yet comply with the required conditions: and it is to scheming such an abutment that inventors of rotary engines should direct attention. We may throw out the hint that, by prolonging the piston backwards and forwards, and sloping it off as shown by the dotted lines in Fig. 2, much of the clearance may be saved, and a modification of the form of the valve or abutment may also be adopted to produce like results; but in a succeeding article we shall consider this point more at length. Theordinary remedy is to provide two abutment valves, one remaining closed during half a revolution, while the other is opening and closing again; but a moment's reflection will show that this plan is only applicable to engines working absolutely without expansion, and would entail enormous waste in engines in which steam was cut off much before the end of the stroke, a stroke being represented by the travel of the piston from abutment to abutment.—*Engineer*.

Process of Germination.

An eminent writer upon the subject, in speaking of the action of the sun in this great work of germination, remarks: "Upon the chemical influence of the sun's rays depends the germination of seeds as well as the growth of the plants. We bury the seed in the ground and shut it out from the influence of light, but we do not place it beyond the reach of the sun's actinic influence, for that penetrates like heat to the little earthy couch where the embryo plant lies hid, and arouses it into life. Light, or the luminiferous rays of the sun, so important to the well being of the plant, is actually inimical to the excitation of vitality in the seed. How singular is this fact! A series of carefully conducted experiments has proved that seeds will not germinate in light, although supplied with heat and moisture, when the actinic rays are cut off. Deprived of the luminous rays with the actinic in full force, they spring into life with great rapidity. Seeds sown upon the surface of the earth will scarcely germinate, as soil cultivators very well know, and, on the other hand, seeds buried so deep that the actinic rays cannot reach them will certainly perish. The planting of seeds, so as to secure the proper distance below the surface, is a most important point in husbandry, as it has much to do with the early starting of the plant and the success of the crops."

Correspondence.

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

The Wonderful Curiosity---The Flexible Marble of Wheeling, Va.

To the Editor of the Scientific American:

My attention has been called to a "Wonderful Curiosity" in your issue of the 17th inst., and I deem it not improper to give you some facts which may not have been in your possession at the time you penned your comments on the *Intelligencer's* article. I am the owner of the curiosity, and know what I say when I assure you that it is a common slab, of the dimensions named, from the Portland quarries, Vermont. It was purchased at one of the marble cutting establishments of this city, like hundreds of similar specimens of the same mineral, from the same quarry, which are kept constantly on hand by all our marble cutters. It was originally sawn for tombstone purposes, and its flexibility was not discovered until after its removal from the *débris* of the burnt college edifice at Moundsville. In proof that it is marble, and not itacolumite as you have supposed, I hand you herewith, from the Pittsburgh *Dispatch*, February 8th, an analysis of the specimen, made by Professor George Hay, Q.S., Professor of Chemistry in the Western University of Pennsylvania. With the value of his opinion, you are no doubt entirely familiar.

J. A. HOLLIDAY.

Wheeling, West Va., Feb. 20, 1872.

ANALYTICAL LABORATORY, 25 Diamond Square,
ALLEGHENY, Pa., February 7, 1872.

J. HOLLIDAY, ESQ—Dear Sir: I have, at your request, carefully analyzed a portion of the flexible marble slab, now in your possession and on view at 22 Fifth avenue, Pittsburgh. Its constitution is as follows:

Carbonate of Lime	97·50
Magnesia, a trace	
Silica	2·05
Water	·45
Total	100·00

The above composition and its crystalline character together proclaim it to be a true marble, and, at the same time, a pretty pure specimen of that mineral. The indubitable flexibility of the slab is its most remarkable feature. Dana states that "some of the West Stockbridge marble is flexible in thin pieces when first taken out." The slab in the possession of Mr. Holliday is about two inches thick, and is nearly as flexible as an equal thickness of vulcanized india rubber. I shall not attempt to explain the flexibility of this extraordinary slab. It may be due to a species of ball and socket movement among the minute crystals which compose the mineral, or it may be due to molecular motion alone; I cannot tell. Certain it is, however, that the slab consists of marble, nowise different in chemical constitution from ordinary marble, and possesses an unusual degree of flexibility for marble which has been so long out of the quarry. Those who are interested in what is curious or strange in Nature should go and see this remarkable slab. I am, &c.,

GEORGE HAY, Q. S.,
Professor of Chemistry in the Western University of Pennsylvania.

