Anthem. An address of welcome was given in English by Sr. Esquival, a response by Dr. Hewett, a welcome by the president of the Chamber of Commerce of Juarez, an address in Spanish by Sr. Ignacio Salas, special representative of the Mexican government, reading of papers, a response to the address of Sr. Salas, by Dr. D. T. MacDougal, closing with "America" given by the military band. The members visited the Agricultural College in Juarez, the old church and other points of interest.

The papers presented at the El Paso meeting occupied four sessions and were given in three sections, Human Science, Biological Science and Physical Science. The subjects specially dealt with were Psychology, Archæology, Education, Forestry, Ecology, Bacteriology, Astronomy, Geology, Chemistry and Medicine. Besides these a half day was devoted to a Symposium upon Southwestern problems. Dr. MacDougal of the Carnegie Institution spoke on Organization of Scientific Interests; Dr. Coan of the University of New Mexico, on Salient Historical Features; Dr. Shreve of the Desert Botanical Laboratory, Tucson, on Plant Distribution in the Mountains, Dean Working, of the University of Arizona, on support of Agricultural Research, Mr. Lawson of the U. S. Reclamation Service, on Reclamation Problems, Dean Butler, of the University of Arizona, on Mining Industry and Dr. Prentiss of El Paso, on Special Features of Medical work in the southwest. The presidential address by Dr. Edgar L. Hewett given Thursday evening in the auditorium of Temple Mount Sinai, was entitled "The Southwest—Yesterday and Tomorrow." It dealt with anthropological lines closely related to the subject of the Symposium. The chief address at the opening meeting on Thursday was by Dr. David Spence Hill, President of the University of New Mexico, on Basic Principles of Research.

In the final business session, a new Executive Committee was elected, consisting of Dr. Edgar L. Hewett, Santa Fe, Dr. John D. Clark, Albuquerque, Dr. V. M. Slipher, Flagstaff, Mr. A. L. Flagg, Phoenix and Professor Romulo Escobar, Juarez, Resolutions of thanks and of appreciation of Mexican cooperation were passed. In a meeting of the executive committee, Dr. A. E. Douglass of the University of Arizona, was elected president and Dr. E. C. Prentiss, of El Paso was elected vice-president and chairman of the executive committee. The secretary-treasurer for the year 1921 will be Mr. Howard W. Estill of the chemistry department of the University of Arizona.

THE AMERICAN CHEMICAL SOCIETY

(*Continued*)

The use of platinum crucibles in electro analysis. Copper determination: HAROLD VAN DOREN and JAMES R. WITHROW; and *The use of platinum crucibles in electro analysis. Rapid Copper determinations:* RUFUS D. REED and JAMES R. WITHROW. We have found that platinum crucibles can be used with proper precautions as readily as platinum dishes and more satisfactorily than flag electrodes for this purpose. Early workers in electro analysis naturally used platinum crucibles but the development of this application of chemistry brought in a variety of other forms, losing sight of the simpler form whose use is now made imperative for economical reasons. The application of the ideas of Richards and Bisby for crowding the current density in a small volume between two platinum crucibles within each other has been tried out and found with slight modification to be eminently satisfactory. Toluene has been found more satisfactory to prevent spraying than kerosene which can be used and which was suggested by Richards and Bisby.

Preparation of manganates and permanganates: H. MCCORMACK. This paper embodies a short description of the customary method for the production of sodium and potassium permanganate and indicates some of the complications in this process and the desirability of avoiding such difficulties by the modification of the process. The modification suggested consists in the crystallization of the sodium or potassium manganate, formed in the reaction between alkaline hydroxide and manganese dioxide, from alkaline solution. The permanganate is then formed by dissolving the manganate crystals in water and oxidizing by some suitable oxidizing agent. The method of oxidation recommended is electrolytic, using an iron anode and cathode with an asbestos cloth diaphragm. A brief summary of results which have been obtained when operating on a commercial scale when using this method is given, and the advantages of operating in this manner as compared with the customary procedure are emphasized.

Estimation of benzene in admixture with paraffin hydro-carbons: H. McCORMACK. There is a considerable quantity of material being used to-day, particularly for motor fuels, which consists of a mixture of benzene and its homologues with gasoline. This has emphasized the desirability of securing a satisfactorily rapid and accurate method of estimating the quantity of benzene which may be present in such admixtures. Considerable study has been given this question by various observers and most of the properties of the compounds which may be present in such admixtures have been utilized from time to time in attempting such estimation. The methods which have heretofore been employed may be separated in two divisions. The methods of accuracy which are long and tedious, and methods of little accuracy which will be used in a short time. This paper describes a method by which the benzene is estimated from the quantity of bromine absorbed in the formation of di-brom benzene. Further work is in progress to determine the possibility of applying the method to estimation of commercial benzol in commercial gasoline where we will have present not only benzene and paraffin hydro-carbons, but also toluene, xylene, and other benzene derivatives.

