Conclusion.

In the course of this series of articles, I have referred to the many points on which light was thrown by the observations made in 1893.

It is quite obvious that the aim of those who observe in India next year with the view of advancing the more important problems of physics and chemistry presented to us by the eclipsed sun, should work along the new lines with a view of testing the soundness of the conclusions so far arrived at, and of obtaining new knowledge. I cannot, I think, more fitly close this article than by giving a very brief summary of the conclusions arrived at in the observations of 1893, so that my readers can gather the drift of much of the work that will be undertaken in 1898.

(1) With the prismatic camera photographs may be obtained with short exposures, so that the phenomena can be recorded at short intervals during the eclipse.

(2) The most intense images of the prominences are produced by the H and K radiations of calcium. Those depicted by the rays of hydrogen and helium are less intense and do not reach to so great a height.

(3) The forms of the prominences photographed in monochromatic light (H and K) during the eclipse of 1893, do not differ sensibly from those photographed at the same time with the coronagraph.

(4) The undoubted spectrum of the corona, in 1893, consisted of seven rings besides that due to 1474 K.

The evidence that these belong to the corona is absolutely conclusive. It is probable that they are only represented by feeble lines in the Fraunhofer spectrum, if present at all.

(5) All the coronal rings recorded were most intense in the brightest coronal regions near the sun's equator as depicted by the coronagraph.

(6) The strongest coronal line, 1474 K, is not represented in the spectrum of the chromosphere and prominences, while H and K do not appear in the spectrum of the corona, although they are the most intense radiations in the prominences.

(7) A comparison of the results with those obtained in previous eclipses confirms the idea that 1474 K is brighter at the maximum than at the minimum sun-spot period.

(8) Hydrogen rings were not photographed in the coronal spectrum of 1893.

(9) D_3 was absent from the coronal spectrum of 1893, and reasons are given which suggest that its recorded appearance in 1882 was simply a photographic effect due to the unequal sensitiveness of the isochromatic plate employed.

(10) There is distinct evidence of periodic changes of the continuous spectrum of the corona.

(11) Many lines hitherto unrecorded in the chromosphere and prominences were photographed by the prismatic cameras.

(12) The preliminary investigation of the chemical origins of the chromosphere and prominence lines enables us to state generally that the chief lines are due to calcium, hydrogen, helium, strontium, iron, magnesium, manganese, barium, chromium, and aluminium. None of the lines appears to be due to nickel, cobalt, cadmium, tin, zinc, silicon, or carbon.

(13) The spectra of the chromosphere and prominences become more complex as the photosphere is approached.

(14) In passing from the chromosphere to the prominences some lines become relatively brighter, but others dimmer. The same lines sometimes behave differently in this respect in different prominences.

(15) The prominences must be fed from the outer parts of the solar atmosphere, since their spectra show lines which are absent from the spectrum of the chromosphere.

(16) The absence of the Fraunhofer lines from the integrated spectra of the solar surroundings and uneclipsed photosphere shortly after totality need not necessarily imply the existence of a reversing layer.

(17) The spectrum of the base of the sun's atmosphere, as recorded by the prismatic camera, contains only a small number of lines as compared with the Fraunhofer spectrum. Some of the strongest bright lines in the spectrum of the chromosphere are not represented by dark lines in the Fraunhofer spectrum, and some of the most intense Fraunhofer lines were not seen bright in the spectrum of the chromosphere. The so-called "reversing layer" is, therefore, incompetent to produce the Fraunhofer spectrum by its absorption.

(18) Some of the Fraunhofer lines are produced by absorption taking place in the chromosphere, while others are produced by absorption at higher levels.

(19) The eclipse work strengthens the view that chemical substances are dissociated at solar temperatures.

NORMAN LOCKYER.

VICTOR MEYER.

