ence given to the feminine gender instead of, as in the more ungallant English, to the masculine; for instance, the word theirs translates "two hers." The work I present is necessarily but a chrestomalthy compared to what can be done in the study of each of the Iroquois languages. Enough beauties, however, have been discovered through this mere insight to convince one that their possibilities were great. The reflection is, therefore, sad that in all probability fifty years hence these chrestomalthies, imperfect as they are, may be the only record of their former existence. Even now English is fast becoming the communicating medium of the people, as it is of the pulpit and the school. We can, therefore, safely predict that within the next century the Iroquois languages, as spoken by its six different tribes, will have become a thing of the past.

STRUCTURE OF MICA VEINS IN NORTH CAROLINA.

By W. C. Kerr.

At Danville, Va., Professor Kerr, of Raleigh, found veins or dykes which seemed to have been filled neither by fused matter nor by the ordinary mode of infiltration, but by a fine granular fragmented mass, derived from the containing bedded rocks, by the crowding, jamming and mechanical comminution of the rocks themselves. The mica veins in North Carolina are simply dykes of very coarse granite. When the crystallization becomes so coarse that the diameter of the mica sheets passes three or four inches, the dyke is called a mica vein. These veins are found in the upper Laurentian or Montalban, and may be considered characteristic of that horizon in North Carolina. The most productive veins are found in the high plateau between the Blue Ridge and the Smoky mountains, mostly in two or three counties. The amount of marketable mica produced per month is not more than two or three tons, although a much larger quantity could be obtained if the market demanded it. The most valuable of the present mica mines were opened and wrought by the mound-builders many ages ago on a much larger scale than now. There are evidences in the great river valleys in North Carolina of extensive glaciation in remote times, although the last glacial period is wholly unrepresented on the present surface. The protrusion of the eastern coast of North Carolina, about a hundred miles beyond the general Atlantic coast, is due to the interaction of the Arctic shore current and the Gulf stream, which collect the detritus thrown into the sea from Maryland to South Carolina, and drop them about Hatteras. This action has carried the coast of North Carolina to within fifty miles of the margin of the deep Atlantic channel, and, therefore, near its limit. The sounds behind the chain of sand islands or dunes, known as "The Banks," are rapidly silted up and converted into marsh and dry land by the sands blown over the dunes, and by the sediment brought down by the numerous rivers from the interior. The movement of the sand of these dunes was found to be about one foot per annum landward.

TRANSFORMATION OF PLANORBIS.

A PRACTICAL ILLUSTRATION OF THE EVOLUTION OF SPECIES.

By A. Hyatt.

The word evolution means the birth or derivation of one or more things or beings from others, through the action of natural laws. A child is evolved from its parents, a mineral from its constituents, a state of civilization from the conditions and surroundings of a preceding age. While evolution furnishes us with a valuable working hypothesis, science cannot forget that it is still on trial. The impatience of many when it is doubted or denied savors more of the dogmatism of belief than of the judicial earnestness of investigation. Every individual differs in certain superficial characters from the parent forms, but is still identical with them in all its fundamental characteristics. This constantly recurring relationship among all creatures is the best established of all the laws of biology. It is the so-called law to heredity, that like tends to reproduce like. There seem to be only two causes which produce the variations which we observe; one is the law of heredity, the other is the surrounding influences or the sum of the physicial influences upon the organism. The first tends to preserve uniformity, the second modifies the action of the first. The law of natural selection asserts that some individuals are stronger or better fitted to compete with others, in the struggle of life, than are others of the same species: hence they will live and perpetuate their kind, while the others die out. An erroneous impression exists, that Darwinian doctrines are more or less supported by all naturalists who accept evolution, but it is far from the truth. The Darwinian hypothesis is so very easy of application, and saves so much trouble in the way of investigation, that it is very generally employed, without the preliminary caution of a rigid analysis of the facts, and it is safe to say that it is often misapplied. A great amount of nonsense has been written about its being a fundamental law, in all forgetfulness that we are yet to find a law for the origin of the variations upon which it acts; it cannot be the primary cause of the variations, for the laws of heredity are still more fundamental. The speaker then described the situation and character of Steinheim, where numerous shells of the Planorbidæ are found in the strata, which have been very regularly deposited. Hilgendorf claims to have discovered great evidences of the gradual evolution of the various forms from the simplest and oldest specimens, but Mr. Hyatt has failed to find what Hilgendorf describes. By means of a lantern a number of illustrations of the shells were projected upon a screen, and quite fully described. Four lines of descendants were shown to branch out from four of the simplest forms, with all the gaps between the species filled with intermediate varieties. Each one of the lines or series has its own set of characteristic differences, and its own peculiar history. It is a fair inference from the facts before us, that the species from the progressive series, which become larger and finer in every way, owe their increase in size to the favorable physical condition of the Steinheim basis. Darwinists would say that in the basin a battle had taken place, which only the favored ones survived. Mr. Hyatt endeavored to present, in a popular manner, the life-history of a single species, the *planorbis levis*, and its evolution into twenty or thirty distinguishable forms, most of which may properly be called by different names and considered as distinct species. He also endeavored to bring the conception that the variations which led to these different species were due to the action of the laws of heredity, modified by physical forces, especially by the force of gravitation, into a tangible form. There are many characteristics which are due solely to the action of the physical influences which surround them; they vary with every change of locality, but remain quite constant and uniform within each.

