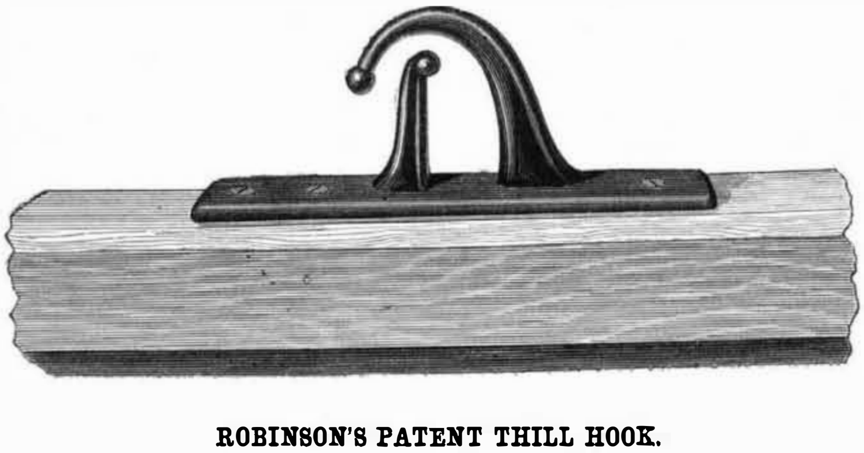
Improvement in Holdback Hooks.

The device seen in the accompanying engraving is a combination of a post with a thill hook, intended to prevent the breeching straps from becoming accidentally unfastened, and still to offer no obstruction to their removal when desired. It is neat, and even ornamental, and its proportions give great strength with lightness. The base or plate is secured to the thill by screws, and is sufficiently long to give a good bearing, while it acts as a brace to the shaft instead of weakening it, as is often the case with other forms of hooks. It may be used either on the upper or under side of the shaft or thill.

This device was patented through the Scientific American Patent Agency, Feb. 4, 1868, by N. W. Robinson, who will dispose of state rights, or sell the whole patent. He may be addressed at Moriah, N. Y.



ROBINSON'S PATENT THILL HOOK.

Tar Pavement Cement.

The following, patented by Albert M. Shaw, of Lebanon, N. H., differs but little from the ordinary tar cements in common use.

"I melt together tar (either coal tar or Carolina tar), Albert coal and resin, mixed in the following proportions: one hundred gallons of tar to fifty pounds each of Albert coal and resin, the same being thoroughly mixed while melted. If my pavement or flooring is laid upon the surface of the ground, I take pebble stones, sufficient to cover the surface to be paved a depth of three inches, and saturate the said stones with the above-named mixture in a heated state, and spread said pebbles over the surface to be floored to the proper depth, and roll the same down. I then take sufficient gravel to cover said surface to the depth of about one inch, and saturate the same with the same mixture, and spread it evenly over said pebble stones to the requisite depth, and roll it down. I then take sand sufficient to cover my surface to the depth of one inch, saturate the same with said mixture, and spread it evenly over the gravel coating, and roll it down smooth, and leave the same to harden. If a fine and smooth surface is required for rooms, I use ground slate instead of sand for my finishing coat, and in rooms where the flooring is not laid directly on the ground, I dispense with the lower stratum of pebble stones."

Improved Process of Purifying Iron and Steel.

This invention consists in an improvement in the manufacture of iron and steel, by what is known as the pneumatic process, the object being to carry off the sulphur, phosphorus, and other impurities from the metal, which are not removed by that process, as ordinarily conducted. This result I effect while the metal remains in the converter, and without subjecting it to a process of reheating. Pig metal, or crude iron, which results from the process of deoxidizing the iron ore by means of a blast furnace, is highly carbonized iron, with which are mingled silicon, sulphur, phosphorus, and other impurities. The atmospheric pneumatic system consists in the removal of the excess of carbon from the metal, by subjecting it, while in a molten condition, to the direct action of an atmospheric blast, for the purpose of burning out the carbon, without the use of separate fuel for supporting combustion and producing the requisite heat. The melted crude iron is poured into a receiver, or converter, at a pressure of about 3000° F., and a blast of atmospheric air at a pressure of about twenty pounds to the square inch, is forced through the melted metal, entering at or near the bottom of the converter, and permeating the mass of molten metal therein. The mechanical effect of the passage of air through the metal is to produce violent ebullition and commotion, and the chemical effect is that the oxygen of the air unites with carbon of the iron, generating a great increase of heat, and causing a vivid combustion, the carbon of the iron serving, together with a portion of the iron, as a fuel, and the carbon being thus burned out and removed. During the process, which ordinarily takes about sixteen minutes, the heat of the metal rises rapidly, to about 5000° F., and as soon as the carbon is all consumed the blast of air is stopped, as otherwise a rapid oxidation of the metal would ensue.

