A SURVEY

OF THE

CABINETS,

(MINERALOGICAL, GEOLOGICAL AND CONCHOLOGICAL),

OF THE

SOUTHWESTERN

PRESBYTERIAN UNIVERSITY,

CLARKSVILLE, TENN.

1879.

Respectfully inscribed to the friends of the Institution throughout the Southwest.

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NOTE.—The origin of this pamphlet will be explained by the following editorial from the Clarksville CHRONICLE of Sept. 6th, 1879:

The present number will bring to a close the series of scientific articles in which the treasures of our University museum are enumerated and described. We must not let our readers infer from the editorial *we* that the editor of this paper is the author of these articles; indeed the disclaimer will be needless with those acquainted with the subject, for all such will know that there is only one man in Clarksville who could write them, and that is Dr. J. W. Caldwell, Stewart Professor of Science in the S. W. Presbyterian University, a gentleman who is at once the fit custodian and the competent historian of the splendid collection bequeathed to the University by Prof. W. M. Stewart, from whom the chair he fills derives its name. We are glad to learn that these admirable papers will soon appear in the more permanent form of a pamphlet, and shall always claim it as a distinguished honor on the part of the CHRONICLE that they first appeared in its columns.

THE CABINETS OF THE UNIVERSITY.

The Stewart Cabinet building, on the University grounds, is now receiving the large and valuable collections, the rich and munificent gifts of the late Prof. Wm. M. Stewart. We have had the pleasure of taking a partial survey of the rooms, and hope to make repeated visits for the purpose of obtaining a more complete knowledge of their contents. We have thought that many of our readers would be pleased to have a description of the same, which, while avoiding unnecessary technicalities, will place them in possession of its general scope and arrangement. We have, therefore, undertaken to furnish in several successive issues such information as will, in our judgment, be acceptable and useful.

The collection is naturally divisible into three parts, viz.: 1st, The Minerals; 2d, The Rocks and Fossils; 3d, The recent Shells and Corals.

THE MINERALS.

We will devote ourselves in the present article, to the first of the above divisions, the Minerals. They are arranged in closed cases, upon trays or shelves, ten deep, and number perhaps over 6,000 specimens. We find them in the order of Dana's original classification, beginning with the forms of Carbon and Hydro-carbon. Mineral Coal and its allied forms are here seen, in regular series, and representing various localities. Peat from Ireland, Lignite or Brown Coal, Anthracite, Bituminous and Cannel coal, from Scotland, England, Germany, and the United States; Graphite and Jet, and in the midst of these darker and less valuable varieties, a "Rough Diamond." Then there are Asphalt and Bitumen, and beautiful specimens of Amber (a fossil resin), some of which contain insects perfectly preserved, which had been caught and entombed in these "crystal coffins" while the resin was coming forth, in a viscous condition, from the ancient forest pines. These handsome yellow forms on the next shelf are crystallized Sulphur, from Sicily, Italy, Switzerland, Spain, the U. S., etc., and alongside perfect cubical crystals of another quite common and useful substance, Salt, one or two specimens of a beautiful blue, colored by the presence of some metallic oxide which happened to have been added to the crystallizing solution.

We come next to the ores of Barium and Strontium, consisting of Sulphates and Carbonates of each. The mineral Barytes, commonly called Heavy Spar, attracts attention by its great weight; hence its name, and, indeed, the name of the metal Barium itself, whose Greek derivation signifies "heavy." One other point of interest in connection with these minerals, may be mentioned; which is, the frequent association of yellow sulphur with the sulphates, indicating the chemical relation, and pointing to the origin of one from the other.

But what shall we say, now that we have struck the Calcium minerals, so numerous and so abundant. Here is Gypsum, crystallized and uncrystallized, as Alabaster, the lustrous Selenite, as radiated, stellate, rosette, stalactitic, fibrous varieties and satin spar. Here too, are the wonderfully numerous modifications of Calcite (the Carbonate of Calcium) identical in constitution with our ordinary Limestone. Of this mineral, 650 modifications of crystallization are distinguished. Among this group we find the optically interesting variety known as Doubly Refracting Spar, so much used for purposes of Polarization of Light; also a form of Arragonite in the condition of delicate plant-like branches, called Flos Ferri, the Flower of Iron, from its simulating a vegetation springing up from an Iron soil, for it is generally associated with Iron. Then beyond are some magnificent crystals of the mineral Fluorite (Fluor Spar or Derbyshire Spar), presenting its most perfect cubes, the prevalent color being blue and green, but often assuming very different hues. Whenever we look at such crystals as these, we are impressed with the strange and inscrutable character of that molecular force which determines the construction of these most wonderful crystalline edifices. Perhaps when our scientists have advanced further in the line of their present investigation of molecules, we may be able to learn more of the underlying principle.

Here we may appropriately mention the marbles—marble being a metamorphic limestone. There is Ruin marble, the lines and shadings resembling a ruined structure; Landscape marble, almost a picture with its varied aspects of trees and earth and water; shell marble, rough on one side, and made up of shells; on the other beautifully polished, the markings scarcely betraying their source; marbles from England, from France, from Gibraltar, from Egypt, from Tennessee.

Leaving the Calcium minerals we reach that other important class, even more abundant, the Silica class—Quartz, which constitutes more than one half of the material of the crust of our globe. Its manifestations, too, are very various. One shelf looks as though it belonged to a jeweler's case, sparkling with almost diamond brilliancy. This contains numerous specimens of Rock crystal, with their characteristic hexagonal prismatic shapes, clear as glass and fit to be set as ornaments—they are indeed the so-called Cape May diamonds. Beautiful nests of larger crystals from the region of the Hot Springs of Arkansas, always attract the eye of the visitor to the Cabinet. But all the crystals of quartz are not clear and glassy. There is some dark,

smoky quartz—here are some fine large specimens, coated over with red oxide of iron, completely concealing their brilliancy; while further on, there is the Rose quartz, whose color is very pleasing. In the next tray are to be seen some exquisitely rich purple tints, pervading crystals which seem to be shaped and fashioned on the same plan as the rock crystal. Yes, here is a splendid collection of Amethysts, for amethyst is quartz colored purple, in general, by the oxide of Manganese. Here, too, we find the red Carnelians, the green Prase, the variegated Jaspers; and there the Flints from the Chalk Cliffs of the Dover coast, England; here is Opal and Onyx; while there is a grand set of Agates, from the Fortification Agate, with its bold and angular marking, to the delicate Moss Agate, already prepared and cut for setting in the broach.