The permanganate determination of sulfur dioxide: H. S. COITH and JAMES R. WITHROW; *The action of permanganate upon sulfur dioxide and sulfides:* F. C. VILBRANDT and SAMUEL L. SHENEFIELD and JAMES R. WITHROW; and *The iodometric determination of sulfur dioxide:* GORDON D. PATTERSON and JAMES R. WITHROW. These three papers represent a study on various phases of the determination of sulfur dioxide from sulfuric acid plant and smelter fumes. The permanganate reaction with SO_2 proves to be the exception to the rule that permanganate goes to the MnO stage of oxidation in presence of sulfuric acid and sulfites going in part only to the MnO_2 stage, as is familiar in alkaline reactions. We have found in the case of the iodometric method which has proved satisfactory in the Marsden modification used by the Selby Smelter Commission that it can be applied also to high concentrations of sulfur dioxide if the color matching is not brought back to the original iodine color but the blank color brought down by thiosulfate to the end color of the SO_2 specimen.

Uniform packages for reagent chemicals: W. D. COLLINS. In order to secure better service in deliveries of reagent chemicals and to decrease the possibility of contamination in packing the following suggestions are made. (1) A set of standard sizes of packages for each reagent chemical should be adopted by the American Chemical Society. One fairly large and one small size would suffice for most reagents. Five hundred grams and either 100 or 25 grams would probably be selected. (2) Reagents should be sold by weight in grams. (3) Purchasers desiring reagents packed in other than standard packages should expect to pay proportionately more than for the standard packages.

Uniform specifications for chemical thermometers: R. M. WILHELM.

Recovery of industrial gases with activated charcoal: O. L. BARNEBEY.

Evidences of auto-catalysis in the hydrogeration of cotton seed oil: O. R. SWEENEY and JOSEPH ELLERT. A series of experiments are given which were carried out to establish the best hydrogeration conditions using cobalt as the catalyzer. The shape of the curve (slope) indicated that auto catalysis was effecting the results. Experiments were made which seem to bear this out. Since this has never been observed, as far as we can learn, it would seem to be a matter of the utmost importance in view of the very considerable amount of research work being done along this line at present.

The use of ammonia oxidation to replace nitre in chamber plants: CHARLES L. PARSONS. The large saving which is to be made by the use of ammonia oxidation instead of producing nitric acid in the ordinary way where the oxides of nitrogen are to be used in a gaseous form has already been pointed out by the author in the *Journal of Industrial and Engineering Chemistry,* Volume 11, page 451, 1919. On the recent trip to Europe a study was made of the practise in those countries, and it was found that ammonia oxidation was rapidly replacing any other source of oxides of nitrogen. In Germany this method was used almost exclusively, while in England some thirty plants have already adopted it, and no plant which has adopted it has changed back to niter. The plants which were visited and some details of the operations in those plants were given.

A study of the separation of iron from aluminium by precipitation as Prussian Blue: G. O. BURR and HARRISON HALE. Precipitation of Prussian Blue from ferric salts with potassium ferrocyanide in the presence of aluminium was tried. Different concentrations of the salts and different strengths of free acid were used. It was found that the method was not applicable because of the formation of complex aluminium potassium ferrocyanides and the difficulty of filtering the Prussian Blue.

Fuel Symposium. A. C. Fieldner, *chairman*

Low temperature carbonization and its application to high oxygen coals: S. W. PARR. By low temperature carbonization is meant decomposition at a maximum temperature of 750°–800° C. This is not an arbitrary range but is a natural division below which substantially all condensible volatile products are discharged and the minimum amount of secondary decompositions occur. The main points of interest were fully summarized and described. In general, it is believed that all of the products of decomposition have a higher intrinsic value as delivered under low temperature conditions, chiefly because of the avoidance of excessive secondary decompositions. The solid residue is a smokeless fuel of from 5 to 15 per cent. volatile, free burning and of good texture, primarily adapted to use as a domestic or factory fuel. Whether suitable for metallurgical purposes or not has not been determined.

Carbonization of Canadian lignites: EDGAR STANSFIELD. This paper summarizes the results of an investigation on the carbonization of Canadian lignites carried out by the Mines Branch of the Department of Mines, and by the Lignite Utilization Board of Canada, at the Fuel Testing Station, of the Mines Branch, at Ottawa. The first series of experiments was carried out on 10 gram samples with exact temperature control, it showed the effect on the resulting carbonized material of widely differing conditions of carbonization: the results obtained have been used to control all larger scale work. The second series of experiments was carried out on samples of 1–3 kilograms. The experiments were similar to the above, but the tar, gas, ammonium sulphate, and water was also collected and studied. A weight balance sheet, thermal balance sheet and other results obtained in one set of experiments are given. The bearing of the above results, and of the economic conditions in southern Saskatchewan, on the design of a commercial carbonizer for that district are discussed, and the evolution from this laboratory investigation to the successful operation of a semi-commercial carbonizer of new design is traced. This carbonizer treated some 200 pounds of dried lignite per hour; the experience gained with it has been used to design a plant now being built by the board, near Bienfait, Saskatchewan, to treat 200 tons of raw lignite per day.

