Scientific Museum.

Imponderable Agents.---No. 4.

1. There are in nature three elements, existing in a form exceedingly more rare than that of the lightest fluids; these elements may be called Etheroids.

2. The Etheroids exist both in combination with other matter and in a free state, nor has any portion of matter been discovered that does not contain them.

3. Etherial particles of the same kind always repel each other, but they both attract and repel all other matter,—their attractions and repulsions varying inversely as the square of the distance.

4. From their mutual repulsion they constantly tend to diffuse equally throughout space —hence, if accumulated in any place, they radiate thence in all directions.

5. When in motion each particle rotates upon an axis, those of the same kind differing in their period of rotation, magnitude, and velocity.

6. Each particle has two poles at right angles to its axis of rotation, the one attractive, the other repulsive.

7. When a particle in motion strikes upon any body, it will enter it if its attractive pole be next the surface, but will be reflected from it if its repulsive pole be next the surface, unless the body be too thin to overcome its momentum. The same happens at the second surface.

8. A chemical molecule is the aggregation of a definite quantity of the ultimate atoms of any element around a definite number of etherial particles, which are arranged in the molecule with their attractive poles outward.

9. The attraction of the Etheroids in one molecule, for the matter in another molecule of the same kind, is greater than their mutual repulsion; from this results cohesion.

10. Gravitation is the result of this attraction when exhibited between two masses.

11. Chemical combination is the intimate union of two or more molecules differing in the quantity of the Etheroids contained, and upon this difference depends their relative affinity.

12. A solid is an aggregation of molecules whose attractions are so great as to hold them firmly fixed in their places.

13. A liquid is a body which has a sufficient quantity of the Etheroids diffused among its molecules to prevent their close adhesion, but not sufficient to wholly overcome their cohesive attraction.

14. A gaseous fluid is one in which, from the presence of a larger proportion of the Etheroids, the cohesive attraction is entirely overcome.

15. The three Etheroids may be called Lumenism, Calorism, and Electrism, producing, respectively, the phenomena of Light, Heat, and Electricity.

16. When an etherial particle in motion enters at an oblique angle, a medium differing in density from that through which it has been passing, it is attracted by the nearest molecule of the densest medium and bent from its course —this is called refraction.

17. Those particles having the greatest momentum will be the least changed in their course, hence the different refrangibility of etherial particles.

18. If the refracting body be crystalline, the body will generally, from the peculiar arrangement of its molecules, attract the etherial particles, in two different directions; the direction taken by any particle depending on the position of its poles—this is double refraction.

19. When an etherial beam has been doubly refracted, each emergent pencil has all its axes of rotation in a single plane, and these planes, in the two pencils, are at right angles to each other—this is polarization.

20. Light is Lumenism in motion. The different colors of the spectrum are caused by the different momenta of its particles.

21. The color of a thin plate is that of a lumenic particle, which, during its semi-period of rotation, passes over a space equal to the thickness of the plate. The colors of opaque bodies are caused by their particles being of a corresponding size.

22. White opacity is caused when the particles of the body are of such a nature as to destroy the motion of all the Lumenism which is not reflected from their first surface. Black opacity results when the particles are of a similar nature, and are at the same time too small to reflect any portion of the Lumenism. Transparency results when the particles are too small to reflect, yet have no power to destroy the motion of the Lumenism.

23. Heat is calorism in motion; its intensity is the sum of the momenta in its particles.

24. The specific capacity of any body for heat, is inversely as the amount of calorism combined with its molecules, and directly as the square of the distances of the molecules from each other.

25. Electricity is the presence of a greater or less portion of free Electrism in any body, than is contained in surrounding bodies.

26. Electrical attraction is the attraction between the matter in one body having less, and the Electrism in another body having more than the mean quantity.

27. Electrical repulsion between bodies positively electrified is the repulsion of their electric particles, between bodies negatively electrified it is the attraction of surrounding objects.

