Onondaga Salt Group, which was deposited during the Salina period, in a series of shallow, land-locked seas, extending east and west from Eastern New York to Iowa. Evaporation caused a deposition of salt in the bottom of these seas; occasional incursions of ocean water in tides and waves kept up a supply of brine, and the deposition went on so long as favorable conditions continued. The slight dip of all the rock strata of Western New York, fifteen to thirty feet to the mile, in connection with the gradual rise of the surface of the country in the same direction, explains the greater depth of the salt formation at Wyoming than at Salina, the springs at the latter place being about 200 feet deep.

The well, eight inches in diameter, is cased with an iron tube. Inside of this is a two-inch tube. Pure water from a spring in the near hillside is caused to run into the larger tube. The water, descending to the mine, becomes saturated with salt and is then driven up the smaller tube, from which it is pumped into a huge reservoir and from that drawn into an evaporating pan, thirty by twelve feet, over a furnace, in which seventy-five barrels of salt can be made in a day. The salinometer shows the brine to have a strength of 90, complete saturation being denoted by 100. Analysis shows the salt to contain only 3 parts of impurities in 1,000.

WATERPROOF ARTIFICIAL FLOWERS.—Mrs. Rosa Harden, of Baltimore, Md., has devised a new method of making artificial flowers, by which the natural beauties can be imitated as with wax, while the flowers are durable and washable. The basis of the leaves would appear to be gelatine chemically treated. Very pretty and promising results are said to be possible by the new process.

THE PARASITES OF A MONSTER JELLY FISH.

BY C. F. HOLDER.

The discophore known as the *Cyanea artica* is familiar to every frequenter of the sea shore, where their stranded jelly-like forms can be found after every tide evaporating, as it were, in the summer sun. While afloat and active in the water they afford protection to several parasites that are figured in the accompanying engraving. The large creature hanging from the inner lobe of the jelly fish is a parasitic sea anemone called the *Becidium parasiticum*. In the engraving it is life size, while the *Cyanea* is reduced greatly. The *Actinia* is generally found in the larger specimens concealed in the mouth folds, where it shares the food brought up by the tentacles of its protector. In appearance it resembles an elongated cone strongly ribbed along its sides; around its mouth are a few short tentacles. The body is covered with innumerable wrinkles, with which it attaches itself to its post, and to which it is a strong contrast, being violet or brownish-red in color. Two or three can generally be found on them.

The little worm-like creature shown on the outer edge of the *Cyanea* is a true parasitic worm, the *Monopus medusicola*—with a depressed subcylindrical body armed with two suckers. The fore one, strange to say, is imperfect, while the latter—one-third the total length from the tail—is columnar and truncate. In the engraving it is magnified twelve fold.

Besides these, numerous little fishes are found up under the tentacles, that with their terrible lasso cells would seem the last place for a fish to choose as a home, but here we find them, darting in and out among the treacherous tentacles, perfectly at their ease.

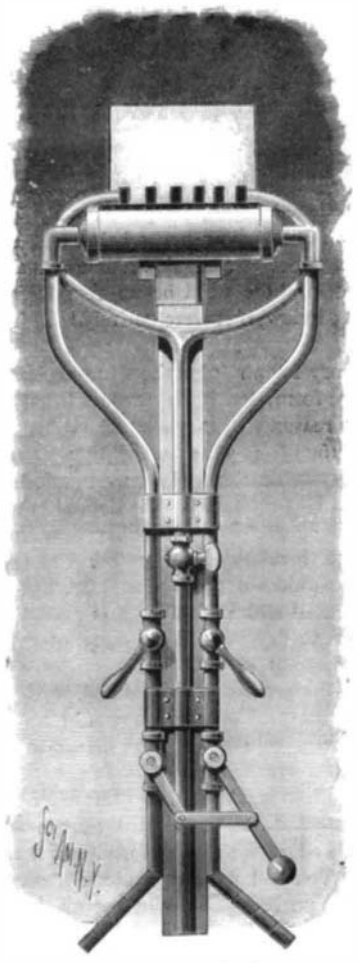
The *Cyanea* is a giant among its fellows and attains a diameter of seven feet, with tentacles two hundred feet long. Mrs Agassiz thus speaks of one: "He was quietly lying near the surface, and did not seem in the least disturbed by the proceeding, but allowed the oar, eight feet in length, to be laid across the disk, which proved to be about seven feet in diameter. Backing the boat slowly along the line of the tentacles, which were floating at their utmost extension behind him, we then measured these in the same manner, and found them to be rather more than fourteen times the length of the oar, thus covering a space of some hundred and twelve feet. This sounds so marvelous that it may be taken as an exaggeration; but though such an estimate could not, of course, be absolutely accurate, yet the facts are rather understated than overstated in the dimensions here given. And, indeed, the observation was more careful and precise than the circumstances would lead one to suppose, for the creature lay as quietly, while his measure was taken, as if he had intended to give every facility for the operation."