This process, which is successfully employed in the manufacture of steel from crude iron, does not effect the removal of the sulphur and phosphorus, which are eliminated, if at all, by a subsequent and distinct operation. It is proposed to effect the removal of the sulphur and phosphorus from the iron while it is yet in the converter, and before it has been allowed to cool, by means of carbonic acid gas, either applied as a separate blast, immediately after the cessation of the atmospheric blast, in the pneumatic process, or by combining carbonic acid gas with the atmospheric air in that operation.

The carbonic acid gas employed in this process may be manufactured by the action of muriatic acid upon limestone, in a suitable apparatus, when it is desired to use the gas pure; but where it is employed in combination with the nitrogen of the air, it may be conveniently procured by means of a generating oven, which consists of a close arched chamber, furnished with grating, forming a bed for coke or charcoal, which, being ignited, a stream of atmospheric air is forced, by a fan, into the closed space under the grating, or fire bed, and the air, passing through the ignited carbon, combines with it, and is converted into carbonic acid mingled with nitrogen, and is conducted to the blast cylinder.

The operation of this improvement is as follows: The atmospheric pneumatic process, as ordinarily practised, is carried on substantially as before described, the valves being set so as to force atmospheric air through the melted metal in the converter. This is continued until the carbon is nearly all removed, which will be usually in about sixteen minutes, the time varying in practice with each charge of metal, according to its heat when poured into the converter, the quantity of carbon which it contains, the pressure of the blast, and other variable causes. As soon as the process of decarbonization is about completed, stop the blast of atmospheric air, and by means of the valve force a blast of the carbonic acid gas through the melted metal in the converter. This blast is continued for half a minute, more or less. Then, again, change the blast, admitting atmospheric air, which is continued for about fifteen seconds, when the blast is stopped, the operation being complete.

The result which is accomplished by this improvement may be briefly stated thus: The blast of atmospheric air being continued through the molten iron until nearly all trace of carbon has disappeared, on the introduction of the carbonic acid gas a chemical union is formed between the two equivalents of oxygen and the sulpher present in the iron, forming sulphurous acid, which passes off as gas, depositing the carbon thus set free, which may be expressed thus: $C\ O_2+S=S\ O_2+C$. A similar result takes place in respect to phosphorous present as an impurity in the iron; the oxygen of the carbonic acid combines with the phosphorous, evolving acid gases of phosphorus, and depositing carbon, thus, $2\ C\ O_2+P=P\ O_4+2\ C$, and carbon is deposited. This deposit of free carbon may be left in the iron, if preferred, in the manufacture of steel, or it may be burned out after the sulphur and phosphorus are removed, by a repetition of the atmospheric blast for a few seconds, as before stated. The oxygen of the carbonic acid gas will also combine with the iron, forming ferrous acid, thus, $C\ O_2+Fe=2\ Fe\ O+C$, the formation of the protoxide of iron setting free and depositing the carbon.

In practice, it will be found that the sulphur and phosphorus will first be expelled, and that what little carbon is deposited, will either be blown off by the blast or current of air or gas, or will unite with the ferrous acid, reducing it to iron, and forming carbonic oxide, which will be evolved as gas. While the blast of carbonic acid gas is passing through the molten iron, the temperature of the metal will fall somewhat, losing almost one fourth of the additional heat gained during the passage of the atmospheric blast. This, however, is rather an advantage than otherwise, as it is found that by the atmospheric pneumatic process, the iron is rendered almost too fluid by the extreme heat. If preferred, the carbonic acid gas may be heated before entering the converter.