VICTOR MEYER was born on September 8, 1848, and died on August 8, 1897. He studied chemistry at Heidelberg, under Bunsen, and at Berlin, under Baeyer. His first official appointment was at Stuttgart, whence he was called, in 1872, to the chair of Chemistry at the Zürich Polytechnic. In 1885 he went to Göttingen, and in 1889, on the retirement of Bunsen, he was appointed Professor of Chemistry at Heidelberg. The later years of his life were clouded by ill-health. His almost abnormal mental activity allowed him no rest, and he suffered greatly from insomnia. To the effects of this malady on a highly sensitive nervous organisation must be ascribed his tragic death in the midst of a career which, brilliant though it was, gave promise of still greater things in the future.

As an investigator Victor Meyer undoubtedly stands in the very front rank. In these days of specialisation it is given to but few men to possess a complete mastery over more than one department of a science. Meyer was equally at home when dealing with the problems of physical chemistry and when working out the chemistry of a group of organic compounds.

His first important investigation was that on the nitro-paraffins. In 1872 he discovered nitro-ethane, and, following this up with characteristic energy, had soon studied several of its homologues, as well as secondary and tertiary nitro-paraffins. By the action of nitrous acid on these substances he obtained nitrolic acids and pseudo-nitrols, and, by his study of these substances, cleared up the constitution of iso-nitroso and nitroso compounds. In 1882 he made the important discovery that iso-nitroso compounds are formed by the action of hydroxylamine on aldehydes and ketones. The generality of this reaction has been of considerable importance in the determination of the constitution of organic compounds, affording a sure indication of the presence of a carbonyl group.

Meyer's discovery of the oximes may be regarded as the foundation of our knowledge of the stereochemistry of nitrogen, for in 1888, working with his pupil Auwers, he showed that the two isomeric benzil dioximes then known were structurally identical. It is of interest that the molecular weights of these bodies were shown to be identical by means of the, then little known, cryoscopic method. To the further development of the stereochemistry of nitrogen, Meyer and his pupils contributed not a little.

The discovery of thiophene in 1882 by Victor Meyer was the result of a lecture experiment which failed. Benzene prepared from benzoic acid was shaken with strong sulphuric acid and isatin, and failed to give the

usual blue colouration. Further investigation revealed the fact that the blue colouration is due to an impurity in ordinary coal-tar benzene, viz. thiophene. The discovery of this remarkable substance was of great importance, giving a deeper insight into the nature of aromatic substances. Six years after the discovery of thiophene, he was able to publish a monograph "Die Thiophengruppe," containing a masterly account of thiophene and its derivatives, practically the whole of the work having been carried out in his own laboratory.

Another extremely interesting group of compounds, our knowledge of which is due to V. Meyer and his pupils, is that derived from the hypothetical iodonium hydroxide, $IH_2.OH$. In these substances the iodine plays a part analogous to that of nitrogen or sulphur in the ammonium and sulphonium compounds. The curious and striking resemblance of the corresponding diphenyl iodonium and thallium salts is very suggestive.

Many of his investigations related to the connection between the constitution of a substance and the relative ease with which it entered into a given reaction. As examples may be mentioned his work on the influence of certain groups on the acid properties of substances containing them, and that on the relative ease of etherification of substituted benzoic acids, and on the formation of oximes or hydrazones of aromatic ketones.

Victor Meyer's best-known work is certainly that on vapour-density. A description of his air-displacement method of determining vapour-density is to be found in almost every text-book of chemistry, and a specimen of his apparatus in almost every laboratory in the world. The method was devised in 1878, and since then hardly a year has elapsed in which he has not described some improvement of the apparatus, rendering it capable of more extended usefulness or some results, frequently of the highest interest, obtained by means of it. It is not easy to realise how little we would know of the molecular condition of vapours, especially at high temperatures, if Meyer's work in this direction were swept away. In a fascinating paper published in 1890, entitled "Chemische Probleme der Gegenwart," he gives rein to his scientific imagination, and discusses what might occur if it were possible to carry out vapour-density determinations at temperatures as much above the highest now reached as the latter are above the ordinary temperature.

In recent years he paid much attention to the study of chemical change in gaseous systems. The investigation of the reaction between iodine and hydrogen is particularly noteworthy as affording one of the very few examples known of a normal reaction between gases.

