he estimates that these ions are molecular aggregates of about 8000 ordinary molecules each. This estimate of the mass of the ions is, of course, based upon data not altogether satisfactory.

THE RESPIRATION CALORIMETER AT MIDDLETOWN, CONN.

PROFESSORS ATWATER AND ROSA give, in the *Physical Review* for September and October, a very complete description of the calorimeter chamber which they are using at Middletown in their interesting experiments upon energy transformations in the human body.

THE COMPENSATED ALTERNATOR.

THE alternating current dynamo, when used to supply current to lamps only, or to one type of electric motors only, may be made to give constant electromotive force by providing a compound field winding. When, however, an alternator supplies current in varying amounts to lamps and to motors simultaneously, the electromotive force cannot be kept constant by compounding. One of the most interesting of recent improvements in the alternator is that of E. W. Rice, Jr., of the General Electric Company. The alternator and exciter are mounted on the same shaft, and the alternating currents pass through the exciter armature on their way to the mains, causing such variations of the electromotive force of the exciter as to compensate for all kinds of variations of load on the alternator. This new alternator is described in the *American Electrician* for November.

W. S. F.

NOTES ON INORGANIC CHEMISTRY.

A PAPER has been lately issued by the Wisconsin Academy on the influence of the presence of pure metals upon plants, by E. B. Copeland and L. Kahlenberg. It is a complete refutation of the theory of Nageli of the oligodynamic effects of metals upon plants, which is that where a plant is growing in water, in contact with a metal as copper, a trace of copper goes into the solution as a metal and produces a toxic action very different from that produced by a salt of copper in solution. In the experimental portion of the work of Copeland and Kahlenberg, plants (corn, oats, lupines and soja beans) were grown in water in paraffin coated glass beakers, in which were exposed as nearly as possible the same surfaces of different metals. Twenty-five or more elements were tested, and while at the end of the experiment many of them were scarcely tarnished, most showed themselves to have had some influence upon the plant used. Comparing with the sequence given by Neumann of elements arranged according to their surface tensions—magnesium, aluminum, manganese, zinc, cadmium, thallium, iron, cobalt, nickel, lead, hydrogen, bismuth, arsenic, antimony, tin, copper, mercury, silver, palladium, platinum, gold—all of these elements down to mercury, except aluminum, tin and magnesium, are injurious, and excepting further manganese and bismuth, fatal during the time of the experiment. Mercury and silver were sometimes injurious, palladium, platinum and gold never. Regarding aluminum and magnesium, their salts are comparatively harmless. Comparing their results with the known toxicity of the salts of the corresponding metals, the authors conclude that the poisonous action is due to the solution of the metal in the form of a salt and not to an action of any other nature. The paper gives an interesting summary of our knowledge on the toxicity of metals toward plants, and has also a bibliography of the subject.

IN a paper on the heat of combination of copper with zinc, presented to the Chemical Society (London), Dr. T. J. Baker makes use of chlorin water and of HNO_3, $3H_2O$ as solvents of the brass. Up to 30% copper no heat of formation could be detected; it then begins and rises to an ill-defined maximum at 62% copper, and then gradually sinks to zero at 100% copper. This alloy of 62% copper, while possessed of somewhat remarkable properties, does not correspond to any simple atomic compound ($Cu_5Zn_3 = 61.8\%$ copper); the existence of the supposed compound $CuZn_2 (= 32.6\%$ copper) is rendered doubtful from the fact that the alloy of this proportion shows almost no heat of formation.

FURTHER researches on radiant matter in pitch-blende have been made by A. DeBierne,

and are published in the *Comptes Rendus*. Polonium, already found by Curie, seems akin to bismuth and radium to barium. DeBierne has worked upon that portion of the solution of pitch-blende which is not precipitated by hydrogen sulfid in acid solution, but is by ammonia or ammonium sulfid. In this portion were present with iron and aluminum small quantities of many other metals, as zinc, manganese, chromium, vanadium, etc., and rare earths. A new radiant substance was found closely akin analytically to titanium, whose power is 5000 times as great as that of uranium, but is not spontaneously luminous as in the case with radium.

In the *Zeitung für Biologie* H. Harms has gone over again the question of the quantity of fluorin in bones, and his conclusion is that the amount varies from 0.005% to 0.022%, and that the quantity is so small and variable that it must be considered, not as belonging to the constitution of the bones and teeth, but as merely accessory.

It has long been believed that the step from the inorganic carbon dioxid and water to organic plant substance, that is to the carbo-hydrates, was by way of formaldehyde, but the actual existence of the intermediate product could not be proven. By macerating fresh leaves with pure water and immediately distilling, it has been possible for Gino Pollacci to detect formaldehyde in the distillate. The test used for formaldehyde is the violet color given with codein and concentrated sulfuric acid.

A notable contribution to the stereo-chemistry of nitrogen by W. J. Pope and S. J. Peachey appears in the last Proceedings of the Chemical Society (London). When α-benzyl-phenyl-allyl-ethyl ammonium iodid is heated with silver dextro-camphorsulfonate, it is resolved into optical isomers, respectively dextro- and levo-rotary. Here the optical activity appears to be clearly due to the asymmetry of the quinquevalent nitrogen atom, linked to five different groups (or atoms). When the paper was read, Dr. Armstrong characterized it as being the most valuable contribution to stereochemistry since the introduction of geometrical considerations by Le Bel and van't Hoff. J. L. H.

SCIENTIFIC NOTES AND NEWS.

Memorial exercises in honor of the late Edward Orton were held at the Ohio State University on November 26th. Addresses were made by President T. C. Mendenhall, Dr. G. K. Gilbert, Hon. T. J. Godfrey, Professor W. H. Scott and Professor S. C. Derby.

The bacteriologists of America are planning to organize a society to meet during Christmas week in affiliation with the American Society of Naturalists. The first meeting for organization will be held at New Haven during the coming holidays. A program of papers has, however, been provided, and all interested in bacteriological topics are invited to attend. Information in regard to the Society may be obtained by addressing Professor H. W. Conn, Middletown, Ct.

Dr. William R. Brooks, director of Smith Observatory, has just been awarded by the Paris Academy of Sciences 'the Grand Lalande' prize for his numerous and brilliant astronomical discoveries.

Professor Charles R. Cross of the Massachusetts Institute of Technology will give a series of Lowell lectures on 'The Telephone,' beginning on December 19th.

A dinner given by the Physical Society, London, was held at the Hotel Cecil on November 17th. The president of the Society, Professor O. J. Lodge, took the chair, and the guests included Right Hon. A. J. Balfour, Mr. G. Wyndham, M.P., Sir W. H. Preece, Major-General E. R. Festing, Dr. J. H. Gladstone, Professor A. W. Rücker, and Professors G. F. Fitzgerald, A. W. Reinhold, A. W. Ayrton, S. P. Thompson, G. C. Foster, and W. Ramsey.

A totemic column from southern Alaska has been presented to the museum of the University of Michigan by Leon J. Cole, assistant in zoology, who visited Alaska last summer as a member of the Harriman Alaska Expedition. The column is about ten feet high and three feet wide and is made from a tree trunk split lengthwise. It was taken by Mr. Cole from the interior of a house in a deserted village of the Tlingit Indians near Cape Fox.