The different stages of the young of this animal are so totally different that they have been described as separate animals, namely *Scyphistoma*, *Strobila*, and *Ephyra*. This enormous creature is produced by a hydroid measuring about half an inch in height. The eggs are laid in the autumn, and the young, when first hatched, are oval, soon they become pear-shaped and attach themselves to the bottom. Now minute tentacles (never over sixteen) appear, and the creature resembles a simple polyp. It grows rapidly, constriction taking place along its entire length, each one being lobed around its margin, until it finally looks like a pile of inverted scalloped saucers. The top one dies and falls off, and the others soon separate by the deepening of the constrictions, and swim off, perfect infantile cyaneas, that soon reach a large size, and in turn deposit eggs.

THE PARASITES OF A MONSTER JELLY FISH.

NEW LIME LIGHT.

The lime light illustrated herewith possesses a few novel features of considerable value, not the least among which are that it will take a block of common lime of any shape and of any reasonable size, instead of the expensive cylinder usually employed, and that the light being once regulated,



NOVEL LIME LIGHT.

it may be turned up and down from a distance without the necessity of approaching the light for focusing and adjustment.

The particular form of apparatus illustrated is intended chiefly for theaters and other large inclosed areas. The chamber in which the combination of the gases takes place contains a series of perforated metal tubes, one within another, the function of which is to insure the complete admixture of the two gases before they arrive at and issue from the burners, which are fixed upon the upper part of the cylindrical chamber.

This feature of the invention is an important one, as it insures the perfect union of the gas without introducing an element of resistance to its flow as occurs when gauze, coils of wire, shot, and other obstructions are employed with the idea of deflecting the currents and so of securing combination.

For the purpose of regulating the light two levers are provided, one on each side of the apparatus. These levers have engraved upon them the names of the gases (oxygen and hydrogen) which they respectively control by means of stop taps. These taps being once adjusted require no further attention, and the light may be turned up and down and regulated at will by means of the tap shown at the bottom of the apparatus, and which controls the supply of both oxygen and hydrogen. This tap may occupy any convenient position when the light is situated where it is not readily or conveniently accessible.

The pipe shown in the center of the apparatus is connected with the ordinary gas service, and supplies gas for the purpose of warming the block of lime, igniting the mixed gases, and preventing explosions. It is stated that the apparatus is so simple that any one may work it with perfect safety, and that it gives ten to twelve times more light than an ordinary burner using the same amount and quality of gas.

The apparatus is being made and introduced by the inventors, Messrs. Allen & Co., of Cardiff, England.

Chimborazo and Cotopaxi.

A large and distinguished company lately assembled at the Royal Institution, Albemarle street, to hear Mr Edward Whymper describe his ascents of these mountains. His Royal Highness the Prince of Wales, who was attended by Colonel Teesdale, the Marquis of Queensberry, Lord Aberdare, Sir Beaumont and Lady Florence Dixie, Sir Allen Young, Sir T. Fowell Buxton, Mr. W. Spottiswoode, Colonel Grant, and the Dean of St. Paul's, were among the audience that filled the lecture theater. Mr. C. E. Mathews, late president of the Alpine Club, took the chair.

