at greater pressures or to come up from a greater depth more rapidly. I suppose that any oxygen dissolved as such in the blood could be readily disposed of by muscular effort and would not be a source of trouble. If helium is of service in this connection, it would obviously be of great economic importance in salvaging operations.

I had hoped to try a few experiments with mice, releasing them suddenly from a pressure of several atmospheres, using in one case air and in the other case a mixture in which helium replaced the nitrogen of the air. However, my time is so much taken up that there seems to be no very early prospect of trying such experiments. It has occurred to me, therefore, that this is a problem which the Bureau of Mines might like to investigate. The results, if successful, would doubtless be patentable, so that work should be done with due regard for protection. I am not desirous of making any money personally from such a venture, but I would hate to have any one else do so, and would want any profits used for scientific purposes. I will be glad to hear what you think of the prospect.

At this time I was altogether unaware that this use of helium had occurred to any one else, and certainly had no means of knowing what was going on in the mind of Mr. Thomson. The issuance of a patent to C. J. Cooke, on November 6, 1923, was unknown to me until a long time after, as I am not in the habit of perusing patent literature. While, therefore, my associates and I can not claim priority in publication, we are, I am sure, indebted to no one else for the idea.

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DE KRUIF'S MICROBE HUNTERS

OUR attention has been drawn to a book called "Microbe Hunters," recently published by Harcourt, Brace and Company, New York, written by Paul de Kruif. The work evidently aims at being a kind of popular history or rather romance regarding medical discovery, and mentions us among others. We should like an opportunity to say, for the information of your readers, that the author's statements about ourselves and our researches are incorrect; that they are not supported by reference to the original literature; and that his knowledge of the subjects with which we have been concerned is obviously incomplete.

We have been legally advised that some of his assertions regarding ourselves are libellous according to British laws; but in America we have no means of protection except a public denial of the truth of his allegations, and we therefore trust that you will allow us to publish such a denial, as emphatically as we may, in your columns.

Dr. Cuthbert Christy's signature does not appear on this letter as he is in Africa; before sailing, however, he left us the following statement:

"With regard to Chapter IX of Paul de Kruif's book 'Microbe Hunters,' I beg to emphatically state that it contains statements which are totally erroneous and misleading. As an example I will quote paragraph 2, page 264, which reads: 'The third member (*viz.*, myself) became disgusted with the ignorance and failures of his two colleagues and went off prospecting for rubber. . . .' This paragraph is absolutely untrue. It suffices to say that I have always given credit to Castellani for his discovery of the trypanosome as the etiological agent of sleeping sickness—see, for instance, my letter to *The Morning Post,* August 22, 1923. As regards my abandoning my colleagues and going off prospecting for rubber, this is absolutely untrue. I never abandoned my colleagues, and, as a matter of fact, I did not get interested in rubber until 1906 which was three years after the labors of the First Sleeping Sickness Commission were completed."

ALDO CASTELLANI,
GEORGE C. LOW,
DAVID NABARRO,
RONALD ROSS

PUBLICATION BY PHOTOGRAPHY

THE recent discussion of publication by photographic reproduction of typewriting (SCIENCE, Dec. 31, 1926; Feb. 18, Feb. 25, 1927) may warrant the following additional notes. The subject is well

worthy of serious study by those who have tabular data to publish, not only because it may be less expensive but also because it avoids all possibility of printer's errors and saves much time usually devoted to proofreading. I have been interested in this method for many years and have used it successfully in several instances, though not recently. A red copying paper used instead of black carbon paper proved just as satisfactory in the reproduction and the red copy was not easily soiled by accidental smudging. Carbon copies may be fixed with shellac solution or similar material. The difficulty of the typist not being able to see the copy as it is being made without use of ribbon can be satisfactorily avoided if certain makes of carbon paper are employed, the type impressions being faintly legible on the reverse of such papers. For one form of typewriter, frequently used by scholars, it is (or was a few years since) possible to secure rolled strips of carbon paper much like the regular ribbon, to be used in place of the latter. The same make of machine controls the type blow by means of a spring, so that perfect uniformity of impact is secured, no matter how the keys are struck, and it has interchangeable type shuttles, allowing the use of many sizes and styles of type and types of many languages. A ribbon may be used instead of copying papers without bad results if a large type is employed and the photographic reduction is great, for the "fringes" practically disappear with such reduction. In such cases a red ribbon has proved better than most black ones. A clearly typed page eight and a half inches wide may be perfectly reproduced as a zinc etching two inches wide or even still narrower and the reproduction is legible without the use of a lens. A reduction to three inches in width is perfectly satisfactory when ordinary typewriter type is used. Tabular matter prepared by hand, by a good draftsman using India ink, is even more satisfactory than typewritten copy and it will bear very great reduction. Erasures on the copy may be made by means of "white ink" (white water-color) but one must make sure that the material used photographs as white; some of the white inks on the market reproduce as black and their use in this way is disappointing. As has been mentioned by others in earlier contributions to this discussion, slight alterations are satisfactorily made by means of paper slips pasted on to the copy.

Those who are interested in this method of publication may be interested in the following references, in which examples of tabular matter thus reproduced may be found. Plant World **17**: 345 (1914); *ibid.* 19: 287 (1916); Physiol. Res. **2**: 341 (1921).

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SINCE my first note, in the issue of December 31, 1926, I have learned that the photographic reproduction of typewriting has been used quite extensively by the Carnegie Institution of Washington. For the marked success attained in printing by this method see, for example, Lehmer's "List of Prime Numbers," his "Factor Table of the First Ten Million Numbers" and Stager's "A Sylow Factor Table of the First Twelve Thousand Numbers."

During the printers' strike in New York a number of years ago several popular magazines were published by the photographic reproduction of typewriting—however, under conditions of incomplete development as to methods, equipment and personnel. The sphere of usefulness and limitations of the method, which is not well known to scientists though likely to prove of great importance to them, would probably be fairly well brought out if the experiences of those who have used it were put on record.

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ENCYCLOPEDIA OF THE SCIENCES

THE undersigned has arranged for publication through The Science Press of an *Encyclopedia of the Sciences*, which is planned to be a survey of science as complete as can be made. It appears that the large encyclopedias, such as the "Britannica," must sooner or later be divided into separate works treating the main lines of human interest and that the alphabetical arrangement must give place to a classification by subjects. The *Encyclopedia of the Sciences* will consist of more than one hundred separate volumes, each treating a special subject but together forming a systematic and completely indexed review of modern science. Such a series of volumes permits each to be published promptly when ready and to be revised when desirable. It also makes possible the purchase of a single volume, the volumes concerned with a special science or the entire work.

It is planned to publish volumes giving general surveys of each of the principal sciences—mathematics, mechanics, astronomy, geophysics, physics, chemistry, mineralogy, geology, geography, meteorology, paleontology, general biology, botany, zoology, physiology, anatomy, bacteriology, pathology, psychology and anthropology. These will be followed by volumes on the different departments or divisions of these sciences. There will also be volumes on the history of each science, with biographical sketches of scientific men. The question of the inclusion of the applied sciences and of subjects such as education, history, economics and philosophy is left open.

The plan of an *Encyclopedia of the Sciences* has long been under consideration. About twenty years