

McCrudden has undertaken to determine by a thorough study of the literature just what is accurately known of the conditions of formation and excretion of uric acid in the animal body. As a man quite familiar with the subject from his previous studies and experimental investigation he has done his work well. The literature references given appear to be very complete, and the book must have a distinct value for the physiological chemist or pathologist interested in this line of research. All the recent chemical work bearing on the relations of the purines is fully considered, which adds much to the practical usefulness of the book for reference. A consideration of all the data presented is sufficient to thoroughly dispose of the Haig and similar doctrines.

J. H. LONG.

THE PENNSYLVANIA RAILROAD SYSTEM AT THE LOUISIANA PURCHASE EXPOSITION. LOCOMOTIVE TESTS AND EXHIBITS. St. Louis, Missouri, 1904. First edition. Philadelphia: The Pennsylvania Railroad Company.

The introduction to this most important document opens with the following statement: "The exhibit of the Pennsylvania Railroad System at the Louisiana Purchase Exposition was designed primarily to show the application of Civil and Mechanical Engineering to the needs of a large railroad." Certainly the report shows that the purpose of the exhibit was fully and completely carried out as would naturally be expected of the system.

As an example of mechanical engineering the locomotive testing plant was presented. The idea of the system of testing as here carried out is credited to Alexander Bowdin of Russia, but the credit of its practical application is given to Professor Goss of Purdue University who seems to have been the first to support a "running locomotive on wheels" and in a laboratory where conditions could be kept constant and without the interruption and variations common in road tests.

In preparing the exhibit and making the tests other railroads were invited to send locomotives and representatives of their engineering forces to aid in testing all the locomotives.

It is stated that "the Pennsylvania Railroad System brought into existence an entirely new testing plant for mounting either freight or passenger locomotives and capable of absorbing for an indefinite period the maximum power of a modern locomotive

when running at any rate of speed between 10 and 75 miles per hour;

"It caused to be designed and constructed a dynamometer capable of registering the tractive power of the heaviest locomotive and at the same time so sensitive as to indicate the slightest variation of force it may exert."

"It has purchased and standardized instruments and apparatus for use in securing all data which have been deemed to be of scientific interest;

"It has organized a complete corps of observers, engineers and computers to carry out the tests and to record, tabulate and analyze the results;

"It has invited and secured the coöperation of scientific and technical men of this and other countries to assist in placing the tests upon the highest plane possible in such work;

"It has overcome difficulties in many cases perplexing and serious, incident to carrying out of such work as a part of a great International Exposition;

"It has as a result of its effort defined the action of eight different typical locomotives as regards performance of the boiler, the engine and the locomotive as a whole under many different conditions of operation making of record a mass of information concerning the economic performance of the modern locomotive of great immediate value and supplying a basis of comparison which will prove useful for many years to come;

"It has met the expenses of equipping and operating the plant with instructed hand, always holding considerations of cost subordinate to the definite object of making the tests as complete and valuable as possible, notwithstanding the fact that the amounts involved have been greater than have ever been appropriated to any similar undertaking;

"It has undertaken a broad plan of publication which is to result in making all its data derived from the tests, and all conclusions based thereon, together with a description of all methods and means employed, all in great detail, accessible to railroad officials and locomotive designers throughout the world."

Special credit is awarded by the Advisory Committee to Messrs. J. J. Turner, Third Vice-president, Theo. N. Ely, Chief of Motive Power, F. D. Casanoor, W. A. Gibbs, A. S. Vogt, E. D. Nelson and G. L. Wall.

We have reproduced here this part of the introduction to their report by the Advisory Committee because it must interest men in every learned profession to have knowledge of work of this class carried out in connection with an International Exposition, illustrating fully and well what the work of such an exposition should be, truly a faithful record of the world's progress in the arts and industries, made in such a way as to be of use for all time. Such work has been attempted in other lines and in other expositions, but never on such a scale and with such practical and accurate results. The results published in this report are of universally greater interest to the mechanical engineer than to the working chemist but even to the latter class they are far from being without value, and many chemists in charge of works will be interested in the volume of data regarding the relation between fuel consumption and steam production and will be interested to learn that in the best types of locomotive boilers in these tests the weight of water evaporated per pound of coal consumed—water from and at 212° F.—varied from 5.5 to 12.5 pounds. Some of us will find comfort in these figures and relief from discouragement which has followed similar tests in the boiler plants of the works, to which the closest attention practicable has been given.

The volumes of results of analysis of fuels used in the tests are of interest and value as are the analyses of the smoke gases, while the methods of analysis will remain the standard for such work. The analyses of coals were made in accordance with the method decided on by the Committee of the American Chemical Society and given in Vol. 21, No. 12, of this Journal. Analyses were made of coal, sparks and ash. Altogether the work will be accepted as high authority by mechanical engineers and will, in very many ways, prove useful to working chemists as well.

The Pennsylvania Railroad System deserves the thanks of the scientific world for having carried out this splendid work and congratulations upon the splendid results obtained.

W. McMURTRIE.

THE UNITED-OTTO SYSTEM OF BY-PRODUCT COKE OVENS. United Coke and Gas Company, New York City, 1906.

As appears from the well-known compilations prepared by Dr. Edward W. Parker, and from Mr. John Fulton's standard treatise on coke, it was only about thirteen years ago that the first