It is, unfortunately, impossible in a necessarily short report to give any idea of the charm of the narrative which Mr Whymper had to relate, brightened as it was by many quietly-given touches of humor. Personal matters, however, were only introduced when they served to illustrate some scientific observation. While purely athletic mountaineers had his sympathy in the practice of mountaineering as a sport, Mr. Whymper confessed that his sympathies were much more with those who employed their brains as well as their muscles. His journey to the Andes was to be one of work, and all its arrangements were devised so as to economize time to the uttermost. In observations for altitudes and position, in studying the manners and customs of the country, in photography and sketching, in the collection of objects of interest, from beetles on the summits of went tains to antiquities buried in the ground, he found quite sufficient to occupy his time. From Bodegas the party was composed of two Swiss mountaineers, the cousins Carrel, of Val Tournanche, Mr. Perring, some muleteers, and their teams. About two tons weight of the most portable and most condensed provisions went out for their use, and irrespective of the things which were bought already tinned, more than 2,000 tins were soldered down. When they reached the summit of Chimborazo, on the 3d of January, after a most arduous climb, they found the wind blowing at the rate of 50 miles an hour from the northeast, and driving the snow before it. With extreme difficulty a reading of the mercurial barometer was effected. The mercury fell to 14·1 inches with a temperature of 21° Fah. This being worked out, in comparison with a nearly simultaneous observation at Guayaquil, gave 20,545 feet for the height of Chimborazo. They began the descent at 20 minutes past 5, with scarcely an hour and a quarter of daylight, and reached their camp (about 17,400 feet above the sea level) about 9 P. M., having been out nearly 16 hours, and on foot the whole time.

Passing from an extinct to an active volcano, Mr. Whymper next gave an account of his journey to the crater of Cotopaxi. Observing with the telescope, during an enforced stay at Machachi, that much less smoke or vapor was given off at night than by day, he resolved, if possible, to pass a night on the summit. On the 18th of February the party got to the edge of the crater, having passed almost the whole way from their camp, at a height of 15,000 feet, to the foot of the final cone over snow, and then over ash mixed with ice. The final cone was the steepest part of the ascent, and on their side presented an angle of 36°. When they reached the crater vast quantities of smoke and vapor were boiling up, and they could only see portions of the opposite side at intervals, and the bottom not at all. Their tent was pitched 250 feet from the edge of the crater, and during a violent squall the India-rubber floor of the tent was found to be on the point of melting, a *maximum* thermometer showing a temperature of 110° on one side of the tent and of but 50° on the other; in the middle it was 72·5°. Outside it was intensely cold, and a thermometer on the tent cord showed a *minimum* of 13°. At night they had a fine view of the crater, which has a diameter from north to south of

2,000 feet, and from east to west of about 1,500 feet. In the interior the walls descend to the bottom in a series of steps of precipice and slope a good thousand feet, and at the bottom there was a nearly circular spot of glowing fire, 200 feet in diameter. On the sides of the interior higher up, fissures, from which flickering flames were leaping, showed that the lava was red-hot a very short distance below the surface. The height he found to be 19,600 feet. The party remained at the top for twenty-six consecutive hours, sleeping about 130 feet below the loftiest point. At first they had felt the effects of the low pressure of the atmosphere, and again, as at Chimborazo, took chlorate of potash with good effect. All signs of mountain sickness had passed away before they commenced the descent, and did not recur during the journey. Nearly five months later Mr. Whymper returned to Chimborazo, and from a second reading of the barometer at 14·028 inches, with a temperature of 15° Fah, he made the height 20,489 feet, the mean of the two readings giving 20,517 feet. While on the side of Chimborazo he witnessed a magnificent eruption of Cotopaxi, ash rising in a column 20,000 feet above the rim of the crater and then spreading over an area of many miles. Professor Bonney had submitted the ash to microscopic examination, and found that the fineness varied from 4,000 to 25,000 particles to the grain in weight, and from observation of the area over which the ash fell Mr. Whymper calculated that at least two million tons must have been ejected in this one eruption.

The Prince of Wales, in proposing a vote of thanks to Mr. Whymper, said the matter which he had laid before them that evening was such as must be of deep interest even to those who had not had any experience of the ascent of high mountains. After remarking upon the pleasing and entertaining manner in which the subject had been treated, his Royal Highness, for his own part, thanked the members of the Alpine Club for the treat they had given him by inviting him to hear the lecture.

Preparation of the Salts of Uranium and Vanadium at Joachimsthal, Bohemia.

BY C. LALLEMAND.

