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 different 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 tuns 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, abutments, 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.

Improved Gas Burner.

Having ourselves experimented with one of these gas burners, we are in a position to speak from knowledge of its merits. We regard it as one of the best, if not the best ever employed for burning gas. Professor Henry Wurtz, editor of the *American Gas Light Journal*, states that "on the evening of June 13, 1870, in the photometric room of the Metropolitan Gas Light Co., at their 42d street station, in company with Mr. Dietrich, the engineer of said company, he made comparative tests of burners of Mr. Cremin's pattern in comparison with an ordinary three feet fish tail. The general result was that, the pressure being one inch, and the consumption of gas being 3½ feet per hour, the ordinary burner indicated an illuminating power equal to seven candles, while the Champion Gas Burner of Mr. Cremin went up as high as 11·5 candles; thus indicating, according to the experiment, a clear gain, by the employment of his peculiar principle, of over sixty-four per cent of the light from the same materials."

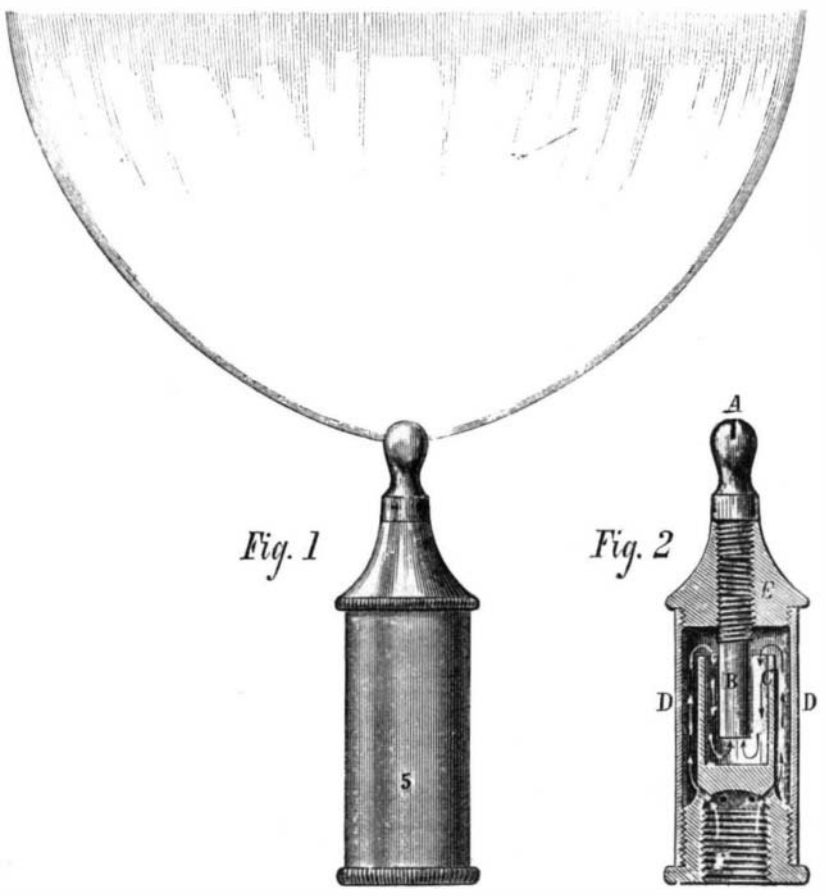
This testimony, from one of the most reliable authorities on gas lighting in this country, is sufficient to establish the reputation of this burner, which is, we are told, being rapidly adopted by such as are cognizant of its economy and value.

Our engravings give a view of the flame of a five feet burner, full size, and drawn, as it actually appeared, by our artist, and also a section showing the construction of the burner.

The general principle is the heating of the gas before it is delivered to the air for burning, whereby the gas is expanded, and a higher illuminating power secured with a given flow as measured by the meter.

In the engraving, Fig 2, A is the burner proper, from which descends a tube, B, into a tube or cup, C. This cup is closed by a diaphragm passing across it just above the screw thread, at F, by which it is attached to the delivery pipe. Small holes perforated in the part, F, allow the gas to flow out into the annular space between the cup and the outer shell. D, and its flow, indicated by arrows, is thence upward within the outer shell, down into the cup, and up to the burner proper through the tube, B. The tube, B, conducts heat downward into the shell and thus the gas is heated and expanded before reaching the point of combustion at A.

The invention was patented January 11, 1870, by Joseph W. Cremin, whom, for territorial rights or other purposes, address at 213 East 51st street, New York.



CREMIN'S GAS BURNER.