By-product coke. Anthracite and Pittsburgh coal as fuel for heating houses: HENRY KRIESINGER.

By-product coking: F. W. SPERR, JR., and E. H. BIRD. The paper discusses the present growth of by-product coke manufacture due to the increased use of its products as fuels. This growth is even, to a considerable extent, becoming independent of the iron and steel industry. The fuel efficiency of the by-product coke oven and the beehive oven are compared. The primary products of the by-product coke oven are discussed with relation to their use as fuel. There have been a number of new applications of these products that are important from this standpoint. The gaseous fuels manufactured from coke are also described, together with the possibilities for their future use in systems for the complete gasification of coal. The economical relation of the Koppers' combination oven fired with producer or blast furnace gas is noted, and other recent technical developments which have contributed to fuel economy are cited.

The charcoal method of gasoline recovery: G. A. BURRELL, G. G. OBERFELL and C. L. VORESS.

Colloidal fuels, their preparation and properties: S. E. SHEPPARD. Reasons for name, and history of development—colloid chemistry and fuels—suspensoids and emulsoids—viscosity conditions and stability requirements—stabilizing by protective colloids—development of plastic inner friction and "plasma" structure—peptization processes in theory and practise—accessory testing methods and practical trials.

Gasoline losses due to incomplete combustion in motor vehicles: A. C. FIELDNER, G. W. JONES and A. A. STRAUB.

Enrichment of artificial gas with natural gas: JAMES B. GARNER. The project of enriching artificial gas with natural gas is one which is of wide spread interest because of its possibility of providing a supply of a clean domestic fuel gas, uniform in quality and of sufficient volume to meet the requirements of the public. This is particularly so in regions where natural gas has been used. Gas is more convenient, more economical and safer to use than any other fuel. There are in nature three potential sources of raw materials adequate for the production of a future domestic supply of manufactured gas. These three potential sources are bituminous shale, oil and coal. Artificial gas, as produced on a commercial scale, consists of the following varieties: Shale gas, oil gas, producer gas, water gas, carburetted water gas, coal and coke oven gas. The manufacture of a domestic supply of water gas, enriched with natural gas, serves two purposes—(1) It conserves in the highest possible manner our natural resources of coal, oil and gas and (2) it insures to the public an adequate supply at all times of a clean, uniform gas at the lowest possible cost. Natural gas companies should no longer be permitted to sell natural gas as such at ridiculously low rates but should be required to utilize it in the highest possible way, viz.: as a means of enriching artificial gas. Such use of this natural resource will insure to the public, for many years to come, a supply of gas at a cost otherwise impossible.

The commercial realization of low temperature carbonization: Dr. Harry A. Curtis. The carbocoal process for converting bituminous coal into a uniform, smokeless fuel resembling anthracite was developed by the International Coal Products Corporation at its experimental plant in Irvington, N. J. Both small apparatus and commercial size units have been in use there for the past four years, and there has been an opportunity to compare the results obtained in laboratory tests with those of plant operation. In the carbocoal process the crushed coal is carbonized first at a low temperature (900° F.), the resulting semi-coke is then ground and briquetted with pitch. The briquets are finally carbonized at somewhat below coke-oven temperature (1800° F.). The resulting fuel, carbocoal, is hard, dense, smokeless, and free-burning. More than a hundred coals, including a wide range of bituminous coals and lignites, have been tried in the process, and apparently any coal can be used successfully. Construction of the commercial plant at Clinchfield, Va., was begun during the war as a government war project. It was finally completed and put into operation in June, 1920. Its capacity is between five and six hundred tons of raw coal per day. (Lantern slides showing construction of commercial plant, yields of by-products, etc.)

Fuel conservation, present and future: Horace C. Porter.

Some factors affecting the sulfur content of coke and gas in the carbonization of coal: Alfred R. Powell.

The distribution of the forms of sulfur in the coal bed: H. F. Yancey and Thomas Fraser. A study has been made of the quantitative distribution of the forms of sulfur, namely pyritic and organic sulfur, in coal as it occurs in the various sections or benches of the seam. About 120 samples were collected at twenty working places in three mines, one operating in the number six seam in southern Illinois, one in the number nine and the other in the number twelve bed in western Kentucky. At each face the seam was divided into from four to eight benches and was represented by a corresponding number of samples. Some of the samples were taken at places in the bed which showed the coal intergrown and interbedded with lenses, bands, and cat-faces of pyrite. The purpose of the work was to determine if a relation exists between pyritic and organic sulfur, and in case segregations or concentrations of organic sulfur were found to exist, to associate such occurrences with other impurities or specific recognizable conditions. The data secured indicate no definite and absolute relationship between quantitative amounts of pyritic and organic sulfur in a given bed or sample. Samples taken at five faces in one mine indicate, in the majority of instances, that an increase in pyritic sulfur is accompanied by a decrease in organic sulfur. This is not uniformly true and the data do not warrant any such generalization, except to say that high pyritic sulfur and visible segregations of iron pyrite are not indicative of high organic sulfur content.

Charles L. Parsons,
Secretary

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