(2) If the English units be used, the minim and the drachm should not be employed at all. All weights should be expressed either in grains or decimal parts of a grain, or in ounces and fractions of an ounce ; all measures in fluid grains, or in fluid ounces and fractions of a fluid ounce.

B. *Formulæ.*—(3) Formulæ should give the number of *parts* of the constituents, by weight or measure, to be contained in some definite number of *parts, by measure,* of the solution. The mixture can then be made up with (*a*) grammes and cubic centimetres, or (*b*) grains and fluid grains, or (*c*) ounces and fluid ounces, according to the unit selected.

(4) The standard temperature for making up solutions should be 15° C. or 62° F. No appreciable error will be introduced by the fact that these two temperatures are not quite identical.

(5) Formulæ should give the quantities of the constituents to be contained in x parts of the finished solution, and not the quantities to be dissolved in x parts of the solvent. When a solid dissolves in a liquid, or when two liquids are mixed, the volume of the solution or mixture is, as a rule, not equal to the sum of the volumes of its constituents. The expansion or contraction varies with the nature of the solids and liquids and the proportions in which they are brought together. In making up a solution, therefore, the constituents should first be dissolved in a quantity of the solvent smaller than the required volume of the finished mixture, and after solution is complete, the liquid, cooled if necessary to the ordinary temperature, is made up to the specified volume by addition of a further quantity of the solvent.

(6) It is very important to specify, in the case of liquids, whether parts by weight or parts by measure are intended. The equivalence between weight and measure only holds good in the case of water and liquids of the same specific gravity : a fluid ounce of ammonia solution or of ether weighs less than an ounce ; a fluid ounce of strong sulphuric acid weighs nearly two ounces.

(7) Whenever possible, formulæ should give the quantities of the constituents required to make up 10, 100, or 1000 parts of the solution.

(8) When a mixture (*e.g.* a developer) is to be prepared just before use from two or more separate solutions, it is desirable that the proportions in which the separate solutions have to be mixed should be as simple as possible—*e.g.* 1 to 1, 1 to 2, 1 to 3, 1 to 10.

(9) When metric units are employed, the original French spelling, "gramme," should be used in preference to the contracted spelling, "gram," in order to avoid misreading and misprinting as "grain."

SCIENTIFIC SERIALS.

IN the *Journal of Botany* for June and July we find contributions to systematic and descriptive botany by Mr. E. G. Baker, on new plants from the Andes, and on the genera and species of Malveæ ; by Mr. F. N. Williams, a synopsis of the genus *Tunica* of Caryophyllaceæ, and others.—Mr. A. Fryer records what he believes to be an example of hybridity in *Potamogeton.*—Mr. H. T. Soppitt describes a new parasitic fungus, *Puccinia digraphidis,* the teleutospore-form of which occurs on *Phalaris arundinacea,* while the æcidio-form is parasitic on *Convallaria majalis.*

THE original papers in the *Nuovo Giornale Botanico Italiano* for July all refer to the geographical distribution of Italian plants, chiefly Hepaticæ and Fungi. Among the papers read at the meetings of the Italian Botanical Society the following are of special interest :—Signor O. Kruch contributes to our knowledge of the foliar fibrovascular bundles of *Isoetes.*—The exhaustive researches of Prof. Arcangeli on the structure of the various organs in the Nymphæaceæ are represented by an account of the leaves of *Nymphæa* and *Nuphar.*—Signor U. Martelli gives a very interesting account of the dissociation of a lichen (*Lecanora subfusca*) into its constituent algal and fungal elements, the complement of Stahl and Bonnier's observations on the synthesis of lichens.—Prof. Arcangeli describes the carnivorous habits of an Aroid, *Helicodiceros muscivorus.*