How almost inconceivable it is, that these very dissimilar forms should all be constructed out of the same material, that most common substance Silica. How are we impressed with the power and resources of Nature, which silently but constantly working, evolves such varied and beautiful results. The more we see and know of Nature, the more of beauty do we detect, and the more inspiration do we draw. The heart of Nature is a heart of love—her atmosphere is pure and tranquil. And he who lives in that atmosphere, and approaches nearest to that heart, is most favored. In thus personifying nature, we do not mean to assert any materialistic or pantheistic views; *the expressions of Nature are the voices of God.*

We should lose much, did we fail to see the beautiful specimens of Silicified Wood and of Wood-Opal; showing perfectly the interior structure of the original vegetable mass, whose *organic* matter has been interstitially, molecule by molecule, replaced by the *inorganic*—interesting illustrations of the process of *petrifaction;* form and feature being retained, while the material has been changed.

A finely crystallizing mineral, well represented in our collection, is Apatite, consisting essentially of Phosphate of Lime; here are some large green hexagonal prisms of it, lying snugly in a matrix of white limestone, the contrast of colors being very striking and effective. It is interesting to note that some mineralogists consider it probable that this mineral has been derived in many cases from animal fossils, as bones contain very analogous ingredients.

The various forms of Silica, already mentioned, consist of the binary compound, known in Chemistry as Silicon Di-oxide, ($Si O_2$) but this substance does not always exist in an isolated state; it is very frequently found united with metals, and then forms an important class of Salts which are denominated Silicates. It would, of course, be unprofitable to give the catalogue of this most numerous class of minerals, the specimens of all of which are to be seen on the shelves in the University cabinet. Let a few names, such as may possess some popular interest, suffice in this connection.

The Calcium (Lime) group, whose Carbonates, Sulphates, Fluorides and Phosphates have been already

met with, has its representative, too, among the Silicates. Wallastonite (named in honor of the distinguished Dr. Wallaston, of England) often called Tabular Spar, is a Lime Silicate, of white color, rather pearly luster and pleasing aspect.

Under the head of Magnesian Silicates, we find several very interesting minerals: Talc, one of the softest substances, of white or green color, often occurring in foliated masses, and having a greasy feeling when touched by the finger, which latter is quite a characteristic of the magnesia compounds; Steatite or Soapstone, well known in powder as a material for polishing and lubricating, as also for removing grease spots. It may be sawn into slabs for various purposes. Serpentine is a massive form, of the same chemical constitution as the foregoing minerals; of a dark green color, and takes a most beautiful polish. The celebrated Verd Antique marble consists of granular limestone containing Serpentine disseminated through its mass. Meerschaum, so highly esteemed nowadays for pipe bowls and cigar-holders, is, also, a Hydrated Silicate of Magnesia, containing some Iron and Alumina. Dana says of a variety from Anatolia: "When first dug up, it is soft, has a greasy feel, and lathers like soap; and on this account it is used by the Tartars in washing their linen. It is used for making the bowls of Turkish pipes, by a process like that for pottery ware. When imported into Germany, the bowls of the pipes are prepared by softening them first in tallow, then in wax, and finally polishing them." The name meerschaum signifies "sea-foam;" it is so called because of its lightness and its whitish color.

The class of Anhydrous Silicates of Magnesia is very fully represented. The most important and abundant genera of this class are Pyroxene and Hornblende, each including many varieties, among which is found the mineral substance called *Asbestos*, characterized by its being in slender, flax-like fibres, which is sometimes woven into cloth. It was used by the ancients for the wicks of the lamps in their temples. It is incombustible and a poor conductor of heat. Its Greek derivation indicates the first property. All that would be necessary to cleanse garments made of Asbestos, would be to throw them into the flames—*purified by fire*.

We next come to the Alumina group, which presents some strange anomalies. For instance, here is a rough-looking substance, approaching to a hexagonal form of crystallization—so rude, that you would not take the trouble to stoop to pick it up—and by its side is a richly-blue Sapphire, only inferior to the diamond in value. These two very dissimilar species are chemically identical, both being pure oxide of Aluminum. The rough crystals are called Corundum, and when triturated, afford the "emery powder" used by the ladies and others, for polishing purposes.

The Sapphire and its unprepossessing relative, Corundum, are very hard, being excelled in this regard by Diamond alone. The typical color of Sapphire is blue; it, however, frequently assumes other colors, as red (Oriental Ruby), yellow (Oriental Topaz), etc. The

true Ruby is a red variety of Spinel, which is a Silicate of Alumina and other bases.

Passing by the so-called Zeolites, we come to two minerals of some interest, Andalusite and Staurolite, both essentially Silicate of Alumina. The first mentioned appears under many varieties of form; of these Macle and Chiastolite "show a tesselated or cruciform structure when broken across and polished. The structure is owing to impurities (usually the material of the gangue) disseminated by the powers of crystallization in a regular manner along the sides, edges and diagonals of the crystal." Staurolite (cross-stone) is so called from the frequency of occurrence of two crystals arranging themselves at right angles, thus causing a very perfect cross-form.

Numerous specimens of the various species of Feldspar are to be seen, crystallized and massive. It is quite a common mineral, generally flesh-colored or white, sometimes glassy. It constitutes one of the essential ingredients of granite rock, and by a characteristic decomposition which it is prone to undergo, namely the loss of its alkaline contents, becomes the source of our ordinary clay.

Here we come to a mineral whose name at least suggests the idea of ornament—Garnet—which has been long used and valued for its beauty. Here are some representatives which appear too black and opaque to be highly esteemed, and too large to be conveniently set or worn. One specimen, a dark colored, rough dodecahedron, is three inches in diameter and quite heavy. But along with these bulky and coarse crystals we have some smaller, more perfect and more transparent ones, some of a brownish red color (common Garnet), some of a beautiful brown yellow, commonly called Cinnamon-stone.

The Garnet is the Carbuncle of the ancients. It is also supposed to be the same as "Hyacinth."

Here too are some tourmalines, red, green, blue and black. This mineral, like the double-refracting Spar already mentioned, is of most interest in connection with the polarization of light, although some varieties are also highly prized as gems.

Two shelves are devoted to the well-known substance Mica. All varieties, from silver white to black, large specimens and small, some showing distinctly cut lines and angles of crystallization, all capable of the characteristic division into very thin, flexible leaves. One unusual variety here noticed is of purple color, consisting of closely aggregated grains, known as Lepidolite or Lithia-Mica.

The precious stones are always attractive, and here are some beautiful crystals of Topaz, transparent and of a delicate yellow color. By its form it is easily distinguished from the so-called False Topaz, to be seen in the tray of Rock crystals, and which is indeed only Rock crystal colored yellow by the presence of Iron. In regard to the etymology of the name it may be of interest to transcribe the following: "The ancient Topazion was found on an island in the Red Sea, which was often surrounded with fog, and therefore difficult to find. It was hence named from *topazo*, to seek."