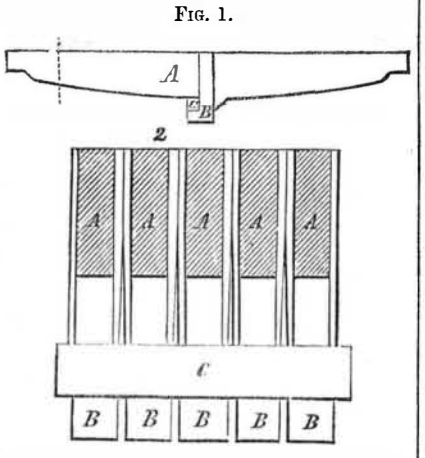
28. Voltaic Electricity is a current of Electrism set free from its combinations by the union of elements at the positive pole, and passing from thence to the negative pole of the voltaic battery.

29. Magnetism is the result of an electric current moving spirally around the magnet from one pole to the other.

30. Magnetic attraction is the result of a motion of the two currents in the same direction, and repulsion of a motion in opposite directions.

Improved Grate Bars.

FIG. 1.



The annexed engravings are views of an improvement in grate bars for furnaces, &c., invented by Samuel Vansyckel, of Little York, New Jersey, and for which a patent was granted on the 3d of last August. Fig. 1 is a side view of one of the bars, and fig. 2 is a transverse section, through a number of bars in a furnace. The same letters refer to like parts. The object of the improvement is to prevent the bars from warping by heat, and the nature of the improvement consists in casting, or otherwise securing to the under sides of grate bars, catches, through a series of which a bar is passed and held, which prevents the grate bars from twisting by the heat, or from falling down, if one end should slip off. A represents the grate bars, each having a hook, or catch, B, either cast or otherwise, secured to it; C is an iron rod; it is framed through the catches of a series of bars, A, forming the grate. The catches, B, may be made square, or round, or angular; the rod, C, being always of a corresponding shape. The catches, or hooks, project below the grate to such a distance, to prevent them, or the rod, from being effected by the extreme heat of the fire. A fastening is not found necessary for the rod, but, if required, wedges may be used. If the grate bars are very long, two or more sets of catches and rods may be employed. The action of the rod, C, is to hold down the grate bars, which have a tendency to warp in the upward direction, and to prevent any of the grate bars from slipping down, if drawn from its end bearings.

The advantages of thus constructing and combining grate bars, over that of common grate bars, which are cast in sections, with permanent braces between them, are, 1st, the spaces between the bars, A, for the draft, may be varied by shifting the bars on the rod, C, so as to increase or diminish the space between the bars. 2nd, the improvement avoids the necessity of closing up any part of the draft space between the grate bars, and allows the fire being raked the whole length of the grate. 3d, the ends of the grate bars are free to expand, while the centers are held firmly in their places, which decreases their tendency to warp. Grate bars made upon this plan have been thoroughly tested, with the most surprising and satisfactory results. The patentee states, that in a fair practical test, they have lasted twice the length of time of ordinary grate bars. The claim is, forming each bar with a catch, or catches, B, on the under side, and uniting a series of bars by the rod, C, as shown.

More information may be obtained by letter addressed to the patentee.

Morse's Telegraph in Switzerland.

The following is from Mr. Prime, one of the Editors of the "New York Observer," who is now travelling in Europe:—

"The boat leaves Lucerne several times a day, to make the excursion of the lake, and I have enjoyed more of the beauty and grandeur it presents, than most of the travellers are willing to take time for. I waited some days there for the senior editor (S. E. Morse) to join me, as I had heard of his arrival in Europe, and that he would soon be in Switzerland. The telegraph has found its way across the mountains and the valleys of Switzerland, and as I was getting impatient, I went to the office in Lucerne to see if I could not send an electric spark to him somewhere between this and Basle. The operator read my message, which was done into decent German, and seeing the name of Morse, said to me that he used Morse's instrument in his work. He was greatly pleased when I told him the relations of my correspondent with the inventor of the telegraph, and we went to work to get the wires into communication with him. 'Now,' said he, 'we are receiving a message from Italy, from Lugano; the line crosses the Alps at the pass of St. Gothard! It works very badly; there must be a thunder storm among the mountains, or perhaps on the other side. Yard after yard of the paper was worked off the reel, and I felt perhaps more vividly than ever before, the value and beauty of this American invention, which transmits thought in an instant over Alpine barriers, causing it to traverse regions of eternal ice and snow, and to enter the heart of a friend in another and a distant clime."

