fashion. These people, who live in abodes that are more like tents than houses, and who, thanks to the glorious climate of their country, are always out of doors, seem to imbibe the influence of the magnificent coloring of nature by which they are always surrounded. Japanese art is true art in the fullest acceptation of the term; that is, a simple rendering of nature without any effort of the brain. When imagination comes in play, then it introduces those terrible though gracefully curved monsters which astonish us and set us thinking, for their magnificent grotesqueness does not interfere with the general composition of the design, but only enhances its beauty by strong contrast.

"The metallic threads used in their brocades are always made of paper, gilt or silvered, for the Japanese are masters in paper manufacture. This has a two-fold utility; while it makes the stuff more rigid, it does away with the hard cracks which occur in pieces in which gold thread of inferior quality is used, for real gold thread is too costly to be used except in church ornamental work, and even then only for pieces used on the altar. In some of the finest embroidery, such as was made for the hangings of temples, the gold work on the dragons is heavy enough to introduce glass eyes and metal claws, which help very much in making the monsters terrible. In embroidering on crape—such as is known in the trade as *crêpe de chine*—they are without rivals. They use a peculiar method of reserving certain parts by painting them over with a chemical which prevents spots thus prepared from taking the dye. In this way, when the stuff comes out of the dye vat, an important part of the ornamental design is already indicated by white masses and lines. Plaids produced by lines of different colors and thickness intersecting at right angles seem to have been used by them long before they became identified with Scotch fabrics."

Communications.

Our Washington Correspondence.

To the Editor of the Scientific American:

Owing to insufficient appropriations many very valuable clerks were recently dismissed from the Patent Office, and complaints have already begun to be made of the interruption of business resulting therefrom. The Commissioner, however, says that the discharge was unavoidable, as funds had run short, and that the allotment for salaries, etc., had even been exceeded. This should be remedied at once by Congress. It is not as if the Patent Office were an expense to the Government, as in that case there might possibly be some excuse for the parsimony which Congress exhibits; but when it is considered that over $120,000 more was received for fees than was paid out for expenses last year, and that over $1,100,000 lies to the credit of the Patent Office in the Treasury, a good reason is shown for more liberal dealings toward the office.

There is another matter where Congress is also derelict in its duty: it has suffered the Patent Office to remain for months without a decent roof, and has taken no steps toward repairing the injuries done by the fire. The inventors of the country have a right to demand that the edifice should be put in order again with the least possible delay, so that the model museum may be again ready for the convenient arrangement and storage of the models, as they pay fees enough to entitle them to sufficient accommodation.

THE PROPOSED PATENT COURT.

Mr. Vance has introduced into the House a bill to establish a Court of Patents, with three judges at a salary of $5,000 each. It allows appeals from the Commissioner to the court, and the decision of the court is to be conclusive, but not to the extent of preventing any person from testing the validity of a patent in any court of law or equity. The clerks and messengers of the court are to be assigned by the Commissioner of Patents from his force, and the rooms to be occupied by the court are to be in the Patent Office building. The board of examiners in chief is to be abolished, and all statutes applicable to it are to be made to apply to the Court of Patents. We have already pointed out the objectionable nature of this project.

REMOVING BARS IN THE MISSISSIPPI.

Captain Eads, having succeeded in his great enterprise at the mouth of the Mississippi, is looking around for more worlds to conquer, and now proposes to apply his jetty system to the removal of the bars wherever they occur between St. Louis and the Mississippi's mouth. He claims that by his method of operating a channel 25 feet deep can be secured between those points, and, moreover, that by making the width of the stream uniform the velocity of the water will equalize the bed of the river through the movement of the sediment, thereby rendering levees unnecessary.

In view of the success of Captain Eads, where it was doubted by many of our prominent engineers, his proposition, notwithstanding the enormous expense involved, is worthy of a careful consideration. The importance of the Mississippi as a national commercial channel cannot be exaggerated, and it consequently has strong claims for a large share of the money which Congress may see proper to appropriate for internal improvements. The money which it would require to construct a complete system of levees is so enormous as to stagger even the warmest friends of a liberal policy in regard to such matters. If it is believed on investigation that the plans of Captain Eads are practical, the expense of improving the Mississippi, and confining it within bounds, would be so greatly reduced that Congress would not be likely to hesitate about granting all the aid necessary for that purpose.

AMERICAN BUTTER IN ENGLAND.