MOUNDS OF ILLINOIS.

By W. McAdams, Otterville, Ills.

Mr. McAdams stated that during a period of some 25 years, when leisure permitted, he had been exploring in the mounds of the State. Within a radius of 50 miles from the mouth of the Illinois river there were many thousands of mounds erected by the past inhabitants of the country.

A map was shown illustrating the ancient works of the region, which include almost every variety of mound in the Union. Mr. McAdams has explored hundreds of these mounds, and collected a great quantity of valuable material illustrating the habits and customs of the people of that age. He gave illustrations of House, Burial, Temple and other Mounds.

Many of the small mounds in this section, the speaker thought, were the remains of dwelling places, originally made by placing poles on end, or in a vertical position, fastened at the top, and the whole covered with sod and earth. This structure, after being repaired from year to year, would finally decay, fall to prices and form a mound. In many of these mounds he had found ashes, remains of animals eaten, and other articles that would be found in

such a primitive home. Of burial mounds there were several different kinds.

But comparatively few of the mounds contained valuable relics. In many of the mounds nothing at all of interest was found. It is an error to think that the ancient people always buried with the dead his personal effects.

He had, however, taken from mounds pipes, some of which are very peculiar, many kinds of sea shells, stone, copper and other ornaments, but seldom any weapons. Some of the copper ornaments shown were very curious and ingeniously made; among them were copper turtles, closely resembling the living animals, and large pipes of stone that represented the human figure in various positions. The speaker gave illustrations of mounds in which it would seem that sometimes on the death of their rulers a number of slaves or subjects were buried with him.

Mr. McAdams concludes from his explorations that the burial mounds show at least two distinct classes of people differing from our present indians.

The mound builders of the low lands of Illinois, like those of Ohio, were characterized by their peculiar pipes with the crescent base, the stem being a part of the base.

The potter makers, such as made the peculiar pottery of the region, were a different people, and imitated nature in their pottery, just as the mound builder did with his pipes. He had specimens on exhibition, and many illustrations showing this peculiar pottery representing men, animals, birds, fishes, shells and other things. The pottery makers' pipes were very unlike the mound builders', and were made for the insertion of a stem, the orifice generally being funnel shaped.

The speaker gave a spirited illustration of the great Temple mound, of Cohokia, opposite the mouth of the Missouri river, and describes it as a place of worship. This mound is 90 feet high. In the vicinity of this great mound were numerous flat square mounds called platforms. These platform mounds are usually ten or twelve feet high, and so large as often to contain on the summit farm-houses, with the out-buildings. In digging cellars, wells, etc., in these mounds, many relics were found; of these Mr. McAdams has a large collection. The speaker closed by describing a hitherto unknown earthwork, circular in form, one mile in circumference at the mouth of the Illinois river. Although the mounds occur in such great numbers and magnitude this seems to be the only earthwork in the region. Mr. McAdams expects to still prosecute his researches in this interesting locality.

