PYROELECTRICITY AND PIEZOELECTRICITY.

W. VOIGT (*Wiedemann's Annalen*, No. 13, 1898) shows that the electrification of certain crystals by heating (pyroelectricity) and the electrification by deformation (piëzoelectricity) are in general one and the same phenomenon, and that it is only in such a crystal as tourmalin, which has a single axis distinguished from all other axes by characteristic physical properties, that pyroelectricity is not due wholly to the deformation accompanying a rise of temperature. Professor Voigt also points out that a plate of tourmalin can be used to generate accurately known electric charges by subjecting it to measured compression, and he gives the results of a determination of an electrostatic capacity based upon the known charge generated by a tourmalin plate and the known e. m. f. of a standard cell. W. S. F.

THE ROTARY CONVERTER.

IN two short articles in the *Electrical World*, for December 17th and 24th, Mr. C. P. Steinmetz gives a quite complete discussion of the theory and action of the rotary converter, a machine used to convert alternating current into direct current, mainly in connection with long distance transmission. Mr. Steinmetz's papers are, almost without exception, very difficult to read for the reason, chiefly, that he always gives a great deal of precise information about difficult subjects not generally understood. The present paper cannot, of course, be abstracted, but it is mentioned for the reason that Mr. Steinmetz deserves to be more generally known as one of the foremost electricians of our time; that he is a scientific electrician is a matter of course. W. S. F.

THE TELESCOPE-MIRROR-SCALE METHOD.*

PROFESSOR S. W. HOLMAN has given in the *Technology Quarterly*, for September, 1898, a most complete and usable discussion of the telescope-mirror-scale method for measuring angular deflections. Almost at the very beginning of the paper a list of the fourteen instrumental errors is given, together with directions for making the adjustments which are necessary to reduce each error to a prescribed value. Following this is a general discussion of each error of adjustment and a derivation of the error in angle due to each. Most physicists have, of course, looked into the detailed theory of the telescope-mirror-scale method in spite of the fact that the literature on the subject is not generally accessible, but the habitual use of the method for rough measurements makes one lose sight of a dozen or more of the adjustments and precautions which are necessary in accurate work, and, therefore, almost every physicist will find this pamphlet of Professor Holman's a useful reminder when the need arises to use the method with all the precision it is capable of. W. S. F.

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NOTES ON INORGANIC CHEMISTRY.

SOME time ago a committee was appointed by the German Chemical Society to formulate an atomic-weight table which should serve as a basis for practical use in analytical calculations. This committee consisted of Professors Landolt, Ostwald and Seubert, and has recently brought in a report which has been widely published. With three exceptions, the decimals in the atomic weights are given only as far as the last figure is practically correct. The weights as far as given agree in general with those published by Professer F. W. Clarke. The most interesting point in connection with the table is that the basis used is the atomic weight of oxygen = 16. It is now a number of years since Dr. F. P. Venable and others in this country and abroad uttered strong protests against the use of hydrogen = 1 as a standard, especially since the atomic weights with few exceptions are determined with reference to oxygen, and at that time the ratio between hydrogen and oxygen was uncertain. Now that this ratio has been, thanks to Professor Morley, rendered almost certain to three decimal places, it is still unnecessary and unscientific to bring in even this little uncertainty, which in the elements of high atomic weight amounts to quite an appreciable quantity. Professor Seubert has been one of the strongest advocates of the basis H = 1, and it is noteworthy that he has agreed to the committee report. In the report Seubert says that, while H = 1 is in

principle the most correct and natural, he agrees to the report chiefly because with O = 16 many of the weights most frequently used in calculations are represented by whole numbers, and hence these numbers are most conveniently used. Landolt adds that he hopes this report will lead to an international agreement as to the figures used.

In a recent paper in the *Journal für praktische Chemie*, W. Eidmann describes the action of metallic magnesium upon compounds containing nitrogen, especially upon the cyanids. At a red heat almost all compounds, inorganic and organic, which contain nitrogen are decomposed, generally with the formation of magnesium nitrid, Mg_3N_2. The cyanids of the alkalies and alkaline earths are decomposed without explosion, the carbid of the metal being formed. This, Eidmann says, shows that the ordinarily accepted formula of the cyanids, *e. g.*, $Ba\begin{matrix} C \equiv N \\ C \equiv N \end{matrix}$ is correct. In the case of those cyanids which decompose at a red heat, as those of zinc, nickel, lead, copper, etc., the reaction with magnesium is more violent and decomposition into magnesium nitrid, carbon and the metal ensues. In the case of those cyanids, as those of silver and mercury, which decompose below a red heat the liberated cyanogen reacts with magnesium with explosive violence.

A series of analyses of waters from wells near the sea-shore are published by P. Guichard in the *Bulletin Société Chimique*. The water in these wells rises and falls with the tide, while the composition of the water leads to the conclusion that there is no direct connection between the wells and the sea, and, hence, it follows, according to the author, that subterranean waters must be affected by the moon, even as the ocean. This conclusion will, doubtless, find many to dissent from it.

A description is given in the *Pharmaceutische Zeitung* by Alfred Zucker of the manufacture of whitelead by electrolysis, at Dellbrück, according to the Luckow process. The electrolyte is a 1½% solution of 80% sodium chlorid and 20% sodium carbonate. The anode is soft lead, the kathode hard lead. The current is 0.5 ampère per square centimeter at 2 volts. Water and carbon dioxid are carefully added as the electrolysis proceeds. With care as to the strength of the electrolyte, a purity of whitelead is obtained not hitherto reached. The hygienic regulations of the factory are worthy of mention. Every operative receives daily one liter of fresh milk, and at the conclusion of his daily work must clean very thoroughly his hands, finger nails, etc. In addition he receives Glauber's salts, and every fortnight must take a complete warm bath in water which contains a certain amount of liver of sulfur. By these precautions all cases of saturnine poisoning have been avoided for several years.

Although not under the head of inorganic chemistry, mention may be permitted of a description of the manufacture of artificial silk in a recent number of the *Zeitschrift für Angewandte Chemie* from the pen of H. Wyss-Naef. The first practical use of the process was in 1889. The raw material is carded cotton which is first converted into nitrocellulose by a bath of strong nitric and sulfuric acids. After washing and drying it is dissolved in a mixture of alcohol and ether. This collodion is then spun through openings .08 mm. diameter. The alcohol and ether evaporate almost instantly on spinning and the material is carefully dried. It is then treated by a secret process to reduce the nitro groups, ammonium sulfid being probably the reducing agent used. The silk is then bleached with chlorin and is ready for the market.

J. L. H.

CURRENT NOTES ON METEOROLOGY.

THE THEORY OF CYCLONES AND ANTICYCLONES.

A publication of unusual interest, containing conclusions of the greatest importance in meteorology, has been issued as *Bulletin* No. 1 (1899), of the Blue Hill Meteorological Observatory ('Studies of Cyclonic and Anticyclonic Phenomena with Kites,' by H. Helm Clayton). This is a study of the results obtained during the kite flights of September 21st–24th and of November 24th–25th last, and it will aid materially towards once more strengthening belief in the older Ferrel, or *convectional* theory of cyclones and anticyclones, as opposed to the newer Hann, or *driven* theory. Lack of space