MISCELLANEOUS INVENTIONS.

Mr. Edward R. Mollenhauer, of New York city, has patented an improvement in violins which relates to the arrangement of their interior, effected without changing their outward form or structure or altering the manner of playing them This improvement increases the power of the instrument, and gives greater roundness and fullness to its tone without sacrificing any of its special and peculiar properties. The invention consists in interposing a board at any intermediate point between the belly and back of the instrument, parallel thereto, so as to divide the interior into two chambers, and providing the board with sound post, sound ports, and a base bar.

An improved fastening for shoes, etc., has been patented by Mr John Howenstine, of Fort Wayne, Ind. It consists of a case secured to the flap, in which is pivoted a catch, held in position by a spring. A tongue is fastened to the other side of the opening, which is adapted to enter the case and to be engaged by the catch. The catch is made to release the tongue by pressing the projecting end with the finger.

Mr. Thomas B. Mosher, of Portland, Maine, has invented an improved ruler, which consists of a narrow strip of suitable material, made flat on its under surface to prevent rolling, provided with a sharp edge to serve as a paper cutter. It has a hollow cylindrical back piece running its whole length on its upper surface, so combined with it as to form a step along the line of junction. This step is sufficient to prevent ink from soiling or blotting the paper. The back piece is made hollow throughout for holding pencil or pen handle, or other articles, and in each end there is a plug, one forming the handle of an ink eraser, the other forming the handle of a piece of erasive rubber

An improved process for removing the germ and fuzzy or woody fibers found upon the ends of wheat and other similar grains before reducing the grain to flour has been patented by Mr Samuel Potts, of Minneapolis, Minn. The process consists in separating the grain kernels into grades of uniform length, and treating the grades in a continuous operation in separate mills, having each a stationary roughened surface and an opposing revolving roughened surface, these surfaces being rigidly adjusted with respect to each other at a distance apart which is invariable, and greater than the lateral axis of the grain kernels, and less than their longitudinal axis.

An improved life preserving suit, patented by Mr. Frank Vaughan, of Elizabeth City, N. C., has a lower section made in the form of rubber pants, distended and protected by rigid frames and rings, and having a sectional annular float at the waist. It is worn in connection with a rubber shirt having a strap and draw cords to connect it with a flange on the float.

Mr. Anson L. Sonn, of Toledo, Ohio, has invented a novel brush, which is an improvement in the class of hair and other bristle brushes having sheet metal back or casing. It consists in constructing the case or frame of the brush of two metal parts, one being let into or inclosed by the overlapping edges of the other, and united to form a water-tight joint.

Mr. James A. Peek, of Beloit, Kan., has patented an improved scraper for use upon railroads, ordinary roads, and in other places where grading is to be done, or soil moved from place to place. The invention consists in a novel combination of devices which cannot be described without engravings.

An improved mail package has been patented by Mr. George Bassett, of Chicago, Ill. It consists of an outer metal case made in two parts, each having a perforated head and inside rubber springs, on which the transparent box containing the samples or other articles is held, so as to be free from the jarring and pressure to which the package is subjected.

A horseshoe, provided with a spring attached to the under side of the toe and carried back in a median line to the heel, and then brought up in an enlarged form on a double or fold to support the frog of a horse's foot, has been patented by Mr. George Bacon, of White, Mich.

A lamp stand, which can be readily attached to a table, shelf, sewing machine, etc., and will securely hold the lamp placed in it, has been patented by Mr. Joseph Robison, Sr., of Birmingham, Conn. A clamp grasps the edge of the sewing machine table or shelf, and is firmly secured by means of a screw. The lamp sets in the ring with its handle between two uprights; a slide, moved down upon the lamp handle, holds the lamp in place.

A simple and, it is claimed, unfailing device for instantly detaching horses from vehicles, whether in motion or at rest, has been patented by Mr. Elijah Stevens, of Somerville, N. J. By this device a horse is attached to a vehicle securely, and in case of threatened accident he can be instantaneously disengaged, the strength of a child being sufficient for the purpose.