The last report from our Consul at Newcastle-upon-Tyne gives some facts relative to American butter, which it seems desirable that the producers of that article should know. Complaint is made that the butter is too salt and packed in roughly finished red oak tubs. If made with less salt, but of the best quality, and packed in neat firkins or kegs of white oak, ash, or white cedar, and sent across the Atlantic in refrigerator steamers, it would command a good sale at remunerative prices. Danish butter has the preference on the east coast of England and in Edinburgh, the price being as high at present as from $38.44 to $38.93 per hundred. In London, Liverpool, Manchester, and Glasgow the American sixty pound tubs give satisfaction.

NORTH CAROLINA GOLD MINES.

A memorial from the Sixth Congressional District of North Carolina asks the appointment of a commission to visit the mineral regions of that district and to make a report thereon. From a pamphlet accompanying the memorial it appears that the gold producing area of North Carolina covers about 12,000 square miles, containing 140 mines already developed, besides large coal, iron, and copper areas. The yield of gold from these mines up to June 30, 1877, was $10,370,492.

OCCASIONAL.

Washington, D. C.

Correlation between Gravity and Electricity.

To the Editor of the Scientific American:

The experiment of Professor Pirani, described on page 80 of the SCIENTIFIC AMERICAN of February 9, 1878, and intended to demonstrate that electric currents are subject to the influence of gravity, does by no means prove what it purports to do. The influence of gravity upon a column of liquid is its hydrostatic pressure on the lower end, and this must necessarily affect the condition of the surface of the electrode which is exposed to this pressure, and make a difference with that which is at the top of the column not exposed to the same pressure. This difference of condition is sufficient to generate a weak current, perceptible by a sensitive galvanometer; this is sufficiently illustrated by the currents developed by two plates of the same metal attached to the ends of the coil of a delicate galvanometer, and plunged in the same solution; the least difference in the condition of their surfaces, or plunging one plate deeper in than the other, will cause a current to be produced.

To this must be added that liquids are very different from gases in respect to uniformity of the mass, which, by the nature of the molecular motion of gas particles and the consequent law of interpenetration, remains perfectly homogeneous throughout the whole mass, while in liquid solutions there is a tendency to greater concentration at the bottom of a column, when not mechanically agitated. I think, therefore, that this experiment may be dismissed as proving nothing in regard to the direct action of gravity upon electric currents; the more so, as from our present knowledge of the nature of these currents, and the overwhelming proofs that no such thing as an electric fluid exists, it is obvious that gravity cannot act on a thing which has no existence. This experiment belongs to the same class as that which tends to prove that heat has a negative weight, by showing that a body when warm weighs less than when cold. In fact a delicate balance will easily show this; but the cause is that the warm body generates upward air currents, which carry up the side of the scale on which the body is situated. In a similar way gravitation causes a difference in the condition of the two ends of a liquid column, which change may generate an electric current.

On page 148 of the SCIENTIFIC AMERICAN of March 9, a comment on the above appears in a communication on "The Correlation of Magneto-Electricity and Gravitation," in which the writer makes several erroneous statements and shows that he has very obscure conceptions of the nature of these forces. He says: "First, gravitation acts upon all kinds of matter; Faraday proved the same of magnetism." The latter statement is incorrect; Faraday proved that most substances were either para- or dia-magnetic, but that magnetism does not act at all on some bodies. "Secondly, gravitation is attractive; so is magnetism." Again incorrect; magnetism attracts or repels, according to whether poles of different or similar kind act upon one another. "Third, gravitation is proportional to the mass; the force of magnets depends also upon the mass." Not so; light and thin steel bars can be better and more strongly magnetized than heavy, thick ones. "Fourth, gravitation acts in an inverse ratio to the square of the distance; so does magnetism." Again incorrect; in some instances, such as the magnetic attraction of wires through which an electric current is passing, magnetism acts in the inverse ratio of the distance and not as the square, as has been proved by Ampère. "Fifth, gravitation does not manifest polarity; magnetism is known not to do so." The latter is the most absurd of all the statements made. It is magnetism which has revealed to us what polarity is; it is the very force which taught the existence of polarity, and with electricity exhibits the only polar phenomena. "Sixth, gravitation acts independently of bodies affording a resistance to light and heat; so does magnetism." Again wrong; while neither light nor heat affect gravitation, light has lately been proved to affect the electric conductibility of selenium, tellurium, and other metals, while increase of temperature diminishes magnetic attraction, and a sufficiently high temperature destroys it altogether.