Digging Wells in Quicksand.

A correspondent in the "Genesee Farmer" communicates the following valuable information in reference to the best mode of digging wells in quicksand. He says:—

"Thinking that it may be of importance to some of your readers, I will give some of my experience in digging wells in quicksand. My father was digging a well where the quicksand run in so bad that he was led to contrive some way to remedy the evil resulting from it. His plan is, (when you get down where the sand runs in so as to prevent working at advantage,) to make a platform to lay the wall on, out of plank, by pinning them together; place this on the bottom, and then lay a wall of good hard brick and water lime. When you get above where there will be any danger of the sand caving in, you can go on and dig the well as deep as you please, and the wall will settle down as fast as you take out the sand under it. We have settled a well two feet after it had stood for years. I was led to send this from hearing of the difficulty they had in digging wells at Geneva."

Photographic Discovery.

A late letter from Berlin says:—"It is well known that the paper prepared for photography grows more or less black by rays of light falling on it. One of our young painters, M. Schall, has just taken advantage of this property in Photographic paper to determine the intensity of the sun's light. After more than 1,500 experiments M. Schall has succeeded in establishing the scale of all the shades of black which the action of the solar light produces on the photographic paper; so that, by comparing the shade obtained at any given moment on a certain paper with that indicated on the scale, the exact force of the sun's light may be ascertained. Baron Alexander Von Humboldt, M. de Littnow, M. Dove and M. Pongendorff, have congratulated M. Schall on this invention, which will be of the highest utility, not only for scientific labors, but also in many operations of domestic and rural economy.—[Ex.

[Not a particle of reliance can be placed on the above discovery, as set forth. There can be no such a thing as a scale of *black shades*, and besides photographic paper grows dark by simple exposure to the atmosphere.

LITERARY NOTICES.

ILLUSTRATED HYDROPATHIC QUARTERLY REVIEW—This is the title of a new magazine, published by Fowlers & Wells, of this city, and devoted to Hydropathy. In it are some very excellent articles, but we cannot agree with the views of the work as a whole. There is, without doubt, much that is wrong in any empiric system for the treatment of disease, whether water, homœopathy, strong doses of quinine, bleeding, &c., but any one of these modes of treatment is useful in the treatment of particular cases. The free use of water conduces to preserve health, by keeping the pores of the skin open so as to allow free perspiration, and this is all that is required of persons in a healthy state. As a remedy in many diseases, its claims are now better and more generally appreciated, but experience alone can tell when to apply it and on whom.

THE ILLUSTRATED MAGAZINE OF ART—A. Montgomery, 17 Spruce street, N. Y., publisher. Price of each number, 25 cents. This elegant publication has now nearly reached the close of its second volume, and has already, as we learn, attained to a very large circulation. This is as it should be, for in point of artistic and literary merit, it is the best work of the day. The engravings are very numerous and are done in the very best manner.

THE POPULAR EDUCATOR—This is the title of an excellent periodical devoted to a general system of instruction upon all important branches—language, natural history, fine arts, physical, and industrial sciences, philosophy, civilization, miscellany, are all treated in a free and popular manner. It is issued in Parts at 12 1-2 cents each, or $1,50 per annum. Published as above.

BOOK OF THE WORLD—This interesting publication has reached the second number of Vol. 2. Each part contains from 4 to 6 beautiful steel and colored engravings on all kinds of interesting topics, horticulture and natural history forming a large share of its contents. Weik & Wieck, publishers, Philadelphia, Pa. Price 25 cts. per number, $3 a volume.

ILLUSTRATED ENGLISH GRAMMAR—We have been presented with the map, on cloth, of the "Ornamental Grammar Tree," by Rufus Blanchard, of this city, published by J. H. Colton: it shows the classification, and properties of the parts of English speech, and will be very useful for teachers and pupils. On one corner is a fine lithograph of the Free Academy in this city.