An improved butter package, constructed so as to keep the butter sweet and pure for any desired length of time, and which can be conveniently transported, has been patented by Mr. Arthur White, of Derby Line, Vt.

An improved barbed fence wire has been patented by Mr. John A. Duncan, of Kansas City, Mo. It consists in providing the main wire or wires with a loop or loops, and passing the wire barbs through the loops and twisting them together and around the wires so that they will be at right angles to each other and held immovable in their places.

A purse or pocketbook fitted with devices for registering or printing figures upon a strip of paper by the act of closing the purse or book, has been patented by Mr. Hugh C. Baker, of Hamilton, Ontario, Canada. The figures are adjustable, so that they may be set to print as desired. The device is intended for keeping an account of money taken from the purse from time to time without the necessity of using a pen or pencil.

An improved brick kiln has been patented by Mr. Thomas S. Hawkins, of Chattanooga, Tenn. The kiln is built in the form of a cupola furnace, with a chimney stack connected to the upper part of the burning chamber. In the lower part of the chamber is a platform that is raised and lowered by a screw. Access to the platform is had through an opening at the bottom of the kiln, through which the bricks can be removed.

An improved device for sprinkling water or other liquid in a fine spray upon clothes, plants, tobacco, leaves, and for various other purposes, where the liquid is required to be delivered in a fine spray, is the invention of Mr. James H. O'Connor, of Helena, Ark. The sprinkler consists of a cup, having a handle, a convex perforated plate or rose, and a valve, which facilitates the entrance of water into the cup by permitting the air to escape.

An improvement in sugar evaporators has been patented by Mr. James F. Sargent, of Strafford, Vt. This invention relates to improvements in the construction of the furnace and evaporating pans used in the manufacture of sugar. The object of the improvement is to direct the fire under the whole or a part of the pan; also, to enable a part of the pan to be used for boiling sap and another part for granulating the sirup.

Mr. Almon P. Whiting, of Astoria, N. Y., has invented an improved rail tie, to which rails may be firmly secured in a novel manner. The rail tie is double flanged and notched to receive the rails, and the rail is secured by a slot bolt and a clip of peculiar form.

Cumberland Mountain Caves.

One of the members of the Harvard University Summer School of Science (which, under the direction of Professor Shaler, has been studying the geology of the Cumberland Mountains in Virginia) writes from Pennington's Gap to the Detroit *Free Press* describing some of the caves of that region. He says:

"There are numerous small, and a few large, caverns in the limestone hills about here, but none of them have any true cave beetles. In one cave I descended into a pit by means of a rope, and from this pit into a second pit, in which I found the floor strewn with bones of cave bear, cave men, and five or six other animals, all of which I got out and packed for the survey. The largest cavern I have examined is only two miles from camp. I have spent three entire days in exploring it, of course returning to camp each night. Of three passages examined I reached the end of but one. I walked for four hours through one series of chambers, which constantly increased in size as I went on, and was obliged to turn back without finding any end, simply because I could not carry in mind the many land marks that had to be remembered on the return.

"This cave contains the most exquisite chalcite and gypsite formations. One large chamber is lined for half a mile with delicate frostwork of crystals as white as snow. The walls seemed to be draped with folds of ermine puffed with bunches of ostrich plumes. In other places are sloping banks covered with an apparently vegetable growth of fungi, moss, and ferns, but all formed of chalcite needles or bunches of white, brown, rose pink, and crystal clear gypsite. There are pillowy masses, like couches of eider down, inviting the tired explorer to repose, but stinging like nettles the hand that brushes, no matter how lightly, against their bristling points. There are ledges, like the shelves of a museum, stored with branching coral. This part of the cave exhibits the perfection of this kind of cave ornamentation, and was said by members of the survey to be unusual in its extent and beauty. Other parts contain curious stalactite and stalagmitic formations, such as one sees in many other caves, halls of statuary, giant coffins, waterfalls, organs, and unexpected imitations of natural and artificial objects."