This magnificent blue color, seen near by, belongs to the mineral called Lapis Lazuli, which is used

for the material of costly vases and in the construction of Mosaics. Its powder was applied in the constitution of a most beautiful and durable blue paint, known as Ultramarine. This, however, is now substituted by an artificial pigment of the same name.

Look at this grand hexagonal crystal; it is a Beryl from North Carolina. It is between five and six inches high and probably over three inches across—a regular six-sided column, built by the crystallizing force. Here are smaller specimens of the same kind; these are all opaque, but in one corner of the tray we find some beautiful transparent green crystals of noble Beryl. They are the precious stone, so valuable in jewelry, known as Emerald. Its rich green color is due to oxide of Chromium. The finest specimens of this magnificent mineral are obtained from Siberia, Hindostan and Brazil. One is described as being as large as the head of a calf, weighing over 18 pounds, transparent and without a flaw.

METALS AND METALLIC ORES.

But omitting many points of interest, we hasten on to say something of the metals and metallic ores.

The metals and their ores are perhaps, in general, more interesting than the majority of the minerals which we have already passed over in our rapid survey. The metals constituting so very important a part of our materials of construction, their mode of occurrence in nature, and the requirements for their reduction, are most essential elements of knowledge, upon which depend all development and progress in the various arts and industries of a country. In looking over this portion of the Cabinet, we are forcibly impressed by the scarcity of specimens of native, uncombined metals—the crust of the earth furnishes in the great majority of cases only the rough ore, which must be manipulated by the skill of man before its valuable properties can be utilized, as if to emphasize the proverb, "Nothing, without labor." As a notable illustration of this fact, we find amongst 350 representatives of the Iron minerals, but a single specimen of pure Iron—and this solitary example was derived from a source outside of our earth—*it is a piece of a meteorite* that fell near the city of Mexico; it is therefore not indigenous. It is considered probable that no native Iron is of terrestrial origin. The numerous ores of this most abundant and useful metal are fully represented, occupying a dozen or more shelves, some of them very beautiful. The first is the common Sulphide, called Iron Pyrites, which occurs almost everywhere, in quite perfect cubical crystals of a golden yellow color, often mistaken for the precious metal, and, in consequence, spoken of as "Fools' Gold." The specimens are very brilliant and handsome. Next we come to the oxygen compounds of Iron: Magnetite, or Magnetic oxide, the Loadstone, the material of our natural magnets. One large piece tenaciously holds on to a needle which was submitted to its grasp many years ago. Then, there is a splendid set of Specular Iron ore, and the various other forms of Hematite—as Red Ochre, Red Chalk and Clay Iron stone—and some very heavy handsome specimens of the

radiated fibrous variety. The Brown Iron ore, known as Limonite, is to be seen also. Then there is Franklinite, a compound of the oxyds of Iron Manganese and Zinc, Chromic Iron, Spathic Iron (Carbonate), Vivianite (Phosphate), and many other compounds, too numerous to mention.

After leaving the Iron group, we come upon the numerous compounds of those rather closely related metals, Manganese, Cobalt and Nickel. Although some of them are represented under handsome crystalline forms, there are no important characters connected with them, that need detain us. One very interesting specimen, however, may be noticed; a micaceous quartz rock covered with Dendritic Manganese, from the Island of Elba; beautiful but deceptive. It looks like an incrustation by vegetable remains, but it is not; it is simply the result of what we might call the vagaries of metallic deposition. In another case, there is a very large and splendid illustration of the same formation, on a slab of limestone slate from Solenhoffen, Bavaria.

Here are specimens of metallic Bismuth, both natural and artificial; and here is a prepared mass of the rare metal, Cadmium. Some of the Cobalt compounds, as also some of Manganese, possess a rich pink color, rendering them prominent and attractive objects.

Next come the ores of Zinc, amongst which we notice the finely crystallizing Blende (Sulphide), Smithsonite (Carbonate), Calamine (Silicate), and the Red Oxide. Then those of Lead, chief among which stands Galena (the Sulphur compound), so universally diffused, in brilliant metal-like cubes. The Red Chromate, the white Sulphate, the Cerusite (native Carbonate), the strange green tuft-like masses of crystals of Pyromorphite (Phosphate), and the brilliant Minium (Red Lead) all are here, and deserve careful attention and study.

Antimony and Arsenic, too, are present, in the condition of pure metals and ores. One beautiful specimen of Antimony Glance in Quartz, from Hungary, appears as if consisting of a bunch of most perfectly polished steel needles, clustered together and crossing one another. The most common ores of Arsenic are the Yellow and Red Sulphides, respectively denominated Orpiment (Auri pigmentum) and Realgar. Mercury is generally found as Cinnabar, the Sulphide, of a deep red color, of which many specimens are seen. There is also quite a number of specimens exhibiting the metal in small globules diffused through various rock masses.

Another drawer is devoted to the ores of Tin. This very common metal is found in nature, mostly as an oxide, the Stannic Oxide of the new Chemistry. Here are some beautiful crystals of it—lustrous, brown and black, belonging to the dimetric system. Most of them are from Cornwall, England, one of the chief sources of the metal at the present day, whose mines are supposed to have been worked long before the Christian era. Malacca and the island of Banca, E. Indies, are also productive localities.

Near by, we encounter a tray, the contents of which are very heavy. We find it to be crowded with spec-

imens of native Copper; the largest and finest being from Lake Superior, which is a noted copper region. The geographical points here represented are many and distinct; Copper, then, is quite frequently met with in a pure metallic condition, and some of the masses that have been obtained are immense. The ores of Copper are very numerous, and some of them very beautiful. The Copper Pyrites, containing Sulphur, Copper and Iron, has somewhat the aspect of the ordinary Iron Pyrites, but is of a more brassy yellow color, and its crystallization is different. The variegated and iridescent form known as Erubescite, is exceedingly beautiful. Here is Gray Copper and Black Copper and Chrysocolla (Silicate); and these splendid blue and green specimens are Carbonates, known as Azurite and Malachite, chemical y identical. The latter often presents itself in radiating velvety green fibres; sometimes it is massive, taking a handsome polish. A beautiful polished specimen of Malachite is here to be seen. Very large masses are said to be obtained from Russia, which are worked into slabs, vases, tables, etc. One room, at Versailles, is (or was) furnished with articles of this kind, "which are of exquisite beauty, owing to the delicate shadings of the radiations and zones of color." But we cannot even name all the various ores of this important metal, here present

Here are two trays of specimens of Silver and Silver ores from Mexico, Germany, Norway, Philippine Islands, Lake Superior, South America, etc. There are 60 or 70 specimens, not however as distinct and recognizable as Silver compounds, as one would imagine or expect; indeed Mineralogical and Chemical knowledge are requisite to guide in determinations of this character. We find Silver frequently associated with Sulphur, Iodine, Arsenic and Antimony–also with Lead, Iron and Zinc. Native Silver is found in Clay-slate, Carb. Lime, Quartz; on Copper, on Pyrites; along with Gold, and contained in Galena.

