matter under anaerobic conditions. The gas of the activated sludge process of sewage disposal may also contain 80 per cent. or more of methane.

Recent studies of chemists have aimed to find methods of converting farm wastes such as corn stalks, etc., into a fuel gas, and processes have been proposed which will produce a gas with about 50 per cent. of methane. These results are significant, since methane is exceedingly valuable as a beginning step in the production of hydrogen, ammonia, . . . (NH_3), etc.

Since methane gas, through the increasing use of natural gas and proposed conversion of farm waste, may in the future play a more important part in life, it is well to know all its ecological properties both in nature and in the laboratory.

Methane, it would appear, is a strikingly inactive gas chemically and physiologically, and it is said it can be breathed in concentrations up to 45 to 50 per cent. of the air volume, with no particularly noticeable ill effects aside from a lowering of the oxygen content. It is the active element of the dreaded "fire damp" of coal mines.

The plant life of the Grassy Pond bog would seem to substantiate this inactive physiological behavior, and to the heaths (*Ericaceae*), sedges and other vegetation of these habitats it is perhaps as inert in itself as the free nitrogen which is the necessary diluent component of our atmosphere.

To say the least, marsh gas may be an important environmental factor in some peat bog areas, and under certain conditions may help to create a low oxygen atmosphere in the water and air surrounding the roots of a group of normal associes of these areas, which are highly tolerant of such conditions.

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PATENTS FOR CHEMICAL COMPOUNDS

DR. CHARLES E. RUBY has recently criticized[1] the policy of the United States Patent Office and Courts for granting and sustaining patents for new and useful chemical compounds. He affirms that such chemical compounds are not human creations but are entirely acts of nature. In this he is entirely incorrect. Although many chemical compounds are found naturally occurring, the synthetic methods of chemistry enable many very useful pure substances to be produced that are not found in nature. The conception and eventual construction of new and useful chemical compounds are accomplished only and entirely through the application of human mental and physical activity. This most certainly constitutes invention, for invention can not consist of more or less than the adjustment of nature to human use and needs.

New and useful chemical compounds should be and are classified together with new plants and new machines. A new printing press could, in a certain sense, be called an act of nature; for is not its operation and construction down to the minutest detail governed by the laws of nature? What fundamental difference is there between the concept of a new chemical compound and the invention and construction of it by means of chemical reactions and the concept of a new machine and the invention and construction of it by means of mechanical operations? A new chemical compound is no more made available for human use by nature than is an automobile. If a new engine is invented, a patent may be issued on the engine and not upon the use of lathe and drill press in its construction. Similarly, if a new chemical compound is invented (and it is without question at least as much of an invention as the engine in that it requires as much human ingenuity to conceive and produce it) a patent is and should be issued on the compound and not on the reactions used in its production.

If our patent laws are changed so that new and useful chemical compounds are not given the benefit of patent protection, a considerable amount of chemical research will be immediately stopped and society will lose the benefits of both the research and the new compounds. Restricting the patent protection to the method of production of the compound will not give enough protection to warrant the expense of the research, because once the usefulness of a new compound is shown many methods of producing it can be found.

There is only one minor difference between the construction of a new compound and a machine. The one is accomplished through processes and the other operations; but basically they are the same, as the fundamental laws of mechanics and electricity govern both methods of procedure. From a patent point of view, the birth of the idea, the initial construction, the development and the testing of the results follow the same pattern in both cases.

Our great mechanical improvements of the past were greatly stimulated by patent protection. Let us not now retard our present age of chemical development by withdrawing patent protection.

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[1] SCIENCE, 89: 387, 1939.

THE CONFIGURATION OF GLUTAMIC ACID FROM SCARLET FEVER ANTITOXIN

AFTER reading the remarkable paper by Kögl and Erxleben[1] in which they showed that the glutamic acid, and to a lesser extent some other amino acids of tumor proteins, were partly of the wrong configuration, it

[1] F. Kögl and H. Erxleben, *Zeit. Physiol. Chemie*, 258: 57, 1939.

occurred to the writer that it would be of interest to know whether the glutamic acid of an antitoxin is also partially racemized. If this were the case it would help to explain the great resistance of certain antitoxins toward cleavage by proteolytic enzymes.