Explosion in a Bessemer Shop.

An accident occurred at Sheffield, England, the other day, which shows the danger of experimenting with petroleum in blast furnaces. The men in the Bessemer shop of Messrs. Brown, Bayley & Dixon's works had been engaged in what is known as the "patent injector experiment," in the course of which an apparatus for blowing vaporous petroleum by steam through molten metal is used, so as to render it hotter —"cold heat," as it is technically called. Shortly before seven o'clock the last of these experiments was being conducted. If it works well, combustion is immediate at the tuyere holes, and thus none of the heat caused by the presence of petroleum is lost. In this instance the experiment was on the point of being concluded, and some thirty men were engaged in the final operations, when an explosion, which shook the entire building, and was heard over the whole district, took place. Mr. Cooper, the acting manager, was at the works, and the inquiries he made showed that the petroleum had exploded in the box of the patent injector (or the vessel used in the experiment) containing the molten metal, and had blown the bottom lid of the latter off. The vessel then turned down, as usual when the experiment is concluded, and the molten metal commenced to run into the pit below, but fortunately no one was there, for the men had run for their lives as soon as they saw the danger. The foreman, however, did not escape, and he was somewhat severely singed over the face and arms. The cause of the explosion is attributed to the fact of there being an excess of petroleum—some of it vaporized—in the box, and that this larger quantity, coming into contact with the air, caused it to spring into a flame, and led to the explosion.

A NOVEL EXHIBITION.

The Royal Agricultural Society of England has issued a circular calling for examples of agricultural engines and machines for their next exhibition, which have been damaged in part or entirely by the incapacity or negligence of the operatives.

It is a novel idea, but such a collection of machinery as it proposes to get together is calculated to do much service to the manufacturer, who can inform himself wherein his machine may be improved in the whole or strengthened in parts, and not less so to the farmer or owner of the machine, who will thus be informed of the incapacity of his employés. The society also request that a written statement accompany each exhibit, stating the circumstances under which the damage was done. These specimens are to be displayed in a special shed in the show, which is to be held at Carlisle, on the 1st of July, 1880. Early notice is thus given that farmers may preserve their injured machines for the exhibition.

In addition to the great loss of property caused in the mismanagement of agricultural machines by incompetent help, a great many innocent persons lose their fingers and some their lives from the same cause. Such an exhibition is intended to form the basis for further investigation, first as to the cause, and then to devise a remedy for such evils.

Progress in Railway Making.

In a recent address Mr. Edmund Smith, one of the vice presidents of the Pennsylvania Railroad, said that thirty years ago 10,000 tons each way daily, or 7,000,000 tons a year, was thought to be the maximum capacity of a double track railway between Philadelphia and Pittsburg. Yet in 1878, the tonnage of the Pennsylvania Railway was 11,000,000 tons, and the extent of its capacity is far from having been reached. In loading cars, a few years ago the rule was one ton to a wheel. The cost of moving one ton one mile under the most favorable circumstances on first class railroads a few years ago was 1 cent: now it is reduced to ½ cent. The most important element in causing these reductions has been steel rails, which are furnished now at two thirds the cost per ton of iron rails 30 years ago. He did not think there was any reason why we should not go on to improve and develop the system in the future as in the past, and he ventured the opinion that the day is not far distant when the main lines of railway will be illuminated at night by the electric light, while other and greater improvements will keep pace with the spirit of the age.

Impurities Contained in Glacial Acetic Acid.