The true magnetic connection between sun and earth may be more plausibly explained by Barlow's hypothesis that the alternate heating of the different sides of the earth during its daily rotation generates electric currents, from east to west, on the principle of thermo-electricity, and that the compass needle, according to the law of Oersted, places itself at right angles to these currents.

As by irregularities in the earth's surface these currents run in most localities not exactly east and west, the needle does not point exactly north and south, except in the few places where the electric currents run exactly east and west. If by reason of the sun spots the amount of heat emitted from the sun fluctuates, the electric currents generated by that heat change; and this may account for the connection between sun spots, magnetic periods, and auroras, which are nothing but electric currents through the rarefied air above the clouds.

Your correspondent further states that "the isoclinal, isodynamic (of the magnetic), and isothermal lines run parallel." This is by no means the case; the only thing which can truthfully be stated in this regard is that there is a slight tendency that way, so that the point of greatest cold on our earth's surface inclines toward the magnetic pole.

Finally, P. M. C. asks some questions, which I will attempt to answer. "1. Will not the supposition that the sun is a huge magnet account for the production by that body of light, heat, etc.?" Answer: Only to those for whom the word magnetism is a mysterious agent which may explain everything; but for those who have studied magnetism and know what a magnet is, it will explain nothing of the sort. Second question: "Admitting this hypothesis, will it not explain why the light of the sun increases as a heavenly body approaches it?" Answer: It will not; the approach to a magnet of another body, whether magnetic or not, never increases its temperature. Third question: "Will any other theory explain this satisfactorily?" Answer: It will; the theory of gravitation teaches a disturbance or tidal wave caused in the solar atmosphere of incandescent vapors by the mutual attraction of gravitation on the approach of a heavenly body. Fourth suggestion: "No known force except magnetism can produce all the phenomena of comets." Answer: A gratuitous assertion, pleasing to those who consider magnetism a convenient word to use in place of a rational explanation. The phenomena of the dual appearance of Biela's comet, the multiplication and relative position of the tails, and their coruscations have been a subject of deep research among speculative astronomers, and the mere assertion that "magnetism is sufficient to produce these most wonderful and least understood features" is a loose statement, without sufficient foundation, and as such insufficient for a rational investigator.

The only road to progress in our knowledge of natural phenomena is by thorough investigation and legitimate deductions from correct premises, while wholesale assertions, especially when they are utterly untrue, can only retard progress by deluding us with a shadow, and even less than a shadow, while the substance remains unknown.

P. H. VANDER WEYDE.

New York, March 16, 1878.

Rating Steam Boilers.

To the Editor of the Scientific American:

The frequent effort to decide the horse power of a steam boiler by the caprice of law, or the impression made by unintelligent experts on an ignorant jury, shows the want of a standard of duty on this subject that would be acceptable to steam users, without entailing on boiler makers a burden "grievous to be borne."

I suggest as a boiler horse power the evaporation of the number of cubic inches of water, obtained by dividing Watt's inch pounds per hour, by the duty developed, when a cubic inch of water is expanded into steam at atmospheric pressure.

Thus boiler H. P. = $\frac{33{,}000 \times 60 \times 12'}{14{\cdot}7 \times 1{,}700} = 950$ inches, which will make two horse power when a good engine is used, and I do not think a boiler maker should be required to furnish an amount of boiler which may be necessary to supply steam to develop a horse power on a bad engine.

T. J. LOVEGROVE.

3,326 N. Broad Street, Philadelphia, Pa.

Man's Place in Nature.

To the Editor of the Scientific American:

What is it that led Dr. J. W. Dawson some years ago to report Huxley as saying that the Engis skull might have contained the brains of a philosopher, without giving the remaining portion of the sentence quoted?

We could not of course expect anything different from the colossal misrepresenter Cook, and therefore are not astonished to find that he quotes the sentence in the same way; but when the President of the New York Academy of Sciences, Professor Newberry, gives the same mutilated quotation, we begin to suspect that there is a mutual understanding between these three, that they will all bear false witness in this matter.

Or is it more probable that Dawson quoted carelessly from memory, and that Cook found it convenient for his purposes to follow Dawson, and that Newberry has been reading the reports of Cook's lectures?

May I beg you to print the sentence from Huxley in italics, so that those who are too lazy to look up the book (which

may be found on every library shelf) may yet read the quotation correctly, and that those who are at all influenced by these orthodox tirades against Darwin may recognize one of the customary weapons used by this class, namely, misrepresentation? The following is the quotation from Professor T H. Huxley's work, entitled "Evidence as to Man's Place in Nature," page 181, lines 2, 3, and 4:

"*It is, in fact, a fair average human skull, which might have belonged to a philosopher, or might have contained the thoughtless brains of a savage.*" * * *

A Leech Barometer.

