need of assaying it would be imperative until its physical characters became sufficiently well established to be depended on by commercial dealers.

We would advise Mr. Wilson, he knowing the amount of extract he adds, to reduce its quantity so that the pure juice of the capsules may bear a larger proportion to the gross amount produced. Probably one-half less would make the result nearer commercial opium, containing 10 per cent. of morphia.

There are various experiments going on at the south and west, in Mississipi and elsewhere, this season, but as yet the results have not reached me. The subject is sufficiently important to claim the attention of the American Pharmaceutical Association, and if experimenters throughout the country will communicate their results to the writer with a clear statement of the processes of culture and preparation employed, he will engage to give a faithful report of them to the next meeting at Chicago. It would be best to accompany each communication, if any are sent, with about half an ounce of the product, fairly representing the gross amount produced by the sender.—*American Journal of Pharmacy.*

Chemical Notation.

BY PROFESSOR C. A. JOY.

In order to understand the present chaotic state into which chemical notation has been plunged, it will be necessary to review the various systems as they have been proposed during the past twenty years, and thus strive to arrive at a clear knowledge of the subject. The nomenclature proposed by Lavoisier, and adopted and improved by Berzelius, was accepted by chemists in all parts of the world, and for fifty years all of the books and all of the separate dissertations on chemical subjects have been written in accordance with this well-devised language.

This state of things is now fast passing away, and in order to understand a modern paper on a chemical subject it is necessary to have a table of the author's atomic weights, a key to his notation, and a glossary of terms. Any one who can find his way through the maze of systems recently proposed, must be possessed of a mathematical turn of mind, and be naturally apt at solving problems and guessing riddles. A vast amount of ingenuity has been displayed in inventing compounds which have no real existence, and in supposing reactions which ought to take place provided the elements were brought together. Numerous bodies have been invented and named by means of puzzling formula, so that the industrious chemist who works in his laboratory and actually discovers new compounds, will find them already named for him in advance of his researches.

There are now four contending armies in the field: First, the followers of the equivalent dualistic system of Berzelius. This includes nearly all of the older chemists, and is the language that has held sway for many years. The advocates of this system speak of combination by weight according to the laws of proportion. They write hydrogen as 1 and oxygen as 8, and if these two are united, they write the symbol HO. They represent all chemical reactions by dualistic formula, as if an acid and a base were really in existence in a compound, and could be removed each by itself. They would write the sulphate of potash, KO, SO^3, and would call the union of an acid and a base, a salt. The old table of equivalents is taken as the basis of all calculations, and there is no necessity in their opinion for doubling the atomic weights of any of the elements.

The nomenclature of Lavoisier and Berzelius, having been employed in all of our textbooks, is well understood by the chemists of all countries, and we need not go more fully into an explanation of it, but can pass at once to the *second class.* The disciples of this class place great stress upon atomic weights; they like to have all atoms of the same size, and they study the simple gases of all bodies. They believe that the simple gases always contain the same number of atoms in equal volumes, and they seek to express in formula the relation of the elements by volumes as well as by weights. This class write the symbol of water H_2O, and, the atomic weight of hydrogen being taken as 1, oxygen is called 16, and they necessarily double a great majority of the elements. The same class object to the dualistic formula, and prefer what is called the unitary atomic system. The adherents of the unitary atomic school are daily increasing in numbers, and will probably eventually carry everything before them. There are, however, many who are willing to abandon the dualistic method, and yet insist upon the unitary equivalent notation as a proper compromise. They do not see the necessity of doubling the atomic weights. It may be that Berzelius went too far in insisting upon his dualistic interpretation of all chemical reactions; but although his belief was incapable of proof, it still served an admirable purpose in its day in aiding chemists in their researches. We cannot prove that sulphuric acid is composed of an anhydrous silky solid (SO^3) and water (HO), yet we cannot prove the contrary, and one party has as much right to write HO, SO^3 as the other has HSO^4 or H^2SO^4.