Cloth Measuring Machine.

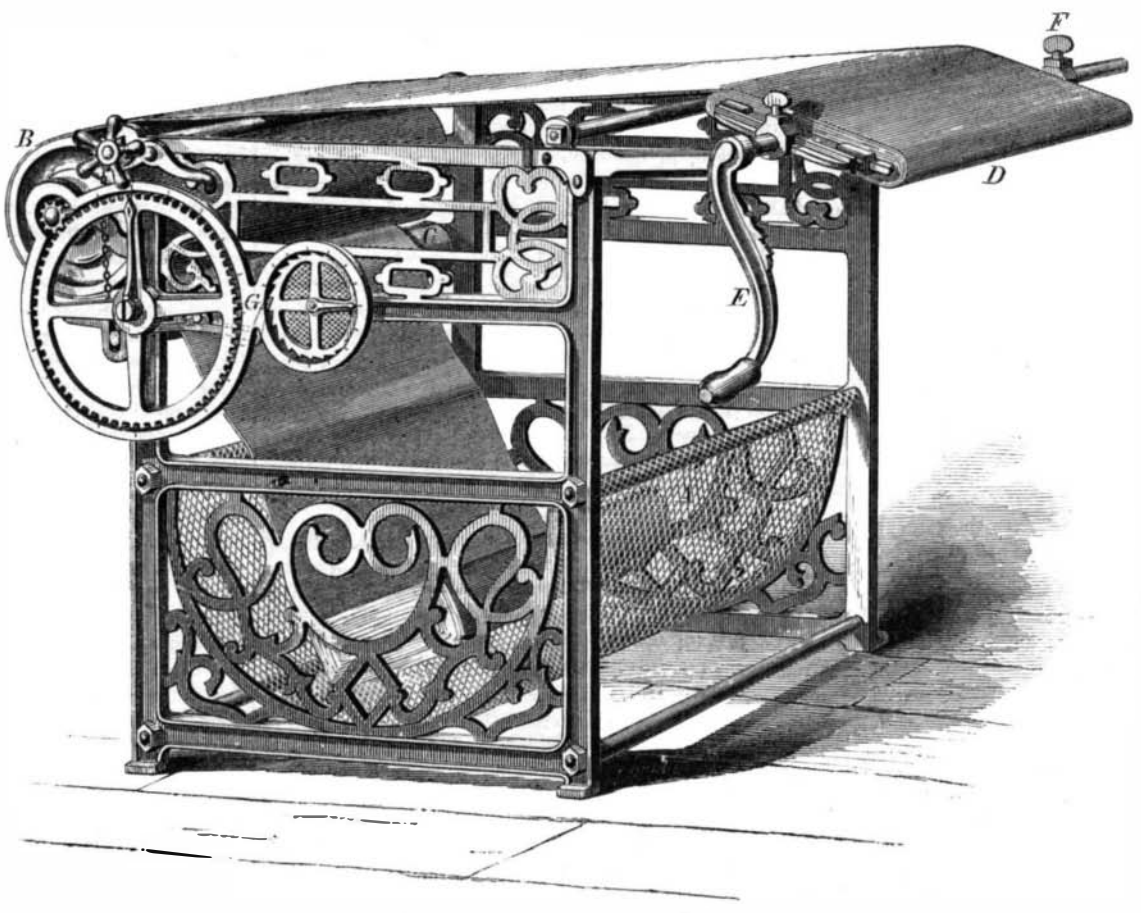
The measuring of cloth by the ordinary method is a tedious and laborious operation. The machine herewith illustrated is designed to replace manual labor and to render cloth measuring very much more rapid than has heretofore been the case. The invention is extremely simple, insures accuracy, and indicates correctly the quantity, while it may be operated readily by a boy.

The construction is as follows:

A is a hollow receptacle for the unmeasured goods; B is a measuring roller covered with cloth; C is a tension roller directly under the measuring roller. The cloth is passed between these two rollers and around the measuring roller, and then connected with the reel board, D, which is turned by the crank, E. The goods on the reel board, D, are quickly disengaged from the same by turning the screws, F, half round. The dials, G, indicate the exact measurement.

The machine will, it is claimed, unroll, measure, re-roll and correctly count every yard and fractional part of a yard with rapidity and exactness, fifty-two yards having been passed through the machine in one minute and a half, to do which, in the ordinary way, would require the work of six or eight men.

Patented June 25, 1871, by Isaac Miller, whom address for further information as to rights or machines, Hamilton, Ontario



MILLER'S CLOTH MEASURING MACHINE

The Science of War.