American Journal of Science, July, 1890.—The inconsistencies of utilitarianism as the exclusive theory of organic evolution, by Rev. John T. Gulick. The author criticizes various conclusions arrived at by Mr. Wallace in his volume on "Darwinism."—The southern extension of the Appomattox formation, by W. J. McGee. In a paper entitled "Three Formations of the Middle Atlantic Slope," published in this *Journal* in 1888, a distinctive late Tertiary formation well displayed on the Appomattox River in Eastern Virginia was defined and named after that river ; and its principal characters, distribution, stratigraphical relations, and probable age were recorded. The present number contains the result of an extension of the research into the Carolinas, Georgia, Alabama, and Mississippi.—An experimental proof of Ohm's law, preceded by a short account of the discovery and subsequent verification of the law, by Alfred M. Mayer. The experiment described is very suitable for lecture demonstration, and all details are given. A low-resistance Thomson galvanometer is joined up to a box containing coils of 1, 2, and 3 ohms resistance, and to a coil of wire wound round a disk of wood which slides on an upright magnet 1·5 cm. in diameter. The quick movement of this coil causes the production of a magneto-electric current, and adopting the conception of the lines of magnetic force it may be said that a ring with one coil cuts a certain number of these lines, this cutting of the lines causes the current, and is the electromotive force. A ring with two, three, or four coils cuts two, three, or four times the number of lines, and increases the electromotive force in the same proportion. The resistance in the circuit can also be changed by means of the resistance coils, and hence it can be proved that the current is directly as the electromotive force and inversely as the resistance by observations of the galvanometer deflections.—Microscopic magnification, by W. Le Conte Stevens. If F be the equivalent focal length of the eye-piece of a microscope, f that of the objective, T the tube length, and D the distance of distinct vision, the magnification, M, is expressed by the formula $M = \dfrac{(D + F)(T - f)}{Ff}$.

—Notes on the minerals occurring near Port Henry, N.Y., by J. F. Kemp.—Occurrence of goniolina in the Comanche series of the Texas Cretaceous, by Robert T. Hill.—A method for the reduction of arsenic acid in analysis, by F. A. Gooch and P. E. Browning.—On the development of the shell in the genus Tornoceras, Hyatt, by Dr. Charles E. Beecher.—Fayalite in the obsidian of Lipari, by Jos. P. Iddings and S. L. Penfield. —On some selenium and tellurium minerals from Honduras, by Edward S. Dana and Horace L. Wells. The locality from which the minerals were obtained is the El Plomo mine, Ojojoma District, Department of Tegucigalpa, Honduras. An analysis of one showed that it contained 29·31 per cent. of selenium and 70·69 per cent. of tellurium, the great proportion of selenium constituting it the nearest approach to native selenium which has yet been found in nature. It is proposed to call this mineral selen-tellurium. Some tellurium-iron minerals are also described.—Some connellite from Cornwall, England, by S. L. Penfield.

American Journal of Mathematics, vol. xii., 4 (Baltimore, July 1890).—This number opens with a short note (pp. 323-336) on confocal bicircular quartics, by Prof. Franklin, and closes with a memoir on the theory of matrices, by H. Taber (pp. 337-396.) The memoir is a full investigation of the subject, touching upon the results already obtained by Cayley ("Theory of Matrices," *Phil. Mag.,* 1858), Hamilton ("Quaternions," 1852), the two Peirces, and Clifford. The writer was not aware of Buchheim's paper, with an identical title, in the London Mathematical Society's Proceedings (vol. xvi.) until after his own paper was written. There is much which is substantially the same in the two memoirs, but Mr. Taber claims to have "treated the whole subject more in detail and more systematically than Mr. Bucheim" (*sic*).

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, July 15.—M. Hermite in the chair. New studies on the rotation of the sun, by M. H. Faye. An account is given of Dr. Wilsing's observations of faculæ for the purpose of determining the time of rotation, and of the recent work done by M. Dunér, in which Fizeau's method was adopted.— On the photography of the polarization fringes of crystals, by MM. Mascart and Bouasse. A method of obtaining photo-