The next tray is most attractive, both from its appearance and the character of its contents; Gold is very attractive on several accounts. Here are more than 30 specimens, all of native Gold. Of these, ten are from California, and twelve from other parts of the United States: Virginia, North and South Carolina, and Georgia. Here is a large California quartz rock, containing the precious metal, in relatively small quantity, probably. We suppose the processes of crushing and amalgamation are used for separation. Here is some California sand, from which the gold is obtained by washing and cradling. Three beautiful specimens from Hungary lie near some magnificent ones from the Sierra Nevada—the white rock and the yellow metal making a splendid contrast. Some fine little nuggets are seen, coming from Georgia and the Carolinas.

Two representatives of another of the noble metals have been placed in the same tray—Platinum; found native and in grains; one from California, the other from Choco, South America. This is a rare and very valuable metal, as is well known.

This ends the enumeration of the metals and their chemical com-

pounds. The survey of this portion of the Cabinet is certainly not without interest—we are struck with the dissimilarity in appearance and in properties, of our common and well-known *metals* (such as Tin, Zinc, Copper and Iron), and the *ores* from which they are derived—we are forcibly reminded that every piece of metal is the exponent and representative of many distinct processes, which were necessary to adapt the material furnished by Nature, to our varied economic and industrial purposes.

We now take up the department of the

ROCKS.

And perhaps it would be well to premise, that rocks differ from minerals in being heterogeneous in their constitution, while minerals are homogeneous; Rocks may be considered mineralogical compounds, while minerals are the corresponding elements; thus, Quartz is a mineral, while Granite, consisting of Quartz, Feldspar and Mica, is a Rock.

Here are a hundred specimens of Granite, from various localities, some coarse grained, others fine. In some, the individual crystals of the compound minerals are large and distinct, in others small and obscure; the relative amounts also of the constituents differ greatly. These can be easily distinguished one from another by their well-known characteristics of color, cleavage, hardness, etc. Numerous splendid specimens from the neighborhood of Philadelphia, are here seen, in which the distinction can easily be recognized by the most inexperienced. The peculiar type known as Graphic Granite is finely represented, from the neighborhoods of Baltimore, Md., and Wilmington, Del., as also from other places. A certain arrangement of the glassy quartz crystals in the midst of, and contrasting with the more flesh-colored feldspar, produces upon the surface of the rock an appearance somewhat resembling Arabic or hieroglyphic *writing;* hence the name. Some very beautiful Granites are red, owing to the presence, often in large crystals, of Red Feldspar.

The gradation from Granite to Gneiss is here well shown—there are 33 specimens of the latter. Gneiss has been called "stratified Granite," having the same constitution, but a more lined or laminated aspect. It is undoubtedly the result of metamorphism, and expresses (if Granite be considered to proceed from this kind of action too, which is now generally accepted) a metamorphic change less complete than that in Granite. Syenite and Syenitic Granite have their representatives, in which the mineral Hornblende is either substituted for Mica, or super-added to the original constituents.

Nearly related to the preceding in constitution, are Mica Slate and Mica Schist, both characterized by the predominance of Mica. One fine specimen of the Slate comes from Georgia, another from near Philadelphia; in the latter the lines of cleavage are beautifully distinct, and there is also to be noticed the interpolation of layers of Carbonate of Lime. Many of the Schists are literally packed with Garnets; adding greatly to the interest of the specimen.

Two drawers contain 50 or more

Sandstone specimens; several of the micaceous variety; some belonging to the Potsdam period, some to the Hamilton; Red Sandstone and gray; purple, yellow and black; some containing ripple marks, others vegetable impressions (as stigmaria and fucoids), still others, Calcite and Pyrites. Here is some white Silicious Sand from Lake Borgne, Mexican Gulf Coast—here are three bottles of beautifully variegated sands from the Plastic Clay formation, Purbeck, England. And here are three bottles more, containing a yellowish brown sand from the Sahara Desert, presented by Mrs. W. W. Legare, now of Walhalla, South Carolina.

Just beyond, we find a tray of 24 splendid conglomerates, puddingstones, as they are generally called. One is particularly fine—large, rounded pebbles, cemented together by red oxide of Iron. This specimen was placed in our hands by Mr. Stewart, some years since, with the remark that it was found in the bed of a river in Virginia. It is therefore of recent origin, geologically.

We must not omit to mention the three very interesting specimens of Itacolumite, or Flexible Sandstone, from North Carolina, one nearly two feet in length. It is capable of bending to a considerable degree without breaking. It is slightly micaceous, to which circumstance its flexibility has been ascribed. We do not think the small amount of Mica present can be taken as a sufficient and satisfactory explanation of the phenomenon. It is more probably due to some unique mode of molecular aggregation. Its particles are loosely held together, allowing therefore of considerable mobility without a permanent loss of cohesion. Itacolumite is found in Brazil; we believe that it is known in but one locality in the United States.

Here is a tray containing Clays of many colors; Kaolin, a white and pure form, from Saxony; a variegated Argile from Columbia, South Carolina; Pipe Clay, and Potter's Clay; Ferruginous Clay and Red Chalk; several specimens of Lithomarge (a compact species, from Rochlitz, Saxony), purple, reddish, white. Many of these specimens are banded, spotted and variously colored. Clay is a rock resulting from the disintegration of Feldspar, as mentioned before, and when metamorphosed, becomes Slate, as Roofing Slate, the Argillite of the mineralogist. And here are the Slates: Three specimens from Wales; near by, a red ferruginous one from Vermont; one from Herkimer, N. Y., with a fine impression of a part of a Trilobite; others with vegetable impressions. There are also Chlorite Slates and Steatite Slates, as also an Aluminous Slate from a New York Lead mine; a splendid piece of Mica Slate from Philadelphia; a Black River Slate with graptolites. Here also is a specimen of Agalmatolite from Deep River, North Carolina, and two of Novaculite from Arkansas.

Porphyry is a name given roughly to any rock containing disseminated crystals of Feldspar; generally the matrix is compact Feldspar.