A *third party* has been brought together, chiefly from discontented members of the old dualistic school. They have been so long accustomed to a neat method of writing reactions, that they would be unhappy over the unimaginative unitary plan. This third party have established the doctrine of *types.* To them everything is built up on the type of water, hydrochloric acid, ammonia, marsh gas, etc.

Water is $\left.\begin{matrix}H\\H\end{matrix}\right\}O$. Caustic potash is $\left.\begin{matrix}H\\K\end{matrix}\right\}O$.

One of H's of the water is replaced by the K, and thus caustic potash is built up on the type of water. The adherents of this system are very numerous, and to persons of an imaginative turn of mind it affords a fine opportunity for the discovery of all manner of curious transformations. It is difficult to see in what particular it is better than the old Berzelius method. It is just as probable that the elements unite in pairs as it is that they unite in types of each other; and as the number of types is on the increase, we are likely to have an immense number of imaginary compounds made to order. In order to represent the power of an element to replace hydrogen, the word *equivalence* or *quantivalence* has been invented, and the equivalence of the elements is expressed by some number being placed over it. Here, too, much confusion prevails, as the equivalence of some of the elements is not known, and in other cases it does not appear to be constant. To say, in mathematics, that the figure 1 sometimes stands for 3, and that the figure 4 may occasionally be written 2, would introduce an element of confusion into arithmetic that would render the study of that important branch next to impossible, but this would be only equal to what we here find in this system. The disciples of equivalence speak of hydrogen, chlorine, bromine, etc., as *monads;* oxygen, sulphur, lead, etc., as *dyads;* nitrogen, phosphorus, arsenic, etc., as *triads;* carbon, silicon and tin as *tetrads;* and all of the elements have been classified according to their atom-replacing power. When the symbols are used in this method it is necessary to express the equivalence by some numeral above the letter; thus hydrogen would be written H, oxygen O^{II}, nitrogen N^{III}, carbon C^{IV}.

The fourth party in the field may be called the disciples of typical unitary atomic notation. They like types, do not like the old equivalents, nor the dualistic, nor yet the unitary equivalent formula. They double most of the atomic weights, take a unitary view of things, and express themselves in figures of speech which they call types. The adherents of this notation are chiefly occupied with organic chemistry, and it cannot be denied that the doctrine of types has suggested researches that have resulted in the discovery of many interesting compounds. It is, however, too cumbersome for application to all branches of chemistry.

As long as no more than four types were employed, there was less danger of confusion; but now that there is a tendency to increase the number, no one can foresee what the end may be. The new chemical nomenclature of Professor Samuel D. Tillman, of the American Institute, New York, attracts a great deal of attention in this country and in Europe. It has very much to commend it, and now that a general overturning of old systems is taking place, it ought to be fully understood before judgment is pronounced against it.—It has the great advantage of being easily remembered, and it can be adapted to any of the doctrines mentioned above.

It is high time that delegates from all parts of the world be sent to a grand chemical congress, for the consideration of all the questions involved, and for the purpose of systematizing once more the nomenclature of the science.

We shall endeavour hereafter to take up each system more in detail, and to illustrate our remarks by examples of reactions, so that our readers may be fully informed of the questions that are now agitating the chemical world.—*Journal of Applied Chemistry.*

ADULTERATED HONEY.—According to the *Deutsche Industrie Zeitung*, there are at present in Germany itinerent dealers in so-called Swiss land-honey. This substance finds a large number of purchasers on account of its fine taste and beautiful appearance, while, instead of being real honey, it is simply starch converted into sugar by means of sulphuric acid. It may be detected by means of the presence of sulphuric acid therein,—viz., in the shape of sulphate of lime or gypsum. Its use, of course, is perfectly harmless, but it is not honey, nor does it contain any honey at all. As this trick is quite likely to be imported into this country, dealers had better be on their guard.