Accordingly, a sample of refined and concentrated scarlet fever antitoxin[2] containing three grams of protein was hydrolyzed by hydrochloric acid and the glutamic acid isolated by Foreman's barium salt method. After four recrystallizations the glutamic acid hydrochloride melted at 203° C. and gave the following analysis:

Found:	C, 32.82%; H, 5.48%; N, 7.66%
Calculated for $C_5H_{10}O_4NCl$:	C, 32.69%; H, 5.49%; N, 7.63%

The specific rotation in 9 per cent. hydrochloric acid was $[\alpha]^{27^\circ}_{D} = +32.2^\circ$ when calculated as the free acid (49.5 mg in 3.06 cc gave a rotation of $+0.42^\circ$ in a one dm. tube). This value is in good agreement with that of d-glutamic acid, $+31.5^\circ$.

It is therefore apparent that at least the glutamic acid of scarlet fever antitoxin is of the normal configuration. Whether this situation extends to other amino acids and other antitoxins remains to be seen.

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LUCITE

IN my recent paper, " 'Lucite' for microscopic Transillumination," published in SCIENCE, Volume 89, No. 2312, April 21, 1939, I made the following statement: "This is presumably the first report of the use of Lucite for this purpose and as a substitute for the Abbe Condenser."

Dr. Elbert C. Cole, of Williams College, has kindly called my attention to the fact that a paper written by him in SCIENCE in April, 1938, entitled "Methyl Methocrylate as a Laboratory Tool," suggested the use of this substance for illuminating living tissue for observation with the microscope. I gladly give Dr. Cole priority as to the use of this substance for illumination.

LEE S. FENT

SCIENTIFIC BOOKS

A HISTORY OF SCIENCE

A History of Science, Technology and Philosophy in the 18th Century. By A. WOLF, professor of the history of science in the University of London. 814 pp., with 345 illustrations. The Macmillan Company, New York, 1939. $8.00.

IT is probably universally true that every reviewer wishes to criticize a book within his own field of interest, and particularly from his own point of view. But, in the case of the volume before us, Wolf's "History of Science, Technology and Philosophy," a reviewer must necessarily take a four-dimensional point of view in order to encompass all that is printed within its 814 pages. The thirty-two chapter headings, beginning with eighteenth century mathematics and ending with philosophy, have called forth all that is implied in pure science and technology, including agriculture, scientific instruments, building, transportation, metallurgy, telegraphy, psychology, medicine, economics, social science, geography and philosophy. This wide range of subject-matter is new from the standpoint of the purely academic treatment of the history of science; it should require, therefore, a group of reviewers or encyclopedists to evaluate properly the true merit of this book.

This volume is the second of a series planned by Professor Wolf, and is of the same general character and scholarship as the first book, which was critically reviewed in SCIENCE.[1] The main points of criticism which Dr. Sigerist brought out in this review concerning the treatment of the history of science in the sixteenth and seventeenth centuries are still valid in the volume for the eighteenth century. There is the same lack of coordination and continuity of subject-matter, and there is no critical analysis of the theory, work and philosophy of each scholar, inventor and philosopher. According to Professor Wolf's treatment in the historical method, each field of activity has gone its own appointed way without apparent reference to the basic sciences.

Modern science has its heritage, and a rich one, from the past. Each succeeding age or century shows something of a mathematical progression in its accomplishments. Accordingly the sixteenth and seventeenth centuries were treated in one volume, while the eighteenth century alone required one volume with one hundred pages more for its treatment. The eighteenth century was a critical one in that scientific discoveries, based upon fundamental principles and natural laws, were asserting themselves in the form of practical application to the needs of society and the betterment of man. Professor Wolf has shown that advances were made in almost every field of intellectual enterprise and that there was an unprecedented spread of knowledge beyond the circle of the specialists. He has by comparison shown that the age of enlightenment was a worthy heir to the age of genius. But he has treated upon this only in the form of chapters on independent subjects, and not as a continuous history

[2] Kindly furnished by Parke, Davis and Company.

[1] SCIENCE, 83: 2150, 262–264, March 13, 1936.