In order to appreciate these figures, let us note the theoretical percentages of the simpler possible combinations of monocalcium phosphate and hydrastine.

A. $2Ca(H_2PO_4)_2.C_{21}H_{21}NO_6$.
$Ca(H_2PO_4)_2 = 54.10$ per cent.
$C_{21}H_{21}NO_6 = 45.90$ per cent.

B. $Ca(H_2PO_4)_2.C_{21}H_{21}NO_6$.
$Ca(H_2PO_4)_2 = 37.9$ per cent.
$C_{21}H_{21}NO_6 = 62.1$ per cent.

C. $2Ca(H_2PO_4)_2.3C_{21}H_{21}NO_6$.
$Ca(H_2PO_4)_2 = 28.9$ per cent.
$C_{21}H_{21}NO_6 = 71.1$ per cent.

It will be seen at once that the apparent limit of the amount of hydrastine which can enter into combination with the phosphate, as shown by analyses 5–10, is practically identical with the percentage of the alkaloid present in the hypothetical salt C, where two molecules of monocalcium phosphate are in combination with three molecules of the alkaloid. In the picrate of hydrastine, one of the few crystalline derivatives, we encounter a combination of equal molecules $[C_6H_2(NO_2)_3OH.C_{21}H_{21}NO_6]$, the amorphous sulphate and chloride ($C_{21}H_{21}NO_6.H_2SO_4$) correspond, however, to the formula B. While the formula C is unsupported by analogy and the aid of crystallization is lacking, the analytical data point strongly towards this as the correct expression for the product obtained by the method described.

TORONTO MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE British Association for the Advancement of Science met in Toronto, August 18–25. Many prominent scientific men from Canada and the United States, as well as from Great Britain, were in attendance.

Professor William Ramsay, of London, was president of the chemical section. His address was on "An Undiscovered Gas." A consideration of the periodic law and of the atomic weights of helium and argon (4 and 40) suggests that there may be another similar element with an atomic weight of about 20. Helium has been subjected to a long series of diffusions by Pro-

fessor Ramsay and Dr. Collie in the endeavor to find such a substance. The gas was by this means separated into a lighter portion with a density of 1.98 and a heavier portion with a density of 2.275 ($H_2 = 1$). The spectroscopic examination showed the presence of argon in the heavier portion, but no evidence of the existence of a new gas could be discovered. Such a negative result cannot, of course, be taken as proof of the nonexistence of the substance sought, and Professor Ramsay very courteously concluded his address by expressing the hope that the prophecy implied in it may find its fulfilment on this side of the ocean.

The papers of most interest presented before the section were the following:

Professor Ramsay described in detail the apparatus used for the diffusion experiments with helium, and described experiments which demonstrated that the apparatus could be successfully used to separate air into two portions, one richer and the other poorer in oxygen, while nitrogen cannot be so separated into a lighter and a heavier portion.

Professor B. Brauner, of Prague, Austria, read an interesting paper on "The Atomic Weight of Thorium" and demonstrated the use of ammonium oxalate in separating thorium from other rare metals.

Professor T. W. Richards, of Harvard University, gave a short account of his recent determinations of the atomic weights of nickel and cobalt, which show the same painstaking care and accuracy which has been attained in his previous work.

Mr. Ramage, of Dublin, presented a paper by Professor W. N. Hartley and himself on the "Spectroscopic Examination of Minerals and Earths." The paper was illustrated by the projection of photographs of spectra obtained, chiefly, in the oxyhydrogen flame. They have demonstrated the presence of gallium, indium, thallium, and other rare elements in many samples of iron and of iron ores. The presence of gallium, especially, has also been demonstrated from the spectra of the flames of Bessemer converters.

On Monday, Professor Meslans, an associate of Professor Moissan, of Paris, contributed a "Demonstration of the Preparation and Properties of Fluorine." The gas was prepared by the electroly-

sis of anhydrous hydrofluoric acid containing acid potassium fluoride in a copper vessel surrounded with a freezing mixture. To free the gas from vapors of hydrofluoric acid it was passed through a copper coil surrounded with solid carbon dioxide and alcohol. The action of fluorine on charcoal, silicon, sulphur, iodine, potassium iodide, and on various compounds of carbon was demonstrated.

A paper by Professors Moissan and Dewar on the "Properties of Liquid Fluorine" was also read. The boiling-point is —185° to —187°, the critical temperature —118°, the critical pressure twenty-five atmospheres. The density of the liquid fluorine is 1. The gas liquefies in boiling air but not in boiling oxygen. It is soluble in liquid air.

Professor H. B. Dixon, of Manchester, England, read a paper on "Photographs of Explosion Flames." Photographs were projected of explosion flames as taken on sensitive paper attached to a rapidly moving drum. The photographs demonstrate that mixtures of cyanogen with an excess of oxygen burn at first to carbon monoxide, the temperature being probably above the dissociation temperature of carbon dioxide. The velocity of waves in the incandescent gas from mixtures of cyanogen and oxygen, as shown by the photographs, indicates a temperature of 3,000° to 4,000°.