The actual acid present in the 57 specimens examined varied from 87 to 99·5 per cent. The author finds that the oil of turpentine may serve for determining with exactness the acid present. For this purpose he takes 10 c.c. of the sample, and carefully drops into it oil of turpentine from a burette graduated into tenths of a c.c. until the last drop added dissolves after slight agitation without producing a permanent turbidity. The quantity of oil which may thus be added increases with the quantity of pure acid. In samples above 99·5 per cent in strength the oil dissolves in any proportion. To obtain comparable results the samples operated upon should be at one and the same temperature, 15° being the most suitable.

In practice it is sufficient to add to a known volume of the acid eight or ten times its volume of the oil and to stir two or three times. If the mixture remains clear the strength of the acid is at least 97 to 98 per cent. Otherwise it should be rejected.—*M. Bardy.*

English Silk Mills to Remove to New Jersey.

We have had several occasions lately to mention the transplanting of English manufacturing establishments to this country. Another significant and important move in this direction is reported in the New York *Times* of August 31. It appears that three gentlemen prominently engaged in the manufacture of silk in Macclesfield, formerly the great center of that industry in England, have been visiting the silk mills of Paterson, N. J. One of the gentlemen builds silk machinery, and hearing of the great prosperity of the Paterson mills, he thought he would find a market for his machinery in that city. He was surprised to learn that nearly all the machinery wanted is made in Paterson, one silk manufacturing company making all its own machinery on the premises. One of the other visitors is superintendent of a large silk mill in Macclesfield, and the other is the son of a great mill owner. Both of these gentlemen, after a tour of the Paterson mills, confessed that the American manufacturers had nothing to learn from their English rivals, but that the latter had much to learn from the former.

A NEW INDUSTRY—FROG FARMING.—A Mr. Soule, of Elgin, Ill., is in his third year of frog farming, and his first crop is now being marketed. He has an acre and a quarter devoted to the frog industry. The kind grown is the "Goslin frog," much larger than the common sort. Mr. S. will, next season, furnish St. Louis, Chicago, and Cincinnati with frogs, and is confident of success in the business.

Proposed English Channel Bridge.

A recent project is the scheme for bridging the English Channel, put forth by M Verard de Sainte Anne, France. He maintains that his bridge scheme is preferable to the tunnel scheme, because its execution would not cost more than 300,000,000 francs, whereas the tunnel could not be constructed for less than 500,000,000 francs. M. De Sainte Anne, moreover, affirms that his viaduct could be constructed in a much shorter space of time than the tunnel.

As described in the London *Standard* the proposed viaduct is to span the Channel from Cape Grisnez to Folkestone. According to the Admiralty soundings the greatest depth of water to be found on the passage is fifty five meters, and this is only for a distance of some four kilometers about half way between the Varne Rock and the French coast. This Varne Rock and its neighbor, the Calbart Reef, play an important part in the scheme. The former, situated at fifteen kilometers from Folkestone and twenty kilometers from Cape Grisnez, is some four kilometers broad, covered with no more than from two to fifteen meters of water. Being of solid rock, and in a direct line with the projected viaduct, it offers itself as a natural half-way resting place. This rock has, till now, constituted one of the greatest dangers to the navigation of the Channel. M. De Sainte Anne proposes not only to turn it to account by using it as the foundation for a portion of the viaduct, but also, in conjunction with the Calbart Reef, for the construction of a free port in which vessels of the greatest tonnage will be able to seek shelter from the storms so frequent in the strait which separates England from France. Both for the construction of this port and for reducing the depth of the water to twenty meters in those places where he will be obliged to construct his columns, M. De Sainte Anne proposes to adopt the method employed in the construction of the Cherbourg breakwater, which consists in dropping huge masses of rock into the sea, and in consolidating them by means of Roman cement.