Twenty specimens are here presented; four from the bank of the Susquehanna, near Wilkesbarre, Pa.; several from New York, several from France, of the variety known

as Variolite; one beautiful specimen, polished, the crystals being of a pale lead color, from New Jersey; and one deep green specimen, the inscription on the old slip of paper which still surrounds it, being as follows: "Green Porphyry—Verd Antique, from Rome, 1809, by A. Stewart, Esquire." This is a most beautiful and valued form of the rock.

The various conditions or varieties of Lava are well represented. We have Obsidian, a volcanic glass, from the Lipari Islands, from Iceland, from Spain, from Vesuvius. Many specimens of Tufa, are here, one from the amphitheatre of Herculaneum. Pumice with its long cavities, is the solidified scum of the Lava stream. Amygdaloidal cavities characterize many of the specimens. Then there is Pitchstone, having a resinous aspect, and Pearlstone of grayish color and pearly luster, and Spherulite, a more vitreous form, often occurring in small globules in massive Pearlstone. Here also are specimens of Phonolite, of Trachyte, and of Basalt. Of the last there are three excellent specimens—one a small hexagonal column from the Giants' Causeway, Ireland; the other two, Prismatic Diabase (Basaltic Hornblende) from the Little Falls of the Passaic, New Jersey. All these rocks are of igneous origin, and the variety of their physical and mineralogical characters have resulted, in general, from the circumstances of their cooling from the condition of fusion. They naturally graduate, one variety into another, so that it is sometimes very difficult to classify them positively.

We have thus given a general view of the classes of Rocks that are presented to our inspection. The geological and mineralogical study of rocks are complementary, one to the other. If our friends are not weary of this survey, we will next give some geological data, such as many rocks carry upon their surface and within them, constituting the records of their history. We mean

FOSSILS.

Fossils have been denominated the "medals of creation"—they are historical mementos, upon which are stamped, in legible characters, much valuable information, such as the relative ages of the containing strata, and the circumstances and conditions, organic and inorganic, attending their origin. And whatever of interest may attach to the consideration of minerals and rocks (outside of their application to the arts and industries), much more must appertain to these relics of antecedent "*time-worlds;*" and the more remote they may be from us, the more desire will we have to know and understand them.

The basis of our Paleontological Cabinet, is the original collection of Van Uxem, who, with the distinguished Prof. James Hall, of New York, and four others, was appointed many years ago to make a thorough survey of the State of New York; whose work laid the foundation of that magnificent publication known as "The Natural History of the State of New York," and also of the Museum now located at Albany. The major portion of the specimens are from New York, as was naturally to be expected; and, in consequence, the Paleozoic system is relatively more

fully represented than either the Mesozoic or the Cenozoic; yet the characteristic fossils of these are by no means absent.

The collection is arranged in accordance with the geological age of the specimens, by periods, the oldest first; and as far as practicable, according to the Zoological relations; classes and orders distinct. We begin with the Silurian age, the earliest and oldest of Paleozoic Time, and with the Primordial or Cambrian Period, the earliest and oldest of this age—which is designated the Age of Invertebrates.

In the first tray we find a few specimens of Fossils from the Potsdam Sandstone, all Lingulella prima, a Brachiopod Mollusk, and one of the earliest forms of life of which Geology gives us any indication. A few more from the Calciferous and Chazy epochs of the Canadian Period include representatives of Orthis and Atrypa (Brachiopods), two fine large casts of Maclurea Magna (Gasteropod), and a Trilobite, the latter a Crustacean Articulate, of which form of life we shall see very many beyond, as it was so characteristic of the Paleozoic time of the earth's history.

The next ten shelves are crowded with Trenton Fossils. The Trenton periods is spoken of as the great Limestone period of the ancient world, in which the animal life of the seas was immense. Here are the Orthoceratites, Cephalopods which were so numerous and so highly developed. A specimen before us now, (an Endoceras, from Middleville, N. Y.) is nearly two feet in length; an Orthoceras and a Gonioceras; all belonging to the same class. These Fossils are very interesting objects of study; they are allied to the modern Nautilus, and are by no means lowly members of the animal kingdom. Then there are several beautifully perfect Conularia, generally classed as a Pteropod Cephalate. Following on, we come to some fine specimens of Graptolites, delicately serrated, pen-like Acalephs, Crinoid stems in great abundance and variety, Corals of different kinds, such as Chœtetes, both hemispherical and branched, Columnaria Alveolata, Cyathophylloids, etc. Here, too, are Receptaculites and other kinds of Sponges; and here is an army of Trilobites of very many genera, Asaphus, Calymene, Trinucleus—some entire, often tightly rolled up into a ball; sometimes the head shield alone, sometimes the tail. This is a most wonderfully perfect illustration of a class of Articulate animals which, during the Trenton Period was perhaps the highest in the Zoological scale. Then there is a large assortment of the Brachiopod genera, Orthis, Atrypa, Spirifer, Leptena, Terebratula and others—splendid specimens of Crinoid columns, and a beautifully marked head of a Glyptocrinas Decadactylus. There are also some fine Trocholites—and representatives of the abundant genera among Gasteropods, known as Pleurotomaria and Murchisonia.

The Medina Sandstone, of the Niagara Period, contains few Fossils. We have here some fine Fucoids (sea-weeds), as Arthrophycus Harlani. A few Lingulellæ, and specimens of Modiolopsis and Pleurotomaria, complete the list. In the Clinton and Niagara groups the life seems to have been more abun-

dant and varied. A common Fucoid was the Rusophycus Bilobatus, several large specimens of which are here seen. And, in addition to the classes already named, we must mention among the Brachiopods, the Pentamerus, several species of which are met with; and among worms, a specimen of Cornulites (worm tubes).

But here are some beauties in the shape of Crinoids, which we must stop to enumerate: seven splendid specimens of Caryocrinus ornatus; one, of the arms of Mariacrinus; and ten or more of Stephanocrinus; all most interesting to contemplate. Here is a great variety of Corals; as especially beautiful, we must name the Catenipora, or chain-coral; the Favositid, or Honeycombed coral; the Syringopora, and the Fenestella elegans; in the midst of these, we find a large hemispherical mass of Stromatopora, considered to be an ancient sponge.

Next, we have a magnificent impression of Eurypterus Remipes, from Waterville, N. Y.; related to the Trilobite, but probably of higher organization. A very choice specimen this is, judging from a note to the original label still attached to it, which reads thus: "Rarest-the *State* has not one-I take great pleasure in sending you this." And next to it we have some perfect and very beautiful Tentaculites, crowded together upon the surface of two slabs, belonging to the Onondaiga Salt group, one from Helderberg, the other from Schoharie, N. Y. A limestone slab from Litchfield, bears upon it three beautiful delicate branching Crinoids; another from Schoharie a very fine specimen of the rather rare species, Lepadocrinus Gebhardi.