A modification of the process which I have described, consists in allowing a small proportion of carbonic acid gas to enter the blast cylinder, together with the air, and thus subjecting the molten crude iron to a combined blast of atmospheric air and carbonic acid gas. By this means the impurities are removed by the process of decarbonization. Other gases or fluids may also be introduced, together with the carbonic acid gas, as may be desired. Patented by John F. Bennett, of Pittsburgh, Pa.

Easy and Cheap Modes of Enriching the Soil.

A discussion on this subject lately held by the Bedford, N. H., Farmer's Club, is reported by the Manchester *Mirror:*

Mr. Buswell, of Auburn, gave the result of plowing in green clover, which was very satisfactory. The plowing in of a crop once in five years kept the land in a high state of fertility.

The chairman (Colonel George W. Riddle) remarked that a crop of green clover upon an acre, estimated at a ton after it is cured would be worth, standing, $10 for hay; if turned under, would be of as much value as a fertilizer as four cords of stable manure, costing $48. He considered it the best and cheapest method of enriching the soil.

John A. Riddle read a paper in regard to a new system perfected by practice in a foreign country, by a scientific agriculturist. By the use of soil of known capacity (sand), he succeeded in rendering it fertile by the application of the four well-known fertilizers: saltpeter, potash, phosphate of lime, and lime. Combined in known proportions they constituted a complete manure; with either omitted the whole was inoperative, or the results very much reduced. With one, the phosphate of lime, omitted, it was found to be impossible to produce vegetation, showing it to be absolutely indispensable, as by the addition of a trace, one one-hundred-thousandth, the plant would live. The addition of lime affected the result only ten per cent, but *humus* (vegetable mold) being added to the sand it increased forty-five per cent, although the *humus* without lime has no effect. The use of the complete manure in conjunction with complete manure less one and another of the constituent elements, would show the farmer which of these essentials his soil contains or lacks—as, if the soil contained the one omitted, its omission would have no bad effect on the succeeding crop; if it was lacking, the crop would show it.

A gentleman present stated the analysis of a fair average of barnyard manure, by Dr. Nichols, editor of the Boston *Journal of Chemistry*, and a practical farmer. It was found that, assuming a cord of manure to weigh 3000 lbs., nearly 2500 lbs. of it was simply water, more than 100 lbs. sand, and more than 300 lbs. of the balance of no more value than muck, straw or chaff—leaving only 74 lbs. of active fertilizing material, which might be carried in an ordinary basket upon the shoulder to the field. Barnyard manure may be imitated by thoroughly composting with a cord of seasoned meadow muck, 65 lbs. of crude nitrate of soda, two bushels of wood ashes, one peck of common salt, ten pounds of fine bone meal, two quarts of plaster, and ten pounds of Epsom salts. It will not cost $3.50 the cord, and ought to serve as good purpose as animal manure.

Effect of Bright Red on Animals.

We have never yet been able to arrive at a solution of the curious effects of the sight of scarlet or brilliant orange or crimson on some animals. No treatise on natural history we ever have seen has given a satisfactory explanation of facts which must often have been noticed by the most unobservant. An exchange says:

"Many persons have unquestionably lost their lives in consequence of wearing articles of dress which provoked domesticated animals to such a pitch of fury as to lead to melancholy results. Females, for example, in attempting to cross a pasture, wearing a red shawl, a red covering for the head, a scarlet dress, or flowing scarlet ribbons, where bulls are grazing hazard their lives. Oxen, otherwise peaceably disposed, become intensely infuriated at some seasons by the sight of bright red handkerchiefs, or almost any article of female dress of that particular hue. It is equally curious that turkeys manifest the same restlessness and ultimate excitement at red flags or red dresses. The turkey cock on such occasions assumes extraordinary dignity, gobbling most uproariously, and creating immense excitement in his family, not accustomed to the sight. Nearly all the wild grazing animals exhibit extreme surprise, if not positive fright, when a red cloth floats before them."

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Bridge Piers and Floating Ice.