Professor J. U. Nef, of Chicago, read a paper on the Chemistry of Methylene. The preparation and remarkable properties of some newly discovered derivatives of methylene were described. Among the most interesting of the new compounds are the derivatives of acetylidene, $CI_2=C$ and $CHI=C$. In the latter case the isomer $CH=CI$ has also been prepared and exhibits a very remarkable difference in its properties. Dr. Nef appears to consider the preparation of a gaseous carbon of the formula $C=C$ as possible, though, perhaps, scarcely probable.

On Tuesday morning the chemical section met with the sections for physiology and botany to listen to a paper by Professor Meldola, of London, on the Rationale of Chemical Synthesis. About 300 compounds found in plants and animals have been prepared by synthetical processes in the laboratory. The opinion was expressed that most of these compounds are on what may be called a low level, as compared with the most important com-

pounds which are formed synthetically in vegetable and animal cells. The laboratory processes, too, are, as a rule, radically different from the processes within the living forms, though no one now believes that the chemical forces within the organism differ in any respect from those outside. In the discussion which followed, in which several biologists and chemists took part, it appeared to be the general consensus of opinion that very little real knowledge has thus far been gained in regard to the processes which give rise to the synthesis of starch, proteids, and other similar substances within living organisms, and some of the enormous difficulties which prevent, thus far, the successful study of such problems were pointed out.

On Friday evening Professor W. C. Roberts-Austen, of London, gave a lecture on Canada's Metals. The experimental illustrations were striking, though their connection with the subject-matter of the lecture was remote. Among the more notable demonstrations were instantaneous photographs showing the similar phenomena produced by the fall of a bullet into a basin of milk and of a bullet of gold into a plate of gold, the constancy of temperature during the melting or solidification of gold as shown by a thermoelectric couple and galvanometer, and the melting of copper, chromium, and silver in an electric furnace, the phenomena being made visible to a large audience by reflection on a screen by means of a concave mirror.

Other papers presented before the chemical section were:

Prof. W. W. Andrews: Reform in the Teaching of Chemistry.

Dr. J. Waddell: The Permeability of Elements of Low Atomic Weights to the Roentgen Rays.

Dr. J. H. Gladstone and W. Hibbert: Continuation of Experiments on Chemical Constitution and the Absorption of X-Rays.

Dr. W. J. Russell: On the Action Exerted by Certain Metals on a Photographic Plate.

M. Travers: The Occurrence of Hydrogen in Minerals.

Prof. F. P. Dunnington: Titanic Oxide.

Prof. F. P. Dunnington: Deliquescence and Efflorescence of Certain Salts.

Dr. J. Waddell: Notes on Concentrated Solutions of Lithium and Other Salts.

Prof. Ramsay: Demonstration of the Spectra of Helium and Argon.

W. L. T. Addison: The Formation of Crystals.

E. C. C. Baly: A Compound of Ozone and Mercury.

J. W. Walker: The Interaction of Hydrobromic and Bromic Acids.

F. J. Shutt: The Composition of Canadian Virgin Soils.

W. H. Ellis: Analyses of Some Pre-Carboniferous Coals.

Prof. P. C. Freer: The Constitution of Aliphatic Ketones.

Prof. Henry: The Nitroalcohols.

Dr. A. Lehmann: Formation of a Benzene Ring by Reduction.

Dr. C. A. Kohn: Condensation Products of Aldehydes and Amides.

Dr. Hugh Marshall: A New Form of Bunsen Burner.

Prof. W. C. Roberts-Austen: Molecular Movements in Metals.

Prof. W. W. Andrews: The Plaster of Paris Method in Blowpipe Analysis.

Dr. W. L. Miller and T. R. Rosebrough: The Vapor-Tensions of Liquid Mixtures.

Dr. C. A. Kohn: The Electrolytic Determination of Copper and Iron in Oysters. W. A. NOYES.

BOOKS RECEIVED.

Some Common Poisonous Plants. By V. K. Chesnut. [Reprinted from the Yearbook of the Department of Agriculture for 1896.] 10 pp. U. S. Department of Agriculture, Division of Botany, Washington, D. C.

Commercial Fertilizers. By H. A. Huston. Special Bulletin, Second Edition. August, 1897. 8 pp. Published by the author. Lafayette, Ind.

Analyses of Manurial Substances and Licensed Fertilizers collected during 1897. Bulletin No. 48, July, 1897. Hatch Experiment Station of the Massachusetts Agricultural College, Amherst, Mass.

Annali del Laboratorio Chemico Centrale Delle Gabelle. Vol. III. Pubblicati daV ittoria Villavecchia. Roma: Tipografia Nazionale di g. Bertero via Umbria. 1897.

Lettera al Prof. S. Cannizaro; Sopra alcune sostanze che si ricavano dall'olio di sesamo e sulla relazoine che esse hanno con la ieazione cromatica caratteristica di quest'olio; Sopra la composizione delle farine italiane e sui criteri che valgono a caratterizzarle nel commercio; Sul gelsolino; Contributo allo studio delle analisi dei saponi; Sopra i petroli da illuminazione che si consumano in Italia; Sopra la dulcina o parafenetol-carbammide e sul modo di riconoscerla; Sull'analisi dei canditi; Sopra la composizione chimica di alcuni vini greci; Recerche sui dégras; Sulla determinazione della glicerina nei vini dolci.