As a lecturer, Victor Meyer was equally admirable. He had a wonderful power of rapidly presenting a subject clearly to his students, and, at the same time, of impressing fundamental conceptions on their minds. He was never dogmatic; if there were two views current on any subject he carefully explained both of them, leaving his hearers to form their own opinions. The bearing of chemistry on practical matters was not forgotten; for example, when dealing with sugar he sketched the development of the German beet-sugar industry, and gave an account of the legislation connected with sugar bounties and its economic consequences. The experimental illustration of his lectures was extremely complete and carefully prepared. This was not only the case with the lectures on inorganic, but also with those on organic chemistry, the number of substances prepared in the latter being quite astonishing. To make this possible in cases where, for example, a prolonged heating was necessary, the beginning of the reaction was shown in one experiment, the end of it in another, which had been started before the lecture.

The "Lehrbuch der Organischen Chemie," by Victor Meyer and Paul Jacobson, the first part of which appeared in 1891, is written with that freshness which is hardly possible without an intimate personal acquaintance with the subject. It is especially valuable in these latter days, when the writing of text-books by men who take a foremost part in investigation is not so common as in the time when Berzelius, Liebig, Gerhard and Kekulé wrote their classical works.

NOTES.

THE French Academy has just accepted the administration of M. Pierre Lasserre's legacy, now amounting to 576,450 francs. In accordance with the terms of the bequest, the capital sum will be divided in three parts, the interests upon which will be awarded to the author of the best literary work, for an important scientific discovery, and to the composer of the best musical work. The respective awards will be made by the French Academy, the Academy of Sciences, and the Academy of Fine Arts.

THE Council of the Society of Arts have appointed the following Committee to investigate the causes of the deterioration of paper: Major-General Sir Owen Tudor Burne, G.C.I.E., K.C.S.I., Chairman of the Council; Sir William Anderson, K.C.B., F.R.S., Mr. Michael Carteighe, Mr. C. F. Cross, Sir John Evans, K.C.B., F.R.S., Dr. Richard Garnett, C.B., Dr. Hugo Müller, F.R.S., Dr. W. J. Russell, F.R.S., Mr. W. L. Thomas, Prof. J. M. Thomson, F.R.S., Mr. Henry R. Tedder, Dr. Quirin Wirtz, Sir Henry Trueman Wood, Secretary. In the course of a circular letter which has been sent to those who are interested in the preservation of paper, it is pointed out that many books of an important character are now printed upon paper of a very perishable nature, so that there is considerable risk of the deterioration and even destruction of such books within a limited space of time. This is believed to be especially true of books which are in constant use for purposes of reference, and are therefore liable to much handling. Although a great deal of investigation has been made into the subject in Germany, the matter appears to have attracted but little attention in this country. The Council of the Society of Arts therefore readily acceded to a proposal made to them, and appointed a Committee to inquire into and report upon the whole subject.

AT Crevalcore, a small town situated on the outskirts of Bologna, there was to be unveiled yesterday, September 8, a bronze monument erected in honour of Marcello Malpighi, the celebrated Italian anatomist, botanist, and microscopist, the contemporary, amongst others, of Hooke, Grew, and Oldenburg, names famous in the early annals of our Royal Society. Malpighi's relations, indeed, with that Society were close and cordial throughout. His interesting correspondence with Henry Oldenburg, its first Secretary, and with men equally concerned in the "Improvement of Natural Knowledge," is carefully preserved in the Society's archives. Not only this, his autobiography, and many most important contributions to the anatomy of plants, and discoveries in physiology were published in London under the auspices of the Royal Society, notably "Anatome Plantarum" (1672), and "De Structura Glandularum conglobatarum" (1689), as well as his treatise on the Silkworm, "De Bombyce" (1669). On March 4, 1668, the Society elected Malpighi an honorary member, on the initiative of Oldenburg, and this compliment was in 1680 gracefully acknowledged by Malpighi in the shape of a present of his own portrait. In addition to the inauguration of a monument there will appear at Milan, almost immediately, "Malpighi e l' Opera sua," edited by Doctor Vallardi. Contributions to the volume have been