The Models at the Patent Office.

To the Editor of the Scientific American:

In your issue of February 10th, you ask: "What shall be done with the modeis at the Patent Office?" No one but an inventor can appreciate the advantage of a fair opportunity to examine models of other inventions in his line.

To be obliged to depend upon drawings alone would add to his labor an hundred fold. As it is, he can find and examine everything of interest to him. He does not expect or wish to go over the whole collection, any more than he would wish to examine every book in a library of reference; but, being directed by courteous assistants, he can spend hours or days in the pursuit of the knowledge he desires, and save himself months of thought and labor on some invention which has perhaps long been patented unknown to him. In answer to your question, I say: Preserve them; erect new buildings as often as necessary. Invention and discovery are the life of America. Let nothing be done to impede them or make them more difficult.

B.

Models at the Patent Office.

To the Editor of the Scientific American:

I am heartily glad to see you come out squarely against the costly farce of requiring to be deposited models of every invention for which a patent is asked. To see that it is a farce, an inventor has but to go and examine his own specimens after only a few years. He will find them beautifully misrepresenting his invention, as I have done, broken, parts reversed, inverted, transposed and lost. They may have been useful, and even necessary, in the early days and at the origin of the patent system in this country. Those days are past. Good drawings are easily and cheaply obtained, and if, with good and profuse illustration in drawing, the examiner is incompetent to fully and completely comprehend a machine, his place should be filled with one better qualified. Drawings do not allow parts of machines illustrated to be lost, misplaced, transposed, or substituted. Drawings do not have to be unscrewed, unbolted, taken to pieces, chipped, filed, or oiled, to make them do their work of illustration. With drawings, the different movements do not have to be examined in rotation, but may be seen, compared, and comprehended at a glance. So also with the construction of internal parts. They are more portable, occupy incomparably less space, can be arranged in more systematic and convenient order, are more accessible, less liable to injury, and cost the inventor, in most cases, much less.

In short, I believe there can be no one sound argument used in favor of models, unless it be the (inexcusable) incapacity of examiners.

INVENTOR, NO. 2.

A New Building Material---Bricks of Slag.

To the Editor of the Scientific American:

To call bricks a new building material is perhaps hardly correct, when every child knows that brickmaking dates as far back as the Israelites in Egypt. But bricks, like everything else, have undergone various changes in form, material, and manufacture. Whether these changes have had a tendency to improve the Egyptian brick is a question not so readily answered. The bricks manufactured by the Egyptians were intended to last for ages, and in this respect they have certainly answered their purpose. With our modern brickmakers, it is different. The inferiority in modern bricks consists principally in the bricks being made of cheap material and badly or insufficiently burnt, and the consequence is that they will not withstand the wet or the hard frosts. This principle of manufacturing an article which is to last for a limited time only is far from being conducive either to safety, durability or comfort. It is precisely with the view of meeting these all-important considerations that the material now introduced to the public has been invented and patented.

Mr. J. J. Bodmer, of London, has discovered a new method of making bricks from a material hitherto treated as refuse only, and the removal of which had to be effected at considerable expense. This material is simply blast furnace slag.