DETERMINATION OF THE COMPARATIVE DIMENSIONS OF ULTIMATE MOLECULES; AND DEDUCTION OF THE SPECIFIC PROPERTIES OF SUBSTANCES.

By Prof. W. N. Norton.

In this paper a detailed exposition is given of the mechanical constitution of an ultimate molecule, the conditions of dynamical equilibrium are definitely stated, and several formulas investigated, representing its diverse mechanical features. From these definite mathematical expressions are deduced the general mechanical, physical, and chemical properties of substances. These are then employed in a detailed discussion of the properties of special substances. In this discussion the fundamental assumption is made that the atoms of different substances may differ in density, as well as in weight or mass. From this point of view it becomes possible to derive the comparative dimensions, and all the special features of the ultimate molecules of substances, from their molecular volumes and tenacities or co-officients of elasticity, as experimentally determined. The results of the numerical computations for a large variety of substances, from hydrogen to bismuth, are given in tables, and also represented graphically, and comparisons made with experimental results.

Chemical transformations are attributed to an effective force of electric tension developed by the contact of dissemilar molecules. An electro-motive force thus comes into play, determining an electric movement from one set of molecules to the other, and bringing them into approximate correspondence. The comparative values of the forces of electric tension, as well as of the electro-motive force, given in the tables, serve to make known the chemical relations of the substances considered. The chemical effects of heat are incidentally considered.

The entire discussion comprised in this and former papers may be epitomized as follows:

1—It has been shown that the mechanical laws and relations of bodies may be deduced from one general molecular formula; and that from their atomic weights, and certain comparative densities assigned to their atoms, may be derived definite expressions representative of the various properties of special substances.

2—We see that the deverse phenomena of Inanimate Nature are but different consequences of variations or inequalities of ethereal tension, produced by ethereal waves; and that, contemplated from the highest point of view, they may be conceived to result from the operation of one primary form of force on one primordial form of matter.

THE publication of the papers read before the recent meeting of this Association will be continued in our next issue, September 18th.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.*]

When a publishing house prints a date at the foot of a title page it is not always a guarantee to the public that the matter of the book has a connection with the date. In a play, a novel, or even a history, the date of a new edition only suggests that some class of readers desires another form of the work. Bnt when the subject of the publication is of such a character as to require additions in the progress of events, it is necessary to enlarge, remodel, or amend the contents, to suit the advance of knowledge and the public need. This is generally announced on the production of a new book. Its advertisement, if not made in the preface, is invariably embodied in a date appended to the title page. In fact, so general has this custom become, that I do not think any one, who takes up a new book of this kind for the first time, would neglect to cast his eye upon the date of publication.

The other day, looking over the well filled shelves of Messrs. Appleton & Co., I picked up a book of this progressive class, to whose pages I have turned with pleasure during many years, for amusement and instruction. Its concise statement of the advances in physical science had always struck me as most complete. I purchased the book (Arnot's Elements of Physics) for old aquaintance sake, and, on reaching my library, looked through its familiar pages for the latest discoveries; but imagine my disgust, to find that the edition of 1880 made no mention of Telephone, Motograph or Phonograph, three applications of science which will make the last decade one of the most brilliant of the century.

This may not be a commercial, but it is surely a *scientific* fraud.

D. O. Farrow.

What constitutes an artificial mineral water is an important question to the consumer, for obvious reasons, and to the importer it is a serious matter, as commercial rivalry and custom duties have forced its consideration upon them and the authorities. Trouble has been caused in other countries, also, for want of a proper definition, and it has given rise to a German imperial decree in which a solution of the difficulty is attempted. This decree, reads as follows: "Under artificial mineral waters are included not only imitations of certain mineral waters as they occur in nature, but also is understood such other artificially prepared solutions of mineral substances as represent mineral waters, without corresponding in their chemical composition to natural waters."