MESSRS. EDITORS:—As you were kind enough to publish some remarks I made a few days since, respecting canal navigation, etc., I will, at the risk of fatiguing your readers, submit some suggestions as to the best method of building bridge piers in streams where large masses of floating ice run at certain seasons of the year. You are undoubtedly aware that bridge piers are usually built with their up stream face, or cut-water, at an angle of not over twenty degrees from where the inclination or bevil commences to the top of the pier. With this slight angle, a field of ice will press upon or strike the pier with as much force as though it stood perpendicular to the surface of the water. If the piers are sufficiently strong to withstand the first field of ice, those which follow either mount upon or slide under it, until a perfect dam is erected, which floods the adjacent country, to the great destruction of property, as is too often seen. It is not unfrequently the case that piers give way, taking bridge and all with them, as recently reported of the Rock Island railroad bridge, at Davenport, Iowa. All this can easily be obviated by building the piers with their upper, or cut-water face, at a greater angle from the perpendicular. If that angle is made at forty-five or fifty degrees, and the cutting face is contracted to a moderately sharp edge, and is built from a few feet below "low-water mark," with a reasonably hard stone laid so as to present the appearance of a "flight of stairs," with the steps from twelve to fifteen inches high, by about three inches deep; an "inclined plane" is made, on which the thickest fields of ice will be forced. When the ice slides upon this "stone saw," if I may so call it, its weight will naturally cause it to crack; but when the cutting of the "saw," as the current drives it on, is added to the tendency to break, there is nothing to prevent its being torn asunder and passing down stream on its harmless way.

A little reflection will show that a considerable portion of the force of the ice is nearly vertical upon the plane of the pier, which rather holds it in its place than otherwise; while the steady, sliding motion up the plane prevents any shock whatever to the pier itself. The first piers of this kind were built by the late Mr. Stevenson, for the Victoria Bridge at Montreal, where the St. Lawrence is nearly two miles wide, and runs fully ten miles the hour. Fields of ice a mile square by from two to three feet thick, can there be seen, at times sawed into pieces or stripes, almost as systematically as though they had been cut for some mammoth ice house.

My object in thus calling attention to this subject is, that as I see your system of railroads is pushing itself far across the continent to the west—your great Mississippi and Missouri rivers will probably be crossed by numerous bridges, it occurs to me if engineers will examine Mr. Stevenson's work at Montreal, when the ice is running in the early spring, they will need no other argument to convince them of the strength and ability of the pier I have endeavored to describe.

New York city. ENGINEER.

For the Scientific American.

HOW A SNOW FLAKE IS BUILT.

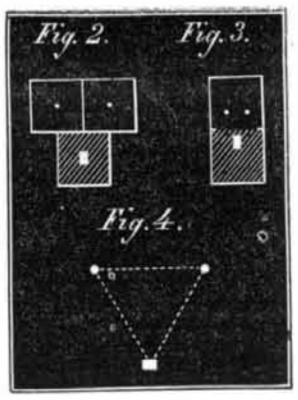
BY PROF. GUSTAVUS HINRICHS.

In No. 8 of the SCIENTIFIC AMERICAN (Feb. 22) a beautiful plate of snow flakes is inserted in the report of the admirable lectures of Prof. Tyndall on heat and cold. The figures, although of course but a very poor imitation of the actual beauty of the snow flakes, nevertheless will enable the numerous readers of this journal to understand how Tyndall in the same lecture can say: "Snow is one of the most wonderful and beautiful things in the whole world."

I believe that Kepler, the great astronomer, is considered the first who called the attention of scientific men to their beautiful and most regular form. Since then they have been studied very accurately; many hundred plates filled with the various forms observed have been published. But never has the cause of these forms been satisfactorily accounted for in a simple manner; indeed the explanation of these forms has hardly ever been attempted. Still, every one in beholding these forms, cannot help being convinced that they are the expression or the result of some grand universal law, just as the spherical form of the heavenly bodies is the expression of the law of gravitation.