A careful analysis of the slag of a blast furnace showed a great similarity with the well known puzzolana, and this fact suggested to the discoverer the idea of manufacturing a cement by incorporating the slag with a certain proportion of lime. The very first experiment succeeded, as far as the quality of the cement was concerned. It set somewhat more slowly than Portland cement, but it attained a similar degree of hardness, especially under water. The blast furnace slag, however, had proved to be so hard that it was quite evident the manufacture of the new cement could never pay unless an improved method could be adopted to deal with the slag. In watching the slag as it flows in a half liquid or viscous condition from the furnace, the idea occurred to the inventor: "Why should the slag be allowed to form lumps and get hard? Why not subdivide it in its viscous, plastic condition?" The difficulty of reducing the hard slag was thus solved. A pair of plain rollers were put under the spout of the furnace instead of the large tub, which was formerly used to receive the slag. Sufficient speed was given to the rollers to receive and take through the whole off flow issuing from the furnace; and by giving the rollers differential velocity, the slag fell from them in the shape of thin scales or flakes. These were found to crush as easily as sugar, and by grinding such slag, together with the proper proportion of lime, the cement was obtained at a mere nominal cost. This cement, in a proportion of 2 parts to 6 parts of sand, makes the finest bricks imaginable. At iron works, slag is again used in lieu of sand; it is rolled coarser and then mixed with the cement like sand, and the bricks obtained are as hard as flint and of a most pleasing color, being that of grey sandstone. The color can, however, be varied *ad libitum*, from a light to a very dark shade. Nor is the material adapted for the manufacture of bricks only, but may be used for blocks or ornaments of every description, as the cement itself may be used in the same manner as the Portland cement. For the purpose of manufacturing blocks and ornaments, a somewhat different *modus operandi* must be observed. If the attention of the owners of some of the large iron founderies of New York or Pennsylvania could be drawn to the subject of brick manufacture from slag, they would find that this hitherto useless material can be turned to profitable account, producing a brick which would prove both cheaper and harder than any other made. A conspicuous feature of these bricks is that they resist the action of the weather, and do not crumble away like most of the clay bricks, a defect from which even the brown stone is not exempt.

The idea of using slag as a building material is not altogether an original one. When the slag is allowed to form large masses, the inside of such blocks cools very gradually and thereby attains the hardness of rock. Such blocks are used, in iron manufacturing districts in England, for foundations, sea walls, &c.

A special feature, too, is the machinery used in the process of brickmaking. The cement and the sand or coarse slag are shovelled into their respective receivers or hoppers, and at the other end of the apparatus, the finished bricks rise to the table, from which they are wheeled away and piled up to set and harden in the open air. The manufacture of bricks from blast furnace slag is covered by letters patent taken through the Scientific American Patent Agency.

Messrs. Bodmer & Co., of Hammersmith, London, are now manufacturing these bricks, and would like to correspond with parties in the United States with a view of introducing the manufacture here. Should any of the American iron manufacturers be present at the great annual meeting of the Iron and Steel Institute in London, in March, 1872, they will have every opportunity to see the process in actual operation.

[The above communication is from a valued correspondent in London, describing a novelty in brick which was patented in this country, and which was briefly referred to in these columns at the time the patent was issued.—ED.

The Davenport Tricks Again.

To the Editor of the Scientific American:

Now that Messrs. Vander Weyde and Patton are about explaining the operations of the Davenport brothers, I hope they will make their explanations as brief, exhaustive, and comprehensive as possible, for the benefit of science. I was once one of a committee of three, chosen to investigate these performances. We proceeded in the following manner: First, we placed eight inverted glass tumblers upon the platform; upon these we set the legs of two light benches, and upon the benches we set up their cabinet, made of thin black walnut boards. We then with strong hemp cords made first two turns around one wrist of one of the brothers, and tied him with a strong square knot; and then tied the other in the same manner. We then pinioned their hands and arms firmly behind their backs, then ran the ends of the rope through holes in the seat, and drew their feet back and secured them firmly to the seat, winding the ropes around their legs and knees, and fastening with a strong square knot, leaving no slack rope anywhere. We also tied their heads back to the cabinet. We then made them open their hands, and placed in each a good teaspoonful of wheaten flour, taking great care that not a particle be dropped inside the cabinet; then, closing their hands, we sewed the ropes and knots through and through with strong linen thread. When thus secured, we placed a speaking trumpet, three or four bells, a violin and guitar in the cabinet, and closed the doors, hooking the two outside doors, the middle door being bolted inside instantly after closing. Immediately the instruments began to be played upon, all together; a hand and half of a naked arm were thrust out through a hole near the top of the middle door, swinging a bell for several seconds, and throwing it upon the floor. Then another hand and arm thrust out the speaking trumpet. This time I seized the hand near the wrist and did my best to hold on to it by pulling downward, but with a power greater than my own, it drew back into the cabinet with a loud grating noise as it rubbed on the edge of the board under the weight of my grasp. The hand was warm, but it left no marks of skin or blood upon the sharp edges of the opening. Immediately after, a head and neck rose through another opening in the top of the cabinet and was plainly visible for several seconds to all the audience. After these things had been going on some time, the doors were thrown open, and we made an examination of things within, but we could discover no change in the tieing of the brothers, the flour still being in their hands as we left it, and no marks of it upon anything in the cabinet. We then proceeded to close the doors a second time; one other of the committee closed the door at the right. While I was fastening the door at the left of the cabinet, a hand struck me with great force upon the left shoulder; I instantly turned to see who did it, and the hand appeared to vanish over the shoulder of one of the brothers. The hand was seen and the force of the blow plainly heard all over the hall; we threw open the doors, but no change could be found in the condition of our ropes or prisoners. We then closed the doors again, and, inside of four minutes, they were thrown open and the brothers stepped out, still holding the flour in their hands undisturbed, the ropes lying upon the floor of the cabinet, but their marks deep in the wrists of our "no longer prisoners."

These things were performed in the presence of at least 250 witnesses in New Haven, Conn. Now, Dr. Vander Weyde says he has performed certain tricks repeatedly and "done everything the Davenports did," etc. If he will come to New Haven and perform everything the Davenports did, under like conditions, and give us a satisfactory scientific explanation of the *methodus operandi*, as he calls it, I stand ready to hire a hall and pay all expenses, and pay him well for his trouble, for the benefit of science.

New Haven, Conn. GEO. T. CALDWELL.

Borax in Nevada.

To the Editor of the Scientific American:

Some years ago Professor Silliman traveled through this section of country, and made an analysis of the many differ ent minerals found in Nevada, and also made a report of the same.

William Troop, of California, got hold of some of his reports, and learned by them that the Professor had discovered a saline marsh, near the Carson river, of some 2,000 acres, which contained traces of borax. He at once prospected, but met with little success, and the marsh lay unclaimed and unnoticed until last May, when Mr. Troop and others located according to law. Since that time I have become interested in the affair, and put up small works and manufactured five tons of borax and placed the same upon the market. The article is merchantable, and has a ready sale; and the demand is increasing.

Our crude material has an incrustation upon the surface, and is called borate of soda. From what little knowledge of chemistry I have, I believe it contains boracic acid, soda, salt, magnesia, and ammonia, but may be mistaken as to the last named.

In looking through the SCIENTIFIC AMERICAN for 1869, on page 202, I find some interesting information entitled "Ammonia and its uses in the arts." That article states that the most recent supply is from the boracic acid works in Italy, and that they had until recently lost a million of pounds of salts of ammonia during a year.

I have been paid double the price of the SCIENTIFIC AMERICAN, almost monthly for the last five years, by reading the many communications on different subjects; and I am desirous of knowing the best method for manufacturing borax from borate of soda; the best method of separating an excess of soda from the borax in concentrating; how to separate magnesia from borax, and also the best method of manufacturing ammonia.

If some of your readers will give me a description of the works at the Tuscan lagoon in Italy, and the manner of working, and the kind of material worked there, they would confer a great favor upon me and many others.

I am informed that these are the greatest borax works in the world. J. V. LEWIS.