The uranium ore is pitch-blende of the sp. gr. 7. It contains on an average 40 to 55 per cent of urano-uranic oxide (U_3O_4), besides vanadium, arsenic, sulphur, molybdenum, tungsten, cobalt, nickel, copper, bismuth, lead, silver, iron, manganese, lime, magnesia, alumina, and silica. The analysis of the sample is thus performed: a portion of 3 grms. is heated on the sand bath with moderately concentrated nitric acid. At the end of two hours the reaction is complete; the solution is decanted, and the residue filtered and washed with hot water till the washings no longer give the characteristic red color with potassium ferrocyanide. The collected liquid is then mixed with sodium carbonate in excess, and boiled to expel free carbonic acid. The totality of the vanadium, iron, lime, lead, copper, etc., is thus precipitated, while uranium remains in solution. The sediment is allowed to settle for some hours, after which it is decanted, washed with hot water by decantation, filtered, and washed upon the filter with hot water until the washings, after slight acidulation with hydrochloric acid, no longer give a red coloration with potassium ferrocyanide. The excess of sodium carbonate is then decomposed by the addition of hydrochloric acid, the free carbonic acid being expelled by boiling, and caustic soda is then added, which throws down all the uranium as sodium uranate with excess of alkali. The mixture is decanted, filtered, and washed very slightly on account of the ready solubility of sodium uranate in pure water; it is dried, the filter detached and burnt, its ash added to the precipitate, and the whole ignited at dull redness in a platinum crucible. When cold it is washed in cold water to remove excess of soda, filtered, dried, ignited, and weighed. We have thus a certain weight p of sodium uranate, $NaO, 2N_2O_3$. The corresponding weight of U_3O_4 is found by calculation. The practical treatment of the ore comprises five operations: Roasting the ore with sodium nitrate and carbonate, lixiviation of the roasted mass, treatment of the residues with sulphuric acid, precipitation of the foreign metals with sodium carbonate, and purification of the liquid and precipitation of the uranium. This precipitation is effected differently according as it is desired to obtain the product in a light yellow or the orange state. For the former the liquid is precipitated with caustic soda, until a portion of the liquid on acidulation no longer gives the red reaction with potassium ferrocyanide. To obtain the orange-colored variety the carbonate of soda is very gradually neutralized with sulphuric acid, avoiding excess. The precipitation is complete. Six different preparations of uranium are produced—uranate of soda, of a light yellow, an orange, and a bright orange; uranate of potash, of a bright orange; uranate of ammonia, of a light yellow; and black uranium oxide. The vanadium present in the Joachimsthal ore does not exceed 0·1 per cent, and the methods tried for its extraction do not appear to have been commercially successful.

Sulphate of Iron.

The salt, protosulphate of iron—or, as the more recent terminology has it, ferrous sulphate—is a purer form of the copperas or green vitriol which can be purchased at the dry-salter's at about a penny per pound, and it is a chemical possessing many very interesting properties apart from its photographic qualities. It is singular—but not less singular than true—that, common and varied as are its uses in pure chemistry, as also in that special branch of applied chemistry which most interests our readers, there are, even yet, many points about its properties which remain uncertain and matter for discussion among chemists. Sufficient, however, is known to show its usefulness and importance, the many changes it undergoes, and the varieties in its forms that may be met with.

It usually occurs in commerce in the form of nice, dry, compact crystals, not very large in size and of a bluish-green color, in which shape it is fairly permanent, though exposure to air, if the crystals be at all damp, is apt to lead to their decomposing with the formation of the brown basic salt, much to the detriment of the appearance of the crystals. Some time ago there was to be found in commerce a sulphate of iron crystal quite different from that we describe, and which was practically free from tendency to decompose. The crystals were very even in size, but of a color quite different from the usual or more familiar kind, being, in comparison, a green of a decidedly yellow—not brown—cast. We have not seen it lately, and cannot say if it be now produced at all, its permanency being its chief passport to use; but, that property being gained at the expense of the presence of a considerable amount of free acid with the crystals, there need be no regret, from a photographic point of view, if it were entirely banished from commerce.

It is customary for photographers to purchase these crystals in the pure form; but if they choose to take a little trouble there is no reason why they should not become their own chemical manufacturers—the purification, as usual, consisting only in recrystallization. If a dozen pounds of clean and fresh copperas be purchased at the dry-salter's, dissolved in about four gallons of hot water, filtered, a little sulphuric acid added, and then the whole set aside to crystallize in a place where it would not cool too rapidly, a crop of crystals would be produced which, drained and placed on pieces of blotting paper to dry, would be equal, for photographic purposes, to the best to be bought, and at a considerably reduced cost—the process of crystallization, too, being very interesting to watch. The crystals would be still better if pieces of string or thin sticks were placed in the liquid for the crystals to form upon. For further economy, the mother liquid—that is, the solution left after crystallization—might be boiled down in an iron saucepan till crystals begin to form, and then again put aside for a fresh crop to be produced. The last mother liquid will contain most, if not all, of the impurities present in the original crystals of copperas.

