VOL. XV. OCTOBER, 1893. NO. 10.

Issued November, 1893.

THE JOURNAL

OF THE

AMERICAN CHEMICAL SOCIETY.

OPENING ADDRESS.

SECTION OF TECHNICAL CHEMISTRY.[1]

BY WM. MCMURTRIE.

IT is my honored privilege and very pleasant duty to call to order the Section of Technical Chemistry at the World's Congress of Chemists, and in doing so I cannot refrain from expressing my personal satisfaction, in the numerous responses to the call for it and the generous list of subjects we shall be able to discuss.

Of the importance of the work being done by the technologists in this and other countries for the advancement of the great science we represent and for its applications to the varied uses of mankind, little need be said before such an audience as this. It has truly been said in this room that the practical applications of the principles of the science have been the forerunners of the development of these principles themselves; and the necessities which these applications have involved, have indeed led to that deeper search for knowledge and to the stimulation of that faculty of invention through which and by which such development of principles could alone be possible. As man's necessities have increased, the development of the great principles which govern all our work has grown, and greatness in both these lines of human activity has been achieved by reciprocal reaction and mutual aid. In the earlier years of the history of our science, the technologists, the toilers in the works

[1] Read before the World's Congress of Chemists, August 25, 1893.

and factories of the manufacturers, depended largely and almost wholly upon the laboratories independently devoted to research, for the closer knowledge of the empirical methods they were forced to employ: but stern necessity, brought about by commercial competition and trade requirements has caused a closer union between the manufacturer and the analytical chemists, and to-day few successful works will be found in this or any other country in which competent corps of analytical and research chemists are not firmly established, controlling laboratories in which the additions to the sum of human knowledge are being massed in mountains of experience and progress. It is true that much of this knowledge is being immediately applied to what seems to be more or less selfish ends. But in this as in other lines, brilliant light cannot be forever hid, and the discoveries and advances here made soon show themselves, first in the new products, then in the extended works, and finally through the stimulus of necessity aroused in others in greater discoveries elsewhere. Truth once developed and brought forth cannot long be kept back, and it is therefore fair to say that the work of the chemists in the technical lines is doing as much to develop the science we all love so much, as the work of that noble and unselfish class who so earnestly struggle after the more abstract principles. The advancement that is being thus made is reflected fairly well in the list of the patented inventions, and the statistics. In the class of chemicals alone, there have been issued from the American patent office during the past decade patents for 657 such inventions. And when we reflect upon the restrictions which from year to year increasingly bear upon the issue of all letters patent we must see in this record, indications of much earnest thought and patient work.

If we consider the value of the product of the applications of chemistry in the arts we must be impressed more than ever by the importance of the work entrusted to those who constitute the section I have had the honor to call to order. Statistics collated by competent authority, as will appear in one of the papers that will be presented in this section, will show that the value of these products reached in 1890 the enormous addition

to our national wealth of $176,000,000. Such data are significant and are a just source of proper pride to those engaged in the work of production.

It has seemed to me that no time or place could be more auspicious for this International Congress of Chemists called to discuss the advances that have lately been made and the possibilities for the future. If we look to the immediate past we see that the advances that have been made during the past three or four years have all the importance of the work of a decade, and whether we look to the organic side of the work or over the inorganic field we see the same enormous activity. In the dyes so rich and so beautiful, in the explosives so powerful and terrible, in the valued additions to our materia medica continual evidence of progress is manifest; in metallurgy the minute exactness in extraction of the precious metals from very low grade ores illustrated in the cyanide process for gold and its modifications and the aluminum zinc process for desilverization of lead—the oxidation and basic process for extraction of copper, the electrolytic processes for extraction and purification of this metal, the new and beautiful process of Mond for extraction of nickel through the production of its carbonyl compound, the extension of the value of aluminum by increase of its strength through the inventions of Prof. Langley must all challenge our ardent admiration and our most profound respect, while the addition to our resources in the new and developing processes for the production of the alkaline products and the bleaching agents and the chlorates by the application of electrolysis and the economies effected thereby all show profundity of research and keenness of invention rarely if ever witnessed in industrial work. Added to these are the condensation of chlorine and its delivery in liquid form, the production of phosphorus by electrolysis with increased economy and diminished danger over the old reduction processes, and the beautiful methods and apparatus for the production of pure oxygen from the atmosphere at substantial reduction of cost. All these advances following each other with such remarkable rapidity become footprints in the path of progress as lasting as they are deep.

In this city of our temporary adoption, in which are to be

found many of the industries managed on a scale only to be dreamed of in the earlier years, we must find splendid inspiration for future work. It is perhaps fair to say that nowhere else in the world can be found so extensive operations in the production of animal fats and oils; in the complete utilization of the waste animal products; in the manufacture of crude fertilizers, glue, soap, and glycerol; in the manufacture of malt, spirits, and the products of brewing, glucose and refined sugar. These are some of the products of technical work common to the city and while such a list must of necessity be incomplete it is sufficient to amply illustrate the sympathy with our work to be found in our immediate surroundings.

And within easy reach as we are of the great exhibitions of the products of chemical manufactures, those signs of the world's progress resulting from the efforts in which most of us are engaged, we must easily find valued causes for earnest congratulation.

THE TECHNICAL ESTIMATION OF LEAD.

By Albert H. Low.

Received October 31, 1893.

THE ordinary fire assay for lead in ores is frequently so erroneous in its results as to cause great dissatisfaction. With some ores the results are considerably too low, and with others, notably oxidized ores containing iron or copper, the lead button may contain several per cent. of such impurities, and weigh more than is warranted by analysis. In Colorado there has been considerable agitation in favor of abandoning the fire assay for a wet method, but thus far no concerted action has resulted. One of the main objections to a wet method is the lack of a suitable one. A number of schemes, both gravimetric and volumetric, have been proposed, but they all appear to be either too lengthy and troublesome or too inaccurate. The writer has devoted much of his spare time to the subject, and feels that the ideal method has not yet been evolved. Alexander's molybdate method is the shortest scheme proposed, but, unfortunately, lime interferes, and lime is a common constituent of ores. The writer's ferrocyanide method, described below, might