Nevada, Jan. 17, 1872.

Technical and Classical Education.

To the Editor of the Scientific American:

In looking over the SCIENTIFIC AMERICAN for the past year, I notice a prevailing tendency towards technical education. I am glad that this is so; but while we consider the value of a technical education, classical studies should not be neglected. To be successful in any calling, a man must have a well balanced mind; and a mind certainly cannot be well balanced which has continually run in one channel. It may be good in certain points, but problems are continually coming up, in the course of a man's life, which require other faculties of the mind than those which a technical education is likely to develope. To educate the other faculties of the mind will not require a very deep insight into classical learning; but a little cannot injure any one in his scientific attainments, and will undoubtedly add to his general culture.

The above is not intended to decry technical education in the least. But at this time it has so many able advocates that we may be in danger of running into extremes on this subject, and to neglect classical education entirely.

PRINCETON, N. J. M.

Shaving with Pumice Stone.

To the Editor of the Scientific American:

I see by your No. 4 that nothing useful is so small as to escape your vigilant attention. I allude to instructions for easy shaving. This leads me to say that shaving with an expensive tool like a razor is all nonsense. The proper way to keep down the human stubble is to get two pieces of of pumice stone, cubes of one and a half inches. Keep them clean by rubbing their faces together; then rub them over your own face, that is all; no soap, no brush, no razor costing originally $1·50, and giving the seller a regular annual income of at least fifty cents in sharpening, no Emerson's patent strap required, no looking glass, no hot water. In traveling you have only to sit still and move the cube around; the shaking of the car, carriage, horse, donkey, or boat will do the work clean.

The moral effect of pumice stone can be imagined when you think of the statistics on suicides by razors, the vituperations of irascible men with hard beards when their razors do not cut smoothly, or when they shave with bad water, bad soap, or by a bad light.

Many other considerations for giving up the razor might be named, if time and space would permit; but I must content myself on giving you this hint on domestic and, I may say also, political economy. * * *

Watch Cleaning.

A correspondent says: "To clean a watch, even if it be of the lowest grade, the barrel or mainspring box should always be taken apart, the arbor and spring taken out and cleaned, fresh oil being applied before the cover is replaced. That there is nothing better than naphtha for cleaning purposes, is the opinion of most watchmakers. If the watch has a fusee, that also should undergo the same treatment as the mainspring box. The pivots also form an important part of the mechanism of a watch; and, to be examined as they always should be, necessitate the act of taking the watch apart. Such attention, no honest practitioners will overlook."

THE population of London, by last year's census, is 3,883,092.

[For the Scientific American.]

MIDDLE PARK, COLORADO.

Colorado is the apex of the United States; within her borders is the culminating point of the Rocky Mountains. Here are those huge vertebræ of the continental back bone, whose cloud-piercing, cloud-compelling summits collect the snow and distil the water to form those mighty rivers—the Platte, the Arkansas and the Colorado—which, flowing to the two oceans, begin their journey in the eternal snows of the dividing range. Beyond the boundary of Colorado the mountains become less abrupt, lose one third of their altitude, and, stooping as it were, form a passage for the iron pathway of the nations.

The main range in Colorado is flexed and doubled upon itself like a huge anaconda; within one of these immense folds lies Middle Park.

It is a region but little known outside of Colorado. There are several reasons, mostly negative, that will account for the meagerness of our knowledge of this gem of American mountain scenery. The principal reason is that the precious metals have never been found here in paying quantities. How little would be known to-day of the greater portion of our western Territories, but for the presence within their borders of gold and silver, those powerful lodestones of humanity!

Middle Park lies on the western or Pacific side of the great continental divide, and is about sixty miles long from north to south by twenty-five miles in breadth, with an area about equal to that of Rhode Island.