The solubility of sulphate of iron is represented in a singularly variable light, some authors giving tables remarkably different from others. Perhaps the following, which is on the authority of Herren Brander and Firnhaber, may be considered as nearly correct as possible:

Temperature in Degrees Centigrade.	Quantity of Water required to Dissolve One Part
10	1·64
14	1·43
25	0·87
32·5	0·66
46	0·44
60	0·38
84	0·37
90	0·27
100	0·30

It will thus be observed that a singular property is shown to be possessed by this salt, its solubility increasing till it reaches within some little distance—10° Centigrade—of the boiling point, when it quickly begins to get less soluble, so that a solution saturated by treatment at 90° over an excess of crystals will be found to have a crust upon its surface when raised to boiling point.

This solution of ferrous sulphate gradually becomes brown colored by keeping, and quickly so if exposed to the air. It, however, strange to say, does not pass beyond a certain stage of change. When that point has been reached no further alteration in its appearance and qualities takes place, and the solution may be kept for a long time—if evaporation be provided against—without subsequent change. The deposit which has been formed is variously stated to be of a basic character, with greater or less proportions of acid.

We have called the commercial crystals "dry;" but, strictly speaking, they will be found to have a slight amount of water clinging to them; and to this is owing the gradual oxidation and browning that occurs when they are kept for any length of time. If the crystals are well dried by pressure between cloths and placed in a dry bottle they will keep for a long time unaltered.

It may be obtained in the form of a slightly blue tinted powder by adding a strong solution to a small quantity of alcohol; the salt, being insoluble in that liquid, is thrown down as a powder, which may be preserved well without oxidizing if kept in a dry place. Another method of obtaining it in powder is to spread a number of crystals out before a fire with occasional turning, when they will part with most of their contained water—seven molecules of water usually crystallizing with it—and effloresce till white through the whole crystal. At this stage it may be easily powdered, and should then be put in a stoppered bottle, in which manner it may be kept almost indefinitely. This powder will, we need scarcely say, be stronger than an equal weight of the crystals, three grains being equal to five.

We may close our remarks by noting that a solution of sulphate of iron that has been kept till well oxidized forms a good antidote against cyanide of potassium, if swallowed directly afterwards.—*British Journal of Photography.*

Action of Certain Chlorides on Aniline Colors.

BY GIRARD AND J. A. PABST.

The authors introduced into tubes the chlorides of silicon, $SiCl_4$, of carbon, CCl_4, and of tin, $SnCl_4$, with four times their respective volumes of chemically pure aniline, which, with arsenic acid, yielded not more than one five-hundredth of its weight of mauvaniline without a trace of red or yellow. The tubes were sealed and heated for twelve hours to 225° to 230°. No pressure was observed when they were opened. The carbon perchloride had produced triphenylguanidine, rosaniline, and a brown matter, offering all the reactions of Bismarck brown, which is well known to be produced by the action of aniline hydrochlorate upon rosaniline. Tin perchloride yield violaniline and mauvaniline in small quantity, a large proportion of rosaniline or pararosaniline; also Bismarck brown, and a trace of green matter. Silicon chloride yielded violaniline, and especially triphenylene diamine blue, as well as a trace of mauvaniline. Antimony perchloride, heated with aniline to 125°, reacted very violently, forming violaniline, a small quantity of triphenylene diamine blue, and a certain quantity of a blue matter, analogous to that produced by the action of hydrochloric acid upon the azoic compounds. Thus, notwithstanding the parallelism of their properties and constitutions, carbon chloride yields rosaniline; silicon chloride, violaniline; and tin chloride, both these coloring matters.

Industrial Society of Mulhouse.

At a special meeting of the society, a letter was read from M. Caro, contending that Messrs. Lloyd & Dale, and not Mr. Thomas Brooks, invented the process for fixing aniline colors by the joint action of tannin and tartar emetic. A silver medal was offered for a decided yellow color equal in permanence to alizarine, and fixed in the same manner. A note from M. Brandt was read on the preparation of stannic sulphocyanide by the double decomposition of calcium sulphocyanide and stannic oxalate. It is likely to find extensive applications in calico printing. M. Dollfus read some extracts from a report on cadmium yellow. M. Jacquet has observed that a few grms. of a salt of cadmium added to a chromate of lead color considerably retard the sulphuration of the latter during steaming. MM. Noelting and De Salis communicated investigations on the nitrized cresylols. On treating the diazoic derivative of ortho-toluidine with nitric acid they obtained a binitro-cresylol fusible at 86°, and yielding crystalline yellow salts. It appears to be identical with a compound discovered by M. Piccard in a commercial product known as saffron substitute.