To the Editor of the Scientific American :

The following is a simple way of making a "leech barometer." Take an eight ounce phial, and put in it three gills of water and a healthy leech, changing the water in summer once a week, and in winter one a fortnight. If the weather is to be fine, the leech lies motionless at the bottom of the glass, and coiled together in a spiral form; if rain may be expected, it will creep up to the top of its lodgings, and remain there till the weather is settled; if we are to have wind, it will move through its habitation with amazing swiftness, and seldom goes to rest till a high wind begins; if a remarkable storm of thunder and rain is to succeed, the leech will remain for some days before almost continually out of water, and show great uneasiness in violent throes and convulsive-like motions. In frost, as in clear, summer-like weather, the leech lies constantly at the bottom; and in snow, as in rainy weather, it moves to the very mouth of the phial. The top should be covered over with a piece of muslin. EDWIN S. CLOUTMAN.

South Boston, Mass.

The Status of Patent Medicines.

In a recent decision by the Assistant Commissioner of Patents the question of the patentability of medical compounds is discussed at considerable length, in reply to a doubt expressed by the primary examiner as to the patentability of this class of inventions. The Assistant Commissioner takes the following grounds: The old leading English cases of Boulton *vs.* Ball, 2 H. B. L., 482, and Rex *vs.* Wheeler, 2 B. A. L. D., 349, expressly mention medicines as being comprehended under the term "manufactures," and as proper subjects of patents. Our patent system having been derived from England, if it had been the intention of Congress to have excepted medical compounds from the list of inventions to be patented, such intention should have been expressed. This was not the case; but, on the contrary, the law ever since 1793 has expressly provided for the grant of patents for "any new and useful composition of matter," in distinction from and in addition to an art, machine, or manufacture.

The discovery of a principle in medicine or medicines, or the effects produced by a medical or mechanical agent, is not patentable; but when a certain composition of specified ingredients is found by reference to the state of the art to be new and useful, the law is perfectly clear in providing that a patent may be granted for it, and it will not do to refuse it upon the ground of policy or distaste.

The case of the Morton patent, in the 8th vol. of the Attorney General's opinions, is often cited against granting patents for medical compounds; but the cases are not parallel, as the patentees in that case attempted to uphold a patent for the discovery of an effect. "The effect discovered was produced by old means upon old subjects." No claim for a medical compound was therein made, involved, or discussed.

The objections to the granting of patents on medical compounds must be the same as those in alleged inventions in other classes, such as want of novelty, utility, etc. Mere professional skill in combining, in the form of prescriptions, ingredients well known to the *materia medica* may not evince invention any more than an arrangement of mechanical elements due to ordinary mechanical skill. Originality may be lacking in both cases. There are petty nostrums and quacks in mechanics as well as in medicine, and there are deserving inventors in both cases, all of whom should be treated with the consideration their cases merit, under the same law and rules of practice.

The decision from which the above is condensed would seem to settle, so far as the practice of the office is concerned, the question of the patentability of medical compounds—a question which has been argued by many able examiners and attorneys both *pro* and *con.*, but without, so far as we are aware, ever having received such an authoritative answer as is given by Mr. Doolittle's decision.

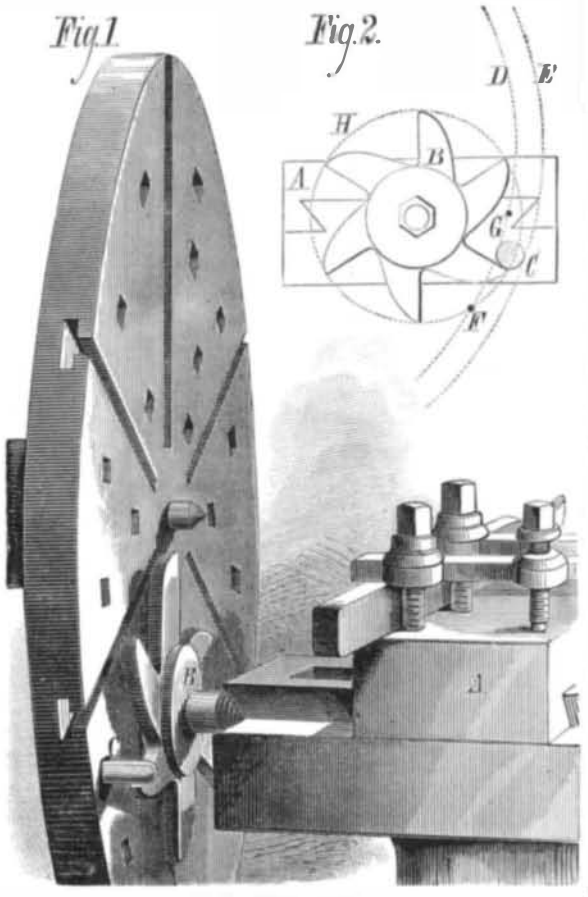
Fall of a Mountain Promontory.