An immense wall of granite, porphyry and queissoid rocks bounds the Park on every side, rising from 3,000 to 7,000 feet above the surface: Long's Peak, with its 14,000 feet of altitude, forming the north-east corner stone. The altitude of the park proper is from 6,000 to 8,000 feet above the sea. Middle Park is drained by Grand river and its tributaries; the Grand rises near the base of Long's Peak, and, flowing diagonally through the park, passes out at the south-west corner.

This river is one of the principal branches of the Colorado, and its waters, after flowing through the three hundred mile cañon of that stream, finally reach the Pacific by way of the Gulf of California.

The surface of Middle Park is, for the most part, rough and hilly, the hills frequently becoming mountainlike in their proportions.

Some of the streams are bordered by broad, level savannas, covered with a dense growth of sage brush. This tough, aromatic plant grows here from one and a half to two feet high, and is very abundant in most of the Territories west of the Rocky Mountains; but no true sage brush has ever been found east of the main range. The spherical cactus or, more scientifically, *cactus mammilacis* grows in the more arid portions of the park. There is but little timber in the park proper, and that is generally confined to the summits of the higher hills; the foot hills of the mountains, however, are covered with forests of pine. Grass is abundant and so nutritious that cattle and horses require no other food, summer or winter. The climate in summer is pleasant and exhilarating, though there is more or less frost every month in the year.

In nearly the lowest part of the park, your correspondent noted a temperature of 22° Fahr. at 6 A. M. August 28, and for a week the temperature at this hour averaged as low as the freezing point.

One thing to be said in favor of this climate, however, is that frost has not the same blighting effect upon vegetation in this rare, dry atmosphere that it would have in the damp, dense atmosphere of the States. It is a well attested fact, improbable as it may seem, that flowers and even strawberries will mature, in the open air, in this elevated region where there is frost every week in the year. The annual snow fall is from 12 to 15 feet, commencing in September and ending in May.

The fauna of Middle Park include deer, coyotes, trout, mountain hares, beavers and Indians; the latter are rather scarce in summer, but infest the park in considerable numbers during the winter. Trout are the principal fish found in the lakes and streams. Beavers are abundant, and their dams may be found on most of the smaller streams. On one stream there are fifty or more beaver dams within a mile, a regular beaver city.

Near the head of Grand river, just within the foot hills of the mountains, lies Grand lake, a beautiful sheet of water, of small area and great depth; though not more than two miles long, a sounding line of five hundred feet failed to reach bottom. It is set as a mirror in a framework of mountains, which rise abruptly from the water's edge. The altitude of the lake, as determined by the temperature of boiling water, is 7,551 feet above the sea.

Grand river forms at once its inlet and outlet. Up through the cañon, where the river comes tumbling down, are several smaller lakes; and higher still is Estes Park, a wee bit of a park on the verge of timber line, wearing its mantle of green grass and beautiful Alpine flowers 11,000 feet above the sea and in close proximity to the eternal drifts.

The hills along all of the larger streams are terraced. There are generally three terraces, very distinct and regular, rising steplike to a hight of two hundred or three hundred feet.

The geology of the park is unique, and forms one of its most interesting features. All the formations known in America, from the azoic to the later tertiary, are represented here. It is a well established principle of geological science that, generally speaking, the highest mountains are the youngest, and *vice versâ*. Thus the Adirondacks of New York are the oldest and the Rocky Mountains are the youngest mountains in the United States; while the Green Mountains and the Appalachians occupy intermediate positions in point of time.

At the close of the cretaceous age only a few isolated ridges of azoic rocks appeared above the waste of waters of the great interior sea, and the elevation of the Rocky Mountains was just beginning. But early in the tertiary age communication with the exterior ocean was cut off, never to be resumed; and fresh or brackish water lakes took the place of the previous interior sea. Middle Park probably formed the bed of such a lake.

The great thickness of tertiary rocks over the Rocky Mountain region proves that this lacustrine condition continued for a long time. The stratified rocks of Middle Peak form an immense quaquaversal; this is the natural result of the elevation of the mountains after the deposition of the strata.