On the foundations thus established it is intended to raise solid masses of masonry to some forty meters above the level of the sea. This is, of course, a gigantic work, the immensity of which will be seen at a glance, when it is remembered that M. De Sainte Anne does not contemplate attempting in his viaduct any span exceeding two hundred meters. The distance from Folkestone to Cape Grisnez being thirty-five kilometers, it will, therefore, be necessary to construct at the very least 175 immense blocks of masonry on which to place the superstructure. As to the superstructure itself he proposes to employ three systems. On the Varne Rock and at the two extremities where the water is shallow and the exigencies of navigation permit, he proposes to construct solid stone arches which will have nothing to fear from the fiercest tempest. This massive masonry is to be followed by the girder bridge system, such as employed in the Charing Cross railway bridge. But to span the deep water he has recourse to the tubular bridge system as applied by Sir Robert Stephenson in the erection of the Menai bridge. With these three systems combined he believes that he is not only certain to succeed in crossing the Channel, but also in satisfying the demands of every government concerning the precautions to be taken to prevent the navigation of the English Channel being rendered even more dangerous than it is at present.

The Bite of the Skunk.

In the *Forest and Stream*, of recent date, is a contribution to the question whether the bite of the skunk is poisonous and will produce rabies. In the West and Southwest of the Mississippi Valley this seems generally believed. A writer from Colorado quotes several instances.

Dr. Cushing, of Trinidad, Colorado, who has, no doubt, seen several cases, gives it as his opinion that the natural bite of the skunk produces hydrophobia—that it does not need to be suffering from rabies itself. He says its bite will kill the victim sooner or later, without fail. Dr. W. L. South, who has had great experience in Texas and New Mexico, says "the bite will fetch the victim some time," meaning that it will sooner or later result in death.

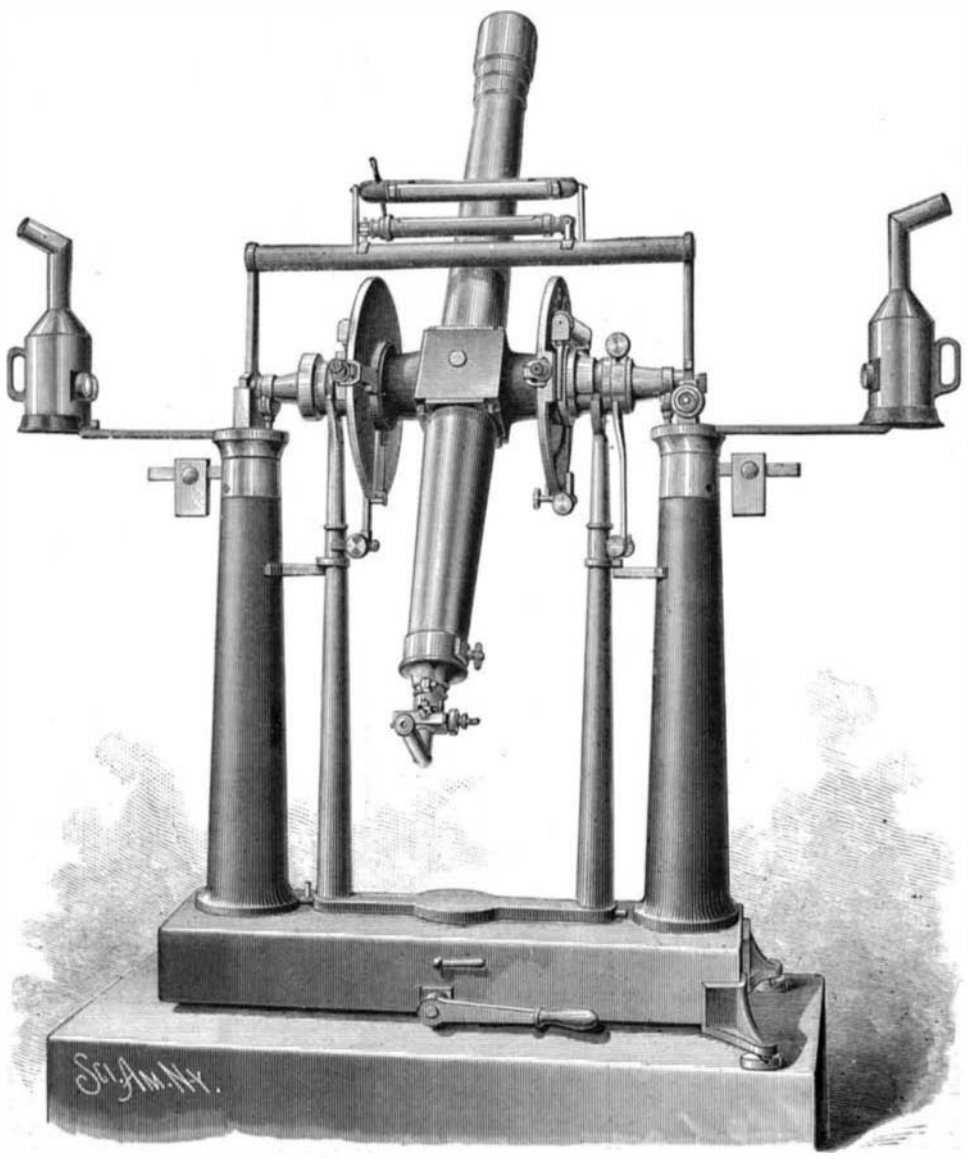
We do not believe this is the case in the Eastern States. The skunk is very common in Pennsylvania. We have seen dogs bitten by it, and have known those who hunted it constantly for its valuable skin, but have never heard of any such ill result from its bite either in man or dog.—*Medical and Surgical Reporter*