Nearly every resident of Montana has either seen or heard of the famous Bear Tooth Mountain, the most prominent landmark in Northern Montana. It is visible from different points at distances ranging from 40 to 60 miles, and is in full view from Helena and the surrounding country. The mountain is distant 30 miles from Helena, and stands like a grim and mighty sentinel at the end of the cañon known as the Gate of the Mountains, through which flows the Missouri River. The Bear Tooth was fully described as a wonderful landmark of the early explorers Lewis and Clarke. In all photographs of the northern country the two tusks, rising black and grim hundreds of feet above the mountain, are the prominent objects. The main tusk remains, looking lonely and isolated in its grandeur. Recently a party of hunters who were chasing game, several miles north of the Bear Tooth, observed a rumbling sound and a quaking of the earth, and supposing it was an earthquake, and not noticing a repetition of it, they soon forgot the occurrence and continued their chase until they reached the Bear Tooth. Here they were astonished by the disappearance of the eastern tusk. This was a perpendicular mass of rock and earth, fully five hundred feet high, three hundred feet in circumference at its base, and about one hundred and fifty feet at the top. This immense mass had become dislodged, and coming down with the speed of an avalanche, had swept through a forest of large timber for a quarter of a mile, entirely leveling it. The country around is now covered with a great mass of broken trees and tons upon tons of rocks, many of them as large as an ordinary house.—*Montana Independent.*

THE STAR FEED.

A correspondent asks: "How can I feed a tool automatically on a lathe which has a slide rest, but has no feed motion? What is a star feed?"

A star feed is a device for improvising a feed motion to a slide rest which has no self-acting feed motion, or to a mechanical tool-holding device which cannot be actuated by the self-acting feed motion attached to the lathe or machine; as, for example, a boring bar. It is constructed as follows: Upon the outer end of the feed screw of the boring bar or slide rest, as the case may be, is fastened a piece of iron plate, which, from having the form in which stars are usually represented, is called the star. If the feed is for a slide rest a pin is fastened to the lathe face plate or other revolving part, in such a position that during the portion of the revolution in which it passes the star it will strike one



THE STAR FEED.

of the star wings, and move it around sufficiently to bring the next wing into position to be struck by the pin during its succeeding revolution. When the feed is applied to a revolving boring bar the construction is the same, but in this case the pin is stationary and the star revolves with the feed screw of the bar.

In Figs. 1 and 2 is shown a star feed applied to a slide rest. A is the slide rest, upon the end of the feed screw of which the star, B, is fitted. C is a pin attached to the face plate of the lathe, which, as it revolves, strikes one of the star wings, causing it to partly rotate, and thus move the feed screw. The amount of rotation of the feed screw will depend upon the size of the star and how far the circle described by the pin, C, intersects the circle described by the extreme points of the star wings. Thus the circles denoted by D E show the path of the pin, C; the circle, F H, the path of the star points, and the distance from F to G the amount which one intersects the other. It follows that at each revolution of C an arm or wing of the star will be carried from the point G to point F, which, in this case, is a sixth of a revolution. If more feed is required, we may move the pin, C, so that it may describe a smaller circle than D E, and cause it to intersect F H to a greater extent, in which case it will move the star through a greater portion of its revolution, striking every other wing and doubling the amount of feed.

It will be observed that the points F and G are both below the horizontal level of the slide rest feed screw, and therefore that the sliding motion of the pin, C, upon the face of the star wings will be from the center towards the points. This is better, because the motion is easier and involves less friction than would be the case if the pin contact first approached and then receded from the center, a remark which applies equally to all forms of gearing, for a star feed is only a form of gearing in which the star represents a tooth wheel, and the pin a tooth in a wheel or a rack according to whether its line of motion is a circle or a straight line.