Here is interpolated a special collection of fossils from Perry county, Tenn., belonging to the Dyestone and Gray Limestone groups of Prof. Safford; which beside the local interest attaching to it, is valuable in containing some splendid specimens, particularly of Crinoid heads.

The next age—the Devonian—also called the Age of Fishes—is introduced by the Carniferous Period, represented by a large number of Fossils, among which we find several fine specimens of Spirophyton Canda-Galli, supposed to be a seaweed; Orthoceras and Cyrtoceras; splendid corals; a particularly fine piece of Favosites Gothlandica; some little Echini (Radiates); also two beautiful Olivenites (Nucleocrinus); besides any quantity of Brachiopods, and a goodly representation from the Trilobites. From the Marcellus Shale of the Hamilton Period we notice some splendid Goniatites, the exterior finely marked, showing the angled character of the Septa, it being thus differentiated from the Nautilus, to which it is nearly related. There is besides, such a vast number of specimens here, belonging to this period and the subsequent periods of the Devonian, of a similar character in general, to those already named, that we must pass them by for want of space. We may, however, mention the advance indicated in regard to vegetable life, for here are many specimens of Ferns, as also of Sigillaria and Lepidodendron, belonging to this period—their highest development takes place in the Carboniferous. Fishes become a

prominent and characteristic feature of the life of the earth during this age. And here we have teeth and scales, and in some instances almost the entire forms preserved upon the rock surfaces. Here are some scales of Lepidosteus and Holoptychius; a quite perfect outline of Paleoniscus from Mansfeld, Prussia; besides several others from our own country.

The Carboniferous Age, or the Age of Coal Plants, of course abounds in vegetation. There is here to be seen a rich collection of Ferns very distinct and beautiful. Handsome specimens of the characteristic Lepidodendra and Sigillarids, belonging to the Botanical division called Lycopods. The remains are distinguished by the exterior markings and the arrangement of the scars left by the falling leaves. These exterior markings are in some cases very elaborate, sometimes of a handsomely embossed character. In the Sigillarids, the leaf-scars are arranged in vertical series, while in the Lepidodendrids they are alternate. The Calamites belonging to the Equiseta or horse-tails, are very abundant and large; their Fossils are very characteristic of the Coal Period.

Here is a tray-full of Sub-Carboniferous specimens, mostly from Clarksville and vicinity; the majority marked "Glenwood" and "Stacker's Quarry." It contains Corals, Lithostrotion and other kinds; several genera of Brachiopods, Spirifer, Leptena, etc., with two splendid specimens of Productus Cora from Montgomery county. There are many very beautiful and perfect bud-like Pentremites, especially characteristic of this age, together with other remains of Crinoidal life; and here is a large Echinoid, obtained from Mr. Wm. T. Dortch's place, near Clarksville, and named by Prof. Safford "*Melonites Stewartii*," in honor of "*the friend and patron*" of our University.

Here are two delicate specimens of Archimedes, one "said to be from Montgomery county, Tennessee," the other from Kaskaskia, Illinois. This is a Bryozoans Coral, of a screw or auger shape, very strange and beautiful under a magnifying glass.

But we cannot remain longer on the many interesting evidences of life during Paleozoic time; we must now take up the medieval life history of our earth—

MESOZOIC TIME.

The types of life in this mid-era of the world, approach the modern to a certain extent—particularly is this the case in the later portion of it, the Cretaceous Period. It is indeed a transition time, the old forms dying out, and more familiar features being gradually assumed. Some of the life remains are very beautiful. Here is a large collection of most exquisite Pentacrinite stems, perfectly pentagonal, and their surfaces richly marked; they would please the eye of the most indifferent observer. These specimens are from Germany and the United States. There are also two splendid representatives of Enerinus Liliformis from Solenhofen.

A neighboring drawer contains one hundred Belemnites, another characteristic type. Their form is that of a pointed cone, from one to four inches in length, resembling considerably a cigar. This is a very interesting Fossil—it is the internal

bone of an ancient Cuttle-fish, the analogue of the so-called Pen-and-Ink fish, frequently obtained from the Atlantic. It is, however, not a fish, but a Mollusk ; a naked Cephalopod, of high organization. It contains an ink-bag within a cavity of this bone, the black contents of which it squirts forth behind it when necessity demands, in order that it may thereby elude its pursuer. This ink-bag containing the black pigment has often been found in a fossil state. The name of this fossil is from belemnon, meaning a dart.

But we pass on to another Cephalopod form, which is also a very distinguishing feature of this age—the Ammonite, successor to the Orthoceras and the Goniate of the Paleozoic, and a congener of the modern Nautilus. It is characterized as a close-coiled chambered shell, the septa being very elaborately frilled, the external portion of the shell highly ribbed and ornamented; and the siphuncle (the tube by which communication is kept up between the outer chamber and the inner apartment) dorsal. A beautiful specimen is here seen, from Oberstein, Germany, cut through perpendicularly to the septa, the surface of section being polished. The inner arrangement is splendidly represented, the material of the partition walls having been substituted, in the process of petrifaction, by Iron pyrites, while the chambers have been filled in with Calcite and in some cases with Red Oxide of Iron, thus most handsomely mapping out the boundaries of the original structure. The specimens of Ammonites are from Germany, France, England and the United States. These typical close-coiled Ammonites were succeeded in the Cretaceous Period by more or less uncoiled varieties—we have here representatives of Baculites, Hamites, Scaphites—one huge fragment of a huge Ancyloceras from England is very noticeable.

Among Lamellibranchs, we find some handsome representatives—the three sided bivalve, Trigonia, with its ornamental lines of tubercles, is present in specimens from England, as also from this country. The Oyster family is here introduced in the shape of the genus Gryphea, some species of which are quite attractive. The Exogyra, also, is a nearly related form. Ostrea too, has a number of very quaint looking specimens, the edges of whose valves are deeply but rather regularly dentated, giving to it a unique appearance. Several varieties of Sponge are here. Sponges were very numerous during the Cretaceous, their siliceous spicules being supposed to have furnished the material of the Flints of the Chalk beds.

Besides the Crinoids already mentioned, and indeed entirely supplanting them towards the close of the age, we have many free Echinoids, as Cidaris Blumenbachii, several species of Ananchites, Goniaster, etc. These forms are very numerous, handsome and quite modern in look. Vertebrates are represented by a specimen of Leptolepis from Solenhofen, besides teeth of fishes and reptiles—and not least, two fine impressions on the Red Sandstone of the Connecticut River Valley, the so-called bird tracks. They are three-toed, and about four inches in length.