In my "Atomechanics," published last year for distribution to the various institutions of learning in this country and in Europe (see the London *Mechanics' Magazine*, Dec. 27, 1867)) these forms find their simple explanation in connection with the other crystalline forms exhibited by matter everywhere. It may not be without interest to give a somewhat more detailed, simple account of this explanation here. The explanation is based upon the known chemical composition of the substance itself; and as this may not be sufficiently plain to all of the readers, we shall present a concise account of that also.

Snow is crystallized water. But what is water? By passing a galvanic current through water, Nicholson and Carlisle discovered in 1800 that water was decomposed into two different gases. Fig. 1.) The gas collecting above the positive pole was found to support combustion; a glowing taper immersed into it bursts into a bright flame; hence it is oxygen. At the negative pole there collects a gas which burns with a pale bluish flame, producing water again as the result of this combustion; it is therefore hydrogen. Furthermore, it is readily ascertained that for every one measure of oxygen



produced in the one tube, O, there are exactly two measures of hydrogen evolved in the tube, H. Water is by this experiment proved to consist of oxygen and hydrogen in the proportion of one measure of the former to two measures of the latter. This has been represented in Fig. 2, where each measure is represented by an equal square, and H standing for hydrogen, O for oxygen.

Now matter, bodies, are made up of parts; the smallest parts or particles are often called atoms. The atoms themselves cannot be supposed to change; hence, since the size of the bodies, particularly gaseous bodies, changes very much, expanding and contracting often to an enormous extent, the atoms themselves are considered to be relatively at great distances from one another. Thus in Fig. 2 the two squares represent the two measures or volumes occupied by two hydrogen atoms; these particles themselves actually filling but a minute portion of this space, as indicated by the dot in the middle of the squares. That the spaces between the atoms (or the interatomic spaces, Tyndall, tenth lecture on heat as a mode of motion) are really so great, we may readily understand if we remember that the water atoms contained in one cubic inch of water will occupy a cubic foot, or nearly two thousand times as much space when the water is converted into steam. We meet here the same fact as in astronomy; the space actually occupied by the sun and planets is entirely insignificant as compared to the space allotted to them for their motions; in other words, the universe is not densely populated by either cosmical atoms in the heavens or chemical atoms in any substance. The question, how the atoms manage to keep other particles out of their great domains, is usually answered, by the vibratory motions of heat; the atoms vibrating to and fro so energetically and rapidly that they actually would kick out any neighboring atom that might happen to get within the space allotted to them.

But furthermore, chemists consider it proved that all elementary atoms occupy equal spaces when the elements are in the gaseous condition. Thus the two volumes or measures of hydrogen obtained from the water would represent two particles or atoms of hydrogen; so also the one measure of oxygen will represent one atom of oxygen. In other words, we learn from the decomposition of water by the galvanic current, that each atom of water consists of two atoms of hydrogen and one atom of oxygen.

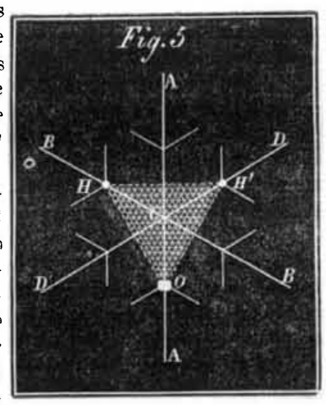
In Fig. 2 these atoms are represented as still uncombined, a mere mixture of oxygen and hydrogen; when actually combined to water-atoms it is known that the three measures have condensed to but two, as represented in Fig. 3. For we know that one volume or measure of oxygen weighs 16 times as much as an equal volume of hydrogen, while water, as steam, weighs exactly 9 times as much as an equal volume of hydrogen. If we call the weight of one measure of hydrogen 1, the weight of one volume or atom of oxygen is therefore 16, the weight of one volume of water=9. But one atom of water, consisting of 1 volume of oxygen (weighing 16) and 2 volumes of hydrogen (weighing 1 each), does weigh 16+2, or 18. Since now, one volume of steam weighs only 9, it follows that one atom of water or steam occupies two such volumes, as represented in Fig. 3. It is readily seen by a comparison of Fig. 2 and Fig. 3, that this chemical paradox, viz., that 2 volumes, H, and 1 volume, O, give not 3 volumes, but only two volumes of steam, may be understood by supposing the two atoms of hydrogen in the act of combination to be brought inside of one volume, which in being placed together with one of oxygen, gives the two of steam, Fig. 3.