Relation of Religious Belief to Epidemics.

The Montreal *Witness* states that diphtheria is more prevalent among the Protestant section of Montreal community than among the Catholic. It is not a mere coincidence, nor is it of a temporary character. A study of the health statistics of Montreal for several years past reveals the same state of things. It is the more peculiar, inasmuch as the general death rate is much higher with the Catholics, particularly so in contagious diseases, and conspicuously so in the case of smallpox. But these admit of explanation. The only solution of the problem seems to be that the bulk of the Protestant community reside in the upper part of the town, where the drainage is less perfect than in the lower town.

NEW FORM OF TRANSIT INSTRUMENT.

The engraving represents an instrument made by Fauth & Co., of Washington, D. C., of the same class as the one described in our issue of August 23, being a transit instrument of smaller and more portable size. This instrument—of which quite a number have been made by Fauth & Co. for colleges in this country, as well as Mexico and Japan—is complete in itself, having base, standards, and reversing apparatus all in one piece, and is, as a glance at it will show, "American," being as convenient and adapted to the purpose as it can well be. As generally made, this instrument has a telescope of 3 inches aperture; the circles, which are divided on the edge, the graduation thus facing the observer, are from 12 to 13 inches in diameter; the latitude and striding level are sensitive to single seconds and chambered. Improved machinery, division of labor, and the great saving of time by only finishing the parts that require it, enable this firm to successfully compete in price with European makers. All the parts not polished are coated with "flocking." This finish gives the instrument a beautiful appearance, and makes handling comfortable, especially in cold weather.



FAUTH & CO.'S PORTABLE TRANSIT INSTRUMENT.

Prosperity in the Lumber District.

According to the *Northwestern Lumberman* the lumber interests of the West, which have been so greatly depressed along back, are now prosperous. There is a sharp demand for lumber, and thus far light receipts, which is pushing prices upward. From the same source we learn that the Hon. Erastus Corning, of Albany, N. Y., has formed a connection with Wm. H. Gratwick & Co., of Tonawanda and Albany, and Oscoda, Mich., for the handling of his entire stock of lumber, embracing some 200,000,000 feet, the product of his large and valuable tract of pine timber on the western shore of Michigan. This gigantic enterprise comprehends about $4,000,000 in value, supposing the lumber to have been marketed. Gratwick & Co., who own about 30,000 acres of fine timber land, will curtail the cutting from their own lands somewhat while the Corning tract is being operated.

