spite of his unsuited type of mind, found nothing but false values, although he devoted a long period of time to the determinations and used only the simple silver titration method.

Thus far the instinctive talent for avoiding methodical errors, which is clearly the characteristic of Richards's gift, has guided him so surely that no such errors have as yet appeared in his measurements extending over a period of over twenty years. Obeying his measuring instinct, Richards abandoned the method of working with large quantities, in which his celebrated predecessor Stas saw the greatest advantage, and returned to working with quantities of a few grams. The absolute errors of weighing, which led Stas to use large quantities, are so insignificant by the side of all other possible errors that the use of large quantities, with the complications of apparatus and preparative method arising from it, really introduces more errors than it eliminates.

A distinctive trait of the researches of this American investigator lies in his elegant simplicity of means. Just as Penny, in his time, carried out his masterly determinations with the simplest imaginable means, and yet attained a precision surpassing everything that his contemporaries had attained, so Richards shows us that refined complications of apparatus can mostly be dispensed with, if one only thinks a little longer over his problem before undertaking its experimental execution, and reduces the work to its simplest and most transparent form by first experimenting with the head.

As an instance of this I will mention only the simple device for closing a weighing tube *within* the apparatus in which the reaction takes place. This device has rendered possible the handling of many halogen compounds and other hygroscopic substances whose weight would be vitiated to an undeterminable extent by exposure to the air.

And so the study of these researches will be an excellent school for every nascent investigator whose heart's desire it is to learn to work precisely.

In conclusion, it is a satisfaction that this remarkable collection has been published in Germany and in the German language. With us, the publication of such a book is a pleasant enterprise for the publisher and involves no particular risk; in America no publisher could apparently be found who thought that there was "money in."[1]

WILHELM OSTWALD[2]

SCIENTIFIC JOURNALS AND ARTICLES

The Journal of Biological Chemistry, Vol. VIII., No. 1, issued July 19, 1910, contains the following: "The Hæmocyanin of *Limulus Polyphemus,*" by C. L. Alsberg and E. D. Clark. The hæmocyanin from the blood of *Limulus* differs from that from the blood of *Octopus* in percentage composition and in various of its reactions. This fact shows that there are different hæmocyanins and that homologous proteins in different animals are not identical. "On the Preparation of Cystin," by Otto Folin. A convenient and rapid method for obtaining cystin in bulk. "Experiments Relating to the Mode of Decomposition of Tyrosine and of the Related Substances in the Animal Body," by H. D. Dakin. Experiments are described which do not support the view that homogentisic acid is a normal intermediary product in the catabolism of tyrosine and phenylalanine, and which show that this acid is not formed in the body from tyrosine by reactions similar to those which obtain in the oxidation of *o*- or *p*-hydroxybenzaldehyde by hydrogen peroxide. "The Fate of Inactive Tyrosine in the Animal Body together with Some Observations upon the Detection of Tyrosine and its Derivatives in the Urine. The Synthesis and Probable Mode of Formation of Blendermann's Para-hydroxybenzylhydantoïn," by H. D. Dakin. These experiments throw doubt upon the probability of the formation of either *p*-hydroxyphenyl-*α*-uramidopropionic acid or *p*-hydroxybenzylhydantoin in the metabolism of tyrosine. "On

[1] The translator leaves this as in the original.

[2] Translated by M. A. Rosanoff, from the German in the *Zeitschrift für physikalische Chemie,* Vol. 72, p. 759, 1910.

Alkylamines as Products of the Kjeldahl Digestion," by C. C. Erdmann. A method for the qualitative detection and approximate quantitative estimation of alkylamines in the presence of ammonia. Alkylamines were obtained from the product of the Kjeldahl digestion of methyl urea, creatin, creatinin and lecithin. "On the Alleged Occurrence of Trimethylamine in Urine," by C. C. Erdmann. Fresh, normal urine does not contain trimethylamine. "The Study of Autolysis by Physico-chemical Methods, II.," by Robert L. Benson and H. Gideon Wells. A discussion, with experimental data, of the value of estimations of freezing point and electrical conductivity in the study of autolysis. "A Method for Treating and Preserving Large Quantities of Urine for Inorganic Analysis," by Edgar F. Slagle. Add sulphuric acid and evaporate to dryness. "Phosphorus in Beef Animals, Part II.," by C. K. Francis and P. F. Trowbridge. Analytical data showing percentages of water, fat and phosphorus in various parts of cattle. "Note on Chemical Tests for Blood," by P. A. Kober, W. G. Lyle and J. T. Marshall. Tannic acid interferes with various common reactions for blood, hence water, not tea, should be given in test meals when the presence of blood is suspected.

A NEW PRINCIPLE IN THE MECHANISM OF NUCLEAR DIVISION

THE present conception of the causes, which determine the movements of the chromosomes and achromatic constituents of the nuclei of vegetable cells, can hardly be said to be in accordance with our views concerning the mechanical causes of other movements of plants.

It assumes contractility of protoplasmatic parts and affinity between homologous organs as the chief forces in play, but this assumption is evidently not sufficiently supported by what we know about contractility and organic affinity in other domains of physiology.

In a recently published paper, prepared in the laboratory of Strassburger, in Bonn, Mr. Theo. J. Stomps proposes a new principle for the explanation of the mechanism in question.[1] It is based on our knowledge of the function of osmotic forces in the growth of cells and in the movements of plant-organs and simply assumes the same forces for the process of nuclear division.

About forty years ago Sachs discovered the now universally acknowledged fact that growth and related movements, such as geotropism and heliotropism, are determined by the distending of the cell walls through the osmotic activity of the cell sap. The tension of tissues in growing parts was found to be due to the same cause, as were the reactions of sensible stamens to the stings of insects and of the motile organs of leaves to the changes in the intensity of the light.

At that time the presence of vacuoles with cell sap in very young cells, during their meristematic condition, was still unknown. This important fact was since discovered by Went, who proved the individuality and continuity of these vacuoles in the same way as this had been done for chloroplasts by Schmitz and Schimper. The foamy condition, which is now found to be so general in the protoplasm surrounding nuclei during their division, is due to the presence of numerous small vacuoles filled with cell sap. The walls of these vacuoles are to be considered as living parts of the protoplasm and as active in the secretion and accumulation of those substances which determine the osmotic pressure of the cells. These vacuoles may divide themselves or unite in groups into larger ones in the same way as these changes have so frequently been observed in older cells.

Starting from observations on the behavior of the chromosomes during the nuclear divisions in *Spinacia oleracea* and other plants, and especially from their visible changes during the synapsis and the reduction-divisions which prepare the production of the sexual cells, Mr. Stomps proposes a new principle for the mechanical explanation of these phenomena in general.

[1] Theo. J. Stomps, "Kerndeeling en Synapsis by *Spinacia oleracea* L.," Amsterdam, 1910.