These are the most characteristic Fossils of this very interesting geological age. There are many others well worthy of description, which we leave unnamed; we now come to the survey of forms of life belonging to the Cenozoic Time, which are much more familiar to the eye than those already noticed, being nearly related to the existing regime; they in consequence, need but little at our hands.

During the Tertiary Age, a growing resemblance is to be seen, to the now existing forms. Although the species in general differ from those of our own day, there is not a sufficient dissimilarity to render them unrecognizable. We see many species of Oyster, more like the modern than those belonging to the Cretaceous—one large specimen is known as Ostrea Georgiana, very thick and heavy. You can easily recognize the Turritella, the Cardita, the Area, the Pecten, the Cyprea, among the Mollusks—some of them having the freshness of appearance characterizing a modern shell. Sharks' teeth are numerous, and bones of Vertebrate animals. One peculiar Fossil is known as Nummulite, a flat, discoid, coin-shaped Foraminifer (Protozoan)—calcareous, and compounded of many cells. Two fine specimens are from New Jersey; a large number of smaller ones from the Isle of Wight, and other trans-Atlantic localities. In some sections these Fossils constitute the material, almost entirely, of the Limestone, which is then called Nummulitic Limestone. The Pyramids of Egypt are largely constructed of this.

The first period of the Quarternary Age, is the Glacial; here represented by one specimen of *Glaciation* from New York, the parrallel furrows, not deep, indicating the action upon the dark Limestone surface, of some scratching or grooving instrument, moved by a considerable force.

Some interesting Mastodon relics are seen, from Wilson county, Tennessee; one large tooth, with its nipple-like protuberances greatly worn; two smaller milk-teeth; and a portion of the tusk and of the femur of one of these huge animals.

Of the remains of Man and his works, there are some interesting specimens—here is a piece of a human bone imbedded in Stalagmite containing land shells, obtained in 1825 from a Limestone cave in East Tennessee, and "presented by Mr. Jas. Leckie." There was also found in the same place, a bead made of the spine of a Strombus—this is also in the University collection. In this connection, we might mention that there is here a piece of the Shell Limestone from the Island of Guadaloupe, from the formation containing the human skeletons which created such a stir some years ago in the scientific world, which skeletons are now in the museums of Paris, London and Charleston, South Carolina.

There are some Indian bones (among them, one almost perfect skull), obtained from the stone coffins of the burial places of the aborigines, near Clarksville, by Prof. Caldwell, assisted by Messrs. Mallard, Cox and Leslie of the University; also pieces of pottery and flint arrow heads. Two splendid specimens of implements of the *polished* stone age (Neolithic) from South Clarksville, were lately

presented by Dr. D. F. Wright, of the CHRONICLE; and another, more recently, by Master James Patton Anderson (from Culleoka, Tenn.) There is also a small but beautiful axe (?), polished, from Provence, France. There are too, some Mexican specimens made of Obridian (volcanic glass).

We trust that this brief and very imperfect resume of the Paleontological specimens in the Cabinet, may afford a general idea of the scope and arrangement, and may stimulate some, to become better acquainted with the life characters of the earth during those long long ages anterior to the introduction of the human race.

The splendid collection of

RECENT SHELLS

constitutes a most attractive part of the Cabinets of the University. There are few persons who do not experience some pleasure in the contemplation of these wondrous structures of the Molluscan inhabitants of the deep. The beautiful and varied tints—the delicate and fragile character of some, contrasting with the strength and massiveness of others—the exquisite adjustment of the hinge among Bivalves—the arrangements for syphonal prolongation, and for muscular attachment and movement - the inexplicably strange duplicature of every marking and coloration as evinced in the multitude of representatives of any one species—the close gradation of species by which we pass without abrupt break from one type of life to the most distant and distinct—all these points, and many others, obtrude themselves upon the attentive examiner, as subjects most interesting and worthy of study.

The extent and completeness of the collection will best be indicated by giving the result of the summing up of the contents of the drawers, as made by Prof Stewart himself; his catalogue is now before us, and closes with the following: "Recapitulation—230 genera, 4,682 species, 14,285 specimens."

The arrangement is, in general, according to the Zoological classification, the first drawer containing the remains of Cephalopods, the highest division of Mollusks. In this are found two specimens of the interior bone of Sepia, such as are frequently seen in Canary bird cages; four fine specimens of the Chambered Nautilus, one of these being cut to show the septa within; then there are six representatives of the beautiful Argonauta, commonly called Paper Nautilus, its shell being extremely thin and delicate—it is not, however, chambered, as is the true Nautilus; besides these, there are fifteen small, light and white shells, of the genus known as Spirula, allied to Argonauta. The contents of this tray represent some of the most highly developed forms of Molluscan life. It might be well to remark that the position of an animal in the Zoological scale depends upon the character of its soft body, of which the shell often gives no satisfactory indications. Conchology, therefore, which is the science of shells, is but a part, although a charming part, of the Zoology of Mollusks.

The next specimens belong to the Gasteropods (of the class of Cephalates). They are here in thousands, and we can only mention some of

the most numerous genera. The first is Strombus, here represented by 42 species, and 153 specimens, some of them of huge dimensions, as S. gigas. Pteroceras, an allied genus, comes next. Near by is Murex, 42 species and 69 specimens. The M. tenuispina is particularly attractive, from the number of its long and delicate spines. Then we have Triton and Fasciolaria, Turbinella and Pyrula, Fusus and Crepidula and Calyptrea. There are 716 specimens of the common genera Buccinum and Nassa. The beautiful Terebra has 89 representatives, Eburna 11, and Purpura 165. There are 57 specimens of Cassis, the well-known Helmet-shell, some of which are very large and extremely heavy. The beautiful Harpa, with its splendidly polished and variegated surface, crossed by bold and characteristic ribs, is represented by 10 species, including 27 individual specimens. Here, too, is the magnificent Oliva, numerously present in 112 species and 557 specimens. The genus Conus has 218 specimens; Cyprea, 444; Natica, 155; Cerithium, 187; Melania, 685. Nerita and Neritina number 320 specimens; Turbo, 78; some of the latter had a portion of the epidermic layer removed, to show the handsome pearly structure beneath. The beautiful Trochus is here represented by large and small specimens; in all, 252. The mother-of-pearl-lined Haliotis; the many varieties of the quaintly shaped Fissurella; Patella and Dentalium; Chiton, with its segments; Helix, numbering 1,324 followers; Bulimus and Achatina; Lymneus, Auricula Cyclostoma and Bulla, all are here, and many others too numerous to mention.