In the preceding we have given nothing but the actual facts (excepting the last explanation of the reduction of the three to two volumes). This must enable us to explain the form of the snow flakes.

A snow flake is but a great collection of water-atoms, arranged according to the form of these atoms. What is that form?

We have seen that each water-atom (Fig. 3) is composed of three little particles, two being the hydrogen atoms, the third being an oxygen atom. But three particles always form a triangle (Fig. 4); and since two of these particles, H and H′, or weights are equal, the third, O, will sustain the same relative position to either of them, or the triangle, H O H′, must necessarily be isoceles; that is OH=OH′. And since now the atoms, even when combined, are at great distances from one another, the most complete position of equilibrium will be attained; that is, the equal sides, OH and OH′, will be equal to the base, HH′, or the triangle, H O H′, is equilateral.

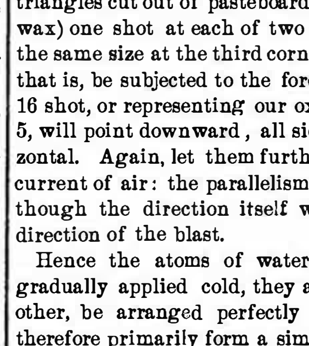
The form of a water atom is therefore necessarily an isoceles triangle, and probably an equilateral triangle. In the latter case it has three equal axes at angles of 60° in the plane of the triangle. This is represented in Fig. 5, where AA, BB, DD, are these three axes, dividing the plane of the water atom equally.

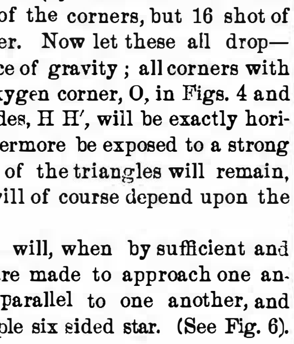


But after having obtained the form of the atom of water, the further question arises: How will the atoms of water arrange themselve when perfectly free to move? It must of course be remembered that they never are actually in contact, for the spaces between the atoms never are nothing.

Suppose, then, there were a great number of water atoms freely moving in space, that is, a space is occupied with little triangles (Fig. 4), the base, H H′, of which weighs 2, the vertex, O, of which weighs 16. They will therefore, under the influence of any force whatever, be directed all parallel to one another. To illustrate this, take equal and equilateral triangles cut out of pasteboard, fix (by means of a little beeswax) one shot at each of two of the corners, but 16 shot of the same size at the third corner. Now let these all drop—that is, be subjected to the force of gravity; all corners with 16 shot, or representing our oxygen corner, O, in Figs. 4 and 5, will point downward, all sides, H H′, will be exactly horizontal. Again, let them furthermore be exposed to a strong current of air: the parallelism of the triangles will remain, though the direction itself will of course depend upon the direction of the blast.

Hence the atoms of water will, when by sufficient and gradually applied cold, they are made to approach one another, be arranged perfectly parallel to one another, and therefore primarily form a simple six sided star. (See Fig. 6).





But any atom in these atoms may again become the center for others, so that forms like Fig. 7 and all other observed forms of snow flakes result.

Even the solid, compact ice is built up in the same way. This has been shown by the beautiful experiment of Tyndall described in his fourth lecture on heat as a mode of motion. In thawing, he showed that similar perfectly regular six-sided stars are formed in the ice.

In conclusion, we will add the description of the snow flakes given by Tyndall in the sixth lecture referred to. By a glance at our figures it will be seen how well our theory accounts for their wonderful forms. Tyndall says:

"Snow, perfectly formed, is not an irregular aggregate of ice particles; in a calm atmosphere the aqueous atoms arrange themselves so as to form the most exquisite figures. You have seen those six-petaled flowers which form themselves within a solid block of ice when a beam of heat is sent through it. The snow crystals formed in a calm atmosphere are built upon the same type; the molecules arrange themselves to form hexagonal stars. From a central nucleus shoot six spicula, every two of which are separated by an angle of 60°. From these central ribs smaller spicula shoot right and and left with unerring fidelity to the angle 60°, and from these again other smaller ones diverge at the same angle. The six-leaved blossoms assume the most wonderful variety of form; their tracery is of the finest frozen gauze, and round about their corners other rosettes of smaller dimensions often cling. Beauty is superposed upon beauty, as if Nature, once committed to her task, took delight in showing, even within the narrowest limits, the wealth of her resources."