Captain Layman, Instructor in Tactics at the German Military School at Cassel, in a series of lectures before the students of that Institute, attributes the victories of the German armies to the efforts which their commanders use to secure the offensive in war, and to keep the initiative of movements constantly in their own hands. This view is sustained by the results of the late Franco-Prussian war. The moral force of attack that seen when a small portion of metal is thrown into some of the same substance in a state of fusion—it is tossed about for some time and then finally disappears. This was what evidently appealed to me to be going on here, the hydrofluoric acid having apparently a solvent action on the glass. What strengthened this opinion was the presence of magnificent colors, changing every moment as these small portions of glass were liberated from the larger piece and were undergoing the process of solution, thus leading one to suppose they consisted of small glass prisms, the colors being more perfect than those obtained by water prisms simply. Some of these particles were completely surrounded by a halo of color, as if they had been thrown into a variegated solution. The principal color evident in such cases was a deep green but dark blue was also seen at rare intervals. The foregoing observations were repeated several times, and always with the same results, with the exception that the small particles of glass floating in the drop of acid exploded now and then, causing a great commotion in the liquid and throwing up little jets of finely divided acid, behaving as if the small glass particles were hollow spheres. I may also mention that when these explosions occurred, bright flashes of light were visible, resembling closely the appearance of rainbows seen in waterfalls.—*Microscopical Journal.*

Microscopic Observation of Hydrofluoric Acid on Glass.

When the acid was first dropped upon the glass, no action was evident, the appearance presented being simply that of a drop of water on glass. In a very short time, however, the drop became a little duller, but this almost immediately cleared away, and several small particles, seemingly of glass, were seen floating in the drop. These seemed to be undergoing a process of fusion, the appearance being similar to

Japan.

We are indebted to an esteemed correspondent for a copy of the Japan *Herald*, of December 9, 1871, printed at Yokohama, one of the treaty ports and a large commercial center. We find a number of curious items relating to Japanese affairs, of some of which we will give the substance:

The Government has taken possession of some extensive tea houses at Yedo, and converted them into a grand hotel for the accommodation of the princes of the empire, that once great and powerful class known as Damios. The botel charges are as follows: First class guests per *diem*, lodging and three meals, 11 nomies, or 18¾ cents.

Six hundred houses were recently burned at Yedo, all of which had been erected on the district swept by the great conflagration of 1870. The latter burned over a district of five square miles.

Extensive gas works for the supply of Yokohama are now in process of erection. The company is of native formation, capital $150,000. The apparatus is supplied by Laidlaw & Son, Glasgow, Scotland.

The nursery gardens in the vicinity of Yedo are gay with blooming chrysanthemums which are cultivated with assiduous care. The Japanese, not content with potting and sticking them, support the large blooms in many instances by circular pieces of thin wood or cardboard, and, placing them under paper lighted conservatories, artistically dispose the plants in such a way as to represent men, women, and scenes in real life—effigies in various striking attitudes being completely covered with the growing blooms and foliage of these plants. Every year an illustrated sheet is issued by the Yedo nurserymen, showing the designs that have been adopted, there being a different one for each garden.

The Japanese Government, with the object of pushing on the civilization of the country and bringing it to as high a pitch in as brief a time as possible, are continuously engaging foreigners from abroad to enter their service. Without mentioning the American citizens who will presently arrive to fill various capacities, twenty-three French military instructors for the imperial army are engaged, and ten English instructors for the Japanese navy. Further, twelve beer brewers from Bavaria have been ordered, and a number of shoemakers (country unknown) will shortly arrive to teach the craft and mystery of boot making.

Building Blocks.

This invention relates to a new manner of forming brick for practical building purposes; and has for its object to facilitate their transportation and handling, and to increase the strength of walls erected from the same. The invention consists principally in forming blocks from a number of bricks, within molds or boxes, in such a fashion that they (the blocks) will form sections of walls with interlocking joints. For certain purposes—as, for example, in the formation of pillars, etc.—the blocks may be made without interlocking projections. Another advantage of thus forming the blocks preparatory to building is that ornamental bricks may be baked on the blocks by subjecting the same to heat.

This will permit the application of all—even the most artistic—kinds of ornaments to the faces of brick structures Blocks thus formed, with or without ornaments, can, in building, be placed so as to project one beyond the face of another, thus relieving the tiresome monotony of the modern plain brick building fronts.

The inventor of this improvement is Mr. Andrew Derrom, of Paterson, N. J.

DISPATCHES from Teheran state that the famine in Persia is unabated. Many persons are dying daily.