The partial enumeration just preceding, relates alone to Univalve shells, Gasteropods. Of the Bivalves, there are two divisions: Brachiopods and Lamellibranchs. The former, which in early geological ages, greatly outnumbered the latter, are now quite exceptional—only a very few genera being known as existing in the present seas. Lamellibranchs are the predominant type. This is illustrated by a comparison of the numbers of the specimens of each class, in our Cabinet. Against 3,200 Lamellibranchs we find but ten specimens of Brachiopods, representing 8 species and 5 genera. Among these five, we have Terebratula, Lingula, Crania and Orbicula, which have continued from an ancient lineage, down to our own day. These shells, characterized by a lateral symmetry when divided by a line drawn from the beak to the middle of the margin, are small and insignificant, though interesting objects for inspection.

The prevalent bivalve forms, then, are Lamellibranchs. We have here, Ostrea (Oyster), 20 species and 34 specimens. They vary greatly among themselves—some varieties being decidedly unique. The very attractive and richly colored, fan-shaped Pectens are represented in considerable numbers. The spiny Spondylus, and the grand Meleagrina Margaritifera are worthy of attention. One specimen of the latter, from California, perhaps 8 inches across, presents a magnificent interior pearly surface. Eleven specimens of the hammer shaped Malleus, from England, thirteen of Pinna, seventy-nine of Mytilus, together with large representations of Modiola, Arca, Pectunculus, etc.,

complete the second case of drawers.

The third is largely occupied with the genus Unio (fresh water Mussels). Over 300 species are here, a large proportion of which are from the waters of the Cumberland and its tributaries. Prof. Stewart, as is well known, devoted a great deal of study to this form of life, and perhaps no one was better acquainted with the varieties and peculiarities of its numerous species than he.

Passing by the multitude of the Unios, and the representatives of certain related genera, we find ourselves among the handsome shells known as Chama, Hippopus and Tridacna; the two latter having a grand development as to size, and being most beautiful and interesting objects. Next follows the very abundant form of marine shell, called Cardium, numbering in this collection, 48 species and 134 specimens. Near by are the allied genera Isocardia, Cypricardia, and Cardita, followed by a large representation from the Lucinæ, Venus, Cytherea and Mactra. The delicately rose-tinted Tellina, the small triangular Donax, the strangely shaped Solen, or Razor-shell, are all fully represented.

Several fine specimens are present of the interesting genus called Pholas, the shell of which is very fragile; so fragile, that a perfect valve is very seldom obtained. It gapes open at both ends—the openings (hiatus) being frequently almost closed by accessory testaceous plates, inconstant in number and position. One specimen from the West Indies shows a number of individual shells occupying cavities in a piece of wood. "From the circumstance of the Pholades being found to inhabit the hardest descriptions of calcareous rocks, we are led to suppose that the cavities in which they dwell are formed by the aid of some powerful solvent secretion, operating with the constant current of water around the shell, as the fine Striæ on its surface disprove that there is any rotary motion." (Reeve).

But before leaving the Bivalve Mollusks, we must mention a beautiful and remarkable genus, of which two or three very perfect specimens are found in this collection. It is Aspergillum—the name signifying a watering-pot. It presents the appearance of a tapering tube; hence it is classed among the Tubicolæ. The lower and larger extremity is closed in by a perforated plate, like the rose of a watering-pot, from which peculiarity the name has been derived. Near this extremity is to be seen a very small bivalve shell, of a beautifully pearly white appearance, opened out, the exterior of which constitutes a portion of the surface of the tube. The perforated plate is surrounded by a frilled prolongation. It is a most remarkable organic form.

There are in the adjacent trays, specimens of remains not molluscan. Certain Annelids form tubes sometimes greatly contorted and elongated. Of this character is the common Serpula, of which we find quite a number of fine specimens. Amphitrite is also of this class. Several objects attract our attention by their unprepossessing appearance, seeming to be string-like aggregations of sand, sea-weed, little bivalve shells, etc. They were obtained from Sullivan's Island, near Charles-

ton, South Carolina. These strings are pierced by a canal running through the entire length; this is the residence of the worm which has, strangely indeed, collected and cemented these heterogeneous materials into the form before us. Its name is Terebella Conchilega.

Here too, are a number of specimens of Balanus (Barnacles), large and small; handsome Coronula; Tubicinella; Conia; Pentelasmis, etc., belonging to the obscure division Lepades, which is said to partake of the character of Annelids, Crustacea, and Mollusca.

To the Radiates, belong not only the Echinoids, here represented by a Cidaris from the Pacific; Echini, Scutellæ and other representatives from the Atlantic coast; Asterioids, etc.—but also the large division of CORALS. Of these we have many varieties, some very rare; especially numerous are the representatives of the Fungia, Madrepore, and Meandrina. Several very large specimens of the beautiful vegetable-like Gorgonia or sea-fan, a sclero-basic Coral, should be noticed.

Here too, are representatives of the Protozoan sub-kingdom—the Sponges—large cup-shaped specimens—long straight cylindrical specimens—and look! a most exquisite *silicious skeleton of a sponge*—the Euplectella, or glass sponge. It is like the most delicately spun glass—its form that of a gradually widening and gracefully constructed cornucopia. It cannot be satisfactorily described—it must be seen to be appreciated. This choice specimen was most highly valued, and most jealously guarded and most proudly exhibited by Prof. Stewart.

Thus have we passed, in rapid survey, through the various departments of this superb collection, taking advantage of the more salient points presented, and endeavoring thereon, to affix such general or specific information as might be most interesting and advantageous to the reader. How we have succeeded the reader alone can judge. We have been urged to this self-imposed task, by the desire to present to our people some idea of the opportunities in their very midst, to suggest the using of these opportunities, and to stimulate to the more general and enlarged pursuit of these *studies of Nature*—studies which combine to so great a degree, attractiveness and practical utility.

One word more, to the friends of the University, in Clarksville, and throughout the South-west. All of them may advance the interests of the Institution and of Science, by their efforts to enlarge this already extensive collection. If every one would take the pains to collect the fossils, rocks, archæological curiosities, etc., of his immediate neighborhood, and forward them to the University, he would be doing a great service. Let the Geology of each of the five States in our bounds be individually illustrated; and this can easily be done, by the efforts of friends who are scattered throughout this wide region. A mutual sympathy will thus be established, which will be a mutual benefit. We trust an intelligent co-operation will inaugurate and rapidly advance this desirable result.

We would, in conclusion, urge upon the citizens of Clarksville, and those who may from time to time visit our city, to inspect and study as far as practicable, the Cabinets of

the South-western Presbyterian University. We can assure them of a hearty welcome, together with the sight of innumerable objects of curiosity, of interest and of beauty, which will enlarge their conceptions of Nature, and give them loftier views of Him who "is before all things, and by whom all things consist."