But there is still one point more which in this connection may readily be explained. According to my "Atomechanics," an oxygen atom—the part here considered solid, O, in Fig. 4 is composed of a group of 32 little particles; each hydrogen atom consists of only two such particles. Suppose now that the water atom represented in Fig. 4 was exposed to a rapid and powerful current of the ether, which according to Tyndall and modern physicists generally, occupies the space between the atoms. Then the oxygen atoms would be blown away in the direction of the current, just like the chaff is blown away from the grain; in other words, this constitution accounts for the decomposition of water by the galvanic current, the oxygen goes in the direction of the flow, or with the current, because its atoms offer the greatest resistance to that current on account of their structure.

It will be seen from this short exposition that "Atomechanics" explains "how the snow flakes are built up," explains a fact which all philosophers unite in declaring one of the most wonderful and mysterious in nature! And Atomechanics does this not by introducing at every turn some new auxiliary hypothesis; but by means of only one principle, that all elements are composed of one substance, pantogen. Perhaps we may at other times present some other points of Atomechanics to the readers of this journal.

Iowa City, March, 1868.

Improvement in Hand Printing Presses.

MESSRS. EDITORS:—I notice in the SCIENTIFIC AMERICAN of March 21st, an inquiry why there are no improvements in hand printing presses, by Mr. Gabe of Bloomington, Indiana. In reply, I wish to say that the proprietor of the *Gazette* office, at this place, and another gentleman, have perfected a very valuable improvement on hand presses, and it will soon be patented and offered to the public. The proprietor of the *Gazette* has attached the improvement to his double-medium Washington press, given it a thorough trial, and it proves a complete success. It greatly lessens the labor of press work, and doubles the speed of the same. The cost of the improvement is trifling, and it is capable of being attached to all hand printing presses in a few minutes. The patent is now being applied for, through your agency, I believe.

Adriance, Ind., March 23, 1868. K. L.

Improvement in the Manufacture of Molded Articles.

Patented by William B. Gleason, Boston, Mass.

"Having a matrix or mold of the form of the article to be produced, I take thin veneers or shavings and moisten them by hot water or steam. The veneers I lay in the mold, and then press into the space in the mold upon the veneer, any suitable plastic adhesive compound that will afterward set and become hard. The plastic material which is forced by the action of a press into the mold, acts upon the thin veneer as a punch or die, which is the reverse of the mold, and causes the veneer to fit all parts thereof, while, by reason of the plastic nature of the filling or backing, the contact between it and the veneering is made perfect, and at the same time the adhesive nature of the compound insures the union of the facing to the backing.

In some cases, where, from sharp angles or abrupt projections or depressions in the mold, there is danger of breakage or separation of the veneer or shaving, I make use of more than one thickness, which increases the chances of there being at the points of breakage at least one unbroken portion of wood. When the veneered object is dry and hard, all of the shavings, where more than one thickness is used, that come immediately into contact with the filling, will adhere to the filling and the layers not adhering may be removed. I am aware that thin substances have been shaped to form by the action of hard, solid punches, which press such substances into molds suited to the punches, which forms or shells have been afterward backed or filled with plaster or other material. My invention, however, differs from the matter just referred to, and it may be said to consist in the process of forming in molds articles which are covered with an adhering pellicle, by pressing the pellicle into the mold by an adhesive plastic substance or compound, as well as in articles so molded."

Curious Habits of the Chlamyder.

Among the recent French publications is a highly entertaining work, by M. Pouchet, Director of the Museum of Natural History of Rouen and correspondent of the Academy of Sciences. The book is a disconnected collection of curiosities in nature, which our author has compiled and published