Tertiary rocks are found high up on the flanks of the mountains, above timber line and 12,000 feet or more above the sea; this shows conclusively that the Rocky Mountains received most of their present altitude after the beginning of the tertiary age.

The tertiary beds are composed of soft, light-colored sandstones and marls, alternating with conglomerates and some laminated, argillaceous beds.

The absence of limestone and marine fossils from this formation is evidence that the water in which the beds were deposited was fresh or nearly so.

Fossil wood is abundant in the rocks of this age; fossil palm trees are recognized by their characteristic endogenous structure, but most of the trees were exogens. In the argillaceous beds mentioned above are many impressions of fossil leaves. A species of magnolia has been identified.

The presence of the remains of these tropical plants in this semi-arctic region is some indication of the great climatic changes that have taken place over the surface of the globe, within quite recent time, geologically speaking.

In the valley of the Blue river, the cretaceous beds have an immense development, and they follow this stream nearly to its source, running high up on the mountains, where the beds have been broken and faulted on a grand scale. Marls and shales are the predominating rocks. In the shale I found *boculites* (cephalopod molluscs) and *inoceramus* (a species of *conchifer*), fossils characteristic of this age.

The carboniferous beds of Middle Park contain the only true carboniferous coal in Colorado.

During the closing epochs of the tertiary age, there was a stormy time, strongly marked in the rocks of this era; fire and water united to leave an indelible impress upon the land.

In Middle Park, there were extensive eruptions and overflows of igneous rocks—basalt and lava—forming a number of well defined *mesas*, whose frowning battlements form an interesting feature in the topography of the park. The most remarkable of these eruptions occurs fifteen miles below Grand lake. Grand river cañons here (making a verb of the noun). The cañon is an enormous gorge cut through a high ridge of basaltic rocks. The ridge is from 800 to 1,200 feet high, and seems to be an intrusive bed, for it is conformable to the sedimentary beds above and below.

The underlying cretaceous shales were converted into slate by the metamorphic action of the fiery mass.

The hot sulphur springs still bear witness to this geological storm. They are situated near the center of the park on the west bank of Grand river, and form the chief attraction of the park at present.

The water issues, from the ground, strongly impregnated with sulphuretted hydrogen, and flows into a capacious basin, of its own handiwork, which forms an excellent tub.

The volume of water is about twenty-five inches, an inch being the amount of water that will flow through an orifice one inch square under six inches head. The temperature of the water is 112° Fahr., which indicates that it comes from a considerable depth, and an analysis of it would probably afford some clue to the mineralogical character of the rocks for a long distance below the surface.

The monumental rocks in the valley of Troublesome Creek are interesting examples of the erosive action of water and frost. During the lapse of ages, the original sandstone beds have been worn down and cut out by the degrading elements, leaving these strange, weird monuments to be the wonder of the world.

Near the mouth of Troublesome Creek is a rectangular hill, about 200 feet high, composed of light colored marl and sandstone; the sides are nearly perpendicular and have been so fashioned by the elements that the whole resembles a huge castle. The resemblance is quite complete; towers, abut ments, massive gateways, all are here. When seen by moonlight or in the early morn, the effect is enchanting.

The quantity of agates, jasper, chalcedony and silicified wood in Middle Park is sufficient to supply the world. Agate and chalcedony are found in the volcanic rocks, and were formed by the deposition of silica in the vesicles of the lava; the subsequent disintegration of the lava leaves the minerals free. There are thousands of acres in these agate patches. Much of the agate contains that dendritic formation of the oxides of manganese and iron, supposed by some persons to be petrified moss, which gives it the name of moss agate.

The Park is much visited by Coloradoans during the summer, but the permanent white population is small, including only a few hunters and trappers who spend the winters in the vicinity of the springs and Grand Lake. The Indians still claim the Park, and are jealous of all attempts of the pale faces to make permanent settlements.

W. O. C.