Photography of the Spectra of Geissler's Tubes.

The spectrum of *hydrogen*, which appears to the eye to consist of only four lines, showed when photographed upon gelatine plates, besides these four lines, hundreds of lines in the blue, violet, and ultra (invisible) violet. Many of these are light and delicate, while some are of extraordinary density. Among these are, besides the mercury lines, four lines in the ultra violet and one which coincides with the thick first H line of the sun's spectrum. The length of the undulations of the lines was measured, and their position as respects the Fraunhofer lines of the sun's spectrum determined.

The spectrum of *mercury* in the Geissler tube furnished in the photograph, besides the remarkable lines in the blue and violet which Thalen saw and measured, a surprising group of lines lying far into the ultra violet (length of the wave of the outermost, 3650). The spectrum of the mercuric spark in the open air coincided in many points with the spectrum of mercuric vapor in the Geissler tube, but it also differed from it in a surprising way. Thus, in the spectrum of the Geissler tube, the distinct line close by H in the violet was absent, while, on the other hand, in the violet and ultra violet it showed a variety of bands which were not present in the spectrum of the spark in the open air between the poles of mercury.

The spectrum of *nitrogen* in the Geissler tube furnished a very characteristic photograph, with magnificent lines in the violet and ultra violet. Several of the latter far exceeded in intensity the visible lines in the violet. The appearance of the lines in the photograph was quite different from that which is given to them in ordinary drawings; they formed no simple shaded-off bands, but sharply defined lines, at the most strongly refrangible side of which lay a weak, washed-out looking band.

The nitrogen lines in the pale blue, which appear strongest to the eye, exercised but a slight action on the photographic plate, and on the green lines even a slighter.

If nitrogen and mercury be both inclosed simultaneously in the same Geissler tube, with a spark one gets the lines of both elements; but if the tube be warmed, the nitrogen lines disappear and only the mercury lines remain. This has already been observed by Herr C. Wiedemann. Thus, if one were to photograph upon the same plate the spectrum of a nitrogen tube containing mercury in a cold and in a warm condition, he would easily get the spectrum of nitrogen and that of mercury together, and by comparison he would be able to recognize which lines belong to one element and which to the other. The nitrogen spectrum reaches as far into the ultra violet as the mercury spectrum.

Then I photographed the spectrum of an electric spark struck through atmospheric air, oxygen, and carbonic oxide gas. Thus upon one and the same plate we had all together the spectra of oxygen, atmospheric air, and carbonic oxide gas. The comparison of the pictures showed that the carbonic oxide gave by preference oxygen lines, and that by the spark it was decomposed into oxygen and carbon (the latter was actually visibly drawn out to the poles.)

It was further observed that the spectral lines which are ascribed to the atmosphere are very different in character according as the different poles are used. For example: the spectrum of the air between mercury poles is very matt and undetermined; that obtained between platinum and aluminum poles is much more brilliant. Many of the lines in photographs of spectra of the air obtained in this way coincide, but many others do not, showing undeniably that the spectrum of one and the same substance may suffer by the presence of modifications which are very likely to arise. The changes in the spectrum of certain elements—as calcium, lithium, iron—which Lockyer ascribes to a decomposition of the elements, should therefore rather be attributed to the influence of foreign substances. The photographs which were obtained will appear, reproduced in lichtdruck, in the report of the Academy of Sciences.—*Dr. H. W. Vogel in Mittheilungen.*

According to a German authority (*Pharm. Zeitung*) a very handy sulphureted hydrogen apparatus may be made by putting into a large test tube, fitted with a cork and delivery tube, a mixture of equal weights of paraffine and sulphur. On applying heat hydrogen sulphide is given off, and on withdrawing the lamp the evolution of gas at once ceases, so that the same mixture may be used many times and will last for a long period.