It is obvious that in designing a star feed, the pitch of the feed screw is of primary importance. Suppose, for example, that the pitch of a slide rest feed screw is 4 to an inch, and we require to feed the tool an inch to every 24 lathe revolutions; then the star must have 6 wings, because each revolution of the screw will move the rest $\frac{1}{4}$ inch, while each revolution of the pin, C, will move the star $\frac{1}{6}$ of a revolution, and $4 \times 6 = 24$. To obtain a very coarse feed the star attachment would require to have two multiplying cogs placed between it and the feed screw, the smaller of the cogs being placed upon the feed screw.

Oiling Wheat.

The perverse ingenuity of mankind is, unfortunately, nearly quite as prominent a phenomenon in human history as that higher kind of ingenuity which, like mercy, blesseth both its possessor and its object. Corn and oil are admirable commodities, and in some parts of the world the latter enters quite as largely into human dietetics as the former. In our own country, however, except in combination with salad, and only then in a very modified degree, a strong prejudice exists, as a rule, with respect to oleaginous food, and an item of news which reaches us through the highly respectable channel of Messrs. Lange & Co., of Altona, is calculated to produce a somewhat disagreeable sensation in the average stomach. It is stated by those gentlemen, in the columns of a Hamburg paper, that for some time past a practice of manipulating wheat with oil has been adopted in that part of the world, for the double purpose of improving its appearance and increasing its specific gravity, upon which the sale value of the article in a great measure depends. Wheat, which in its natural condition would weigh 123 Dutch pounds, or about 75 kilos. per hectoliter, gains by the process of oiling about 6 Dutch pounds, or nearly 3 kilos. per hectoliter, and is thus made to appear from 10 to 12 per cent more than it really is. The money gain to the dishonest seller is 20s. to 25s. per ton, with an outlay for rape oil of about fourpence. The apparent increase in the specific gravity is caused by the smoothness imparted to the wheat by the oil, which makes a considerable number of "corns" go to the same bulk. The evil results, in addition to the direct money loss inflicted on the buyer, are, that thorough milling is impossible, and that the flour produced from the oiled wheat will never bake properly. The abominable practice is not confined to wheat alone, but has become common with almost all foreign seeds which are sold by specific gravity value, but in no other instance are the consequent evils so serious as that of wheat. Two tests are given, by which, it is said, this novel form of seed adulteration may be readily detected by the miller. One is to put the suspected wheat in a perfectly clean vessel, and shake through it a small quantity of turmeric powder. If the wheat is oiled the powder will adhere to the grains, especially about the beard and crease, while on unoiled wheat, even if it be damp, not a speck of the powder will be visible. The second method is to fill a clean glass with clean water, and then shake a little crystallized camphor dust on the surface of the water. The small particles of camphor will gradually melt, and while doing so a continuous lively rotary motion is caused. Now throw a few corns of the suspected grain in the water. If it has been oiled the rotary motion of the camphor will at once cease, and the latter will float motionless on the surface of the water. If the grain is unoiled the rotary motion of the camphor will continue as before.—*The Miller.*

Warning to American Workmen.

The United States Consul at Buenos Ayres, in a recent report, states: "I have been in receipt of frequent letters since I have been here, asking in regard to the conditions and prospects of labor in this country. I would not advise anybody to come here with a view to bettering his condition. They cannot expect to find employment of any kind. Every variety of manual and mechanical labor is suffering with the general depression of business, and establishments requiring skilled labor are reducing rather than increasing the number of their employés. If persons will come here in search of work, they should bring sufficient money with them to pay their return expenses. Every few days the consulate is visited by distressed Americans, who, having been induced to come out here, have been sadly disappointed upon their arrival to find no opportunity to earn a livelihood; thus, finding themselves without means either to live here or return home, they become objects of charity."

It would appear from the tenor of this, as well as from other similar communications from our consuls in different parts of the world, that our country is not the only one suffering from hard times, and that it is very little use for an American workingman to leave his country in the hopes of bettering his condition.

Rectification of Benzine.

In the examination of the products obtained in rectification of the benzine of gas manufactories, M. Vincent has found quite a number of interesting substances. Sulphide of carbon is very abundant. Ordinary alcohol is present also in notable quantity, and M. Vincent characterizes it by the preparation of sulphovinate of baryta, iodide of ethyl, and bromide of ethyl. Lastly, there is a considerable quantity of cyanides of methyl, the extraction of which, he thinks, might be made industrially profitable.