A Novel Actinic Phenomenon.

BY DR. PHIPSON.

The author describes a zinc-white of a dazzling purity obtained by precipitating a solution of zinc sulphate by means of barium sulphide, submitting the precipitate to strong pressure, and igniting it with limited access of air. If any barium sulphide escapes oxidation, the white compound, on exposure to the sun, begins to darken, and in about twenty minutes becomes of a deep slate color. If removed into a dark place it gradually loses color, and in about five or six hours it becomes again snow-white. This experiment may be repeated with the same specimen as often as desired. Further, this change of color does not take place under a slip of common glass, whether thick or thin; at most the compound takes a slight yellowish-brown color on exposure to the sun for two hours. The sample on analysis was not found to contain silver or any other substance known as actinic.

Manufacture of Soda from Sulphate.

Salt cake is produced in quantity in California in the manufacture of nitric acid. As coal and limestone are dear in California, Le Blanc's process is not economical. The author therefore proposes to mix a solution of salt cake with calcium sulphite and pass in sulphurous acid. Soluble calcium bisulphite is formed, and by decomposition calcium sulphate and sodium bisulphite. The two salts are separated by filtration, and the sodium bisulphite is treated with milk of lime. The result is a solution of caustic soda, retaining a certain quantity of sodium sulphite and sulphate, which is evaporated down in the usual manner, and calcium sulphite, which is used again in the process.—*J. Putzkow, in Dingler's Pol. Journ.*

Hardening Steel.

According to a Sheffield paper a very fine preparation for making steel very hard is composed of wheat flour, salt, and water, using, say, two teaspoonfuls of water, one-half a teaspoonful of flour, and one of salt. Heat the steel to be hardened enough to coat it with the paste by immersing it in the composition, after which heat it to a cherry red and plunge it into soft water. If properly done, the steel will come out with a beautiful white surface. It is said that Stubs' files are hardened in this manner.

A COSTLY LETTER ENVELOPE.—Among the curious articles in the Indian Court of the Melbourne Exhibiton are two hollow elephant tusks, fitted with a gold cover. They were sent to the Viceroy of India by the Rajah of Burmah, who used them as an envelope for an official communication. They are valued at $1,000.

Four Years of Industrial Progress.

The following interesting statistics are taken from a Treasury Department statement of the financial and economic transactions of the United States during the past four years:

	For year ended March 1, 1878.	For year ended March 1, 1879.	For year ended March 1, 1880.	For year ended March 1, 1881.	Total.
Exports of live stock	$4,205,893 00	10,853,241 00	$12 065,459 00	$20,681,738 00	$47,806,331 00
Exports of other food	269.752,809 00	326,752,030 00	374 568,342 00	456,244,111 00	1,427,317.292 00
Total exports merchandise	639.485,209 00	725,856,296 00	767,875,740 00	915,271.563 00	3,048,488,808 00
Specie	47.103,365 00	26.391,143 00	23,722,972 00	16,028,803 00	113,446,283 00
Total imports merchandise	475,838,318 00	432,094,129 00	555,569,696 00	703,139,889 00	2,166,642,032 00
Specie	25,209,050 00	26,999,280 00	92,714,238 00	98,570,197 00	243,492,765 00
Production of cotton, number of bales	4,485,423	4,811,265	5.073,531	5,761,252	20,131,471
Production of wool, number of pounds	207.000,000	211,000,000	232.500,000	264,000,000	914.500,000
Production of wheat, number of bushels	364,194.146	420,123,400	448.756,630	480.849,723	1.713,922.890
Production of corn, number of bushels	1,342 558.000	1,388.218,750	1,547,901,790	1,537,535,900	5,816.214.440
Production of pig iron, number of tons	2,066,594	2,301,215	2,741,853	3.300,000	10,409.662
Production of coal, number of tons	54,308,250	52,130,554	65,808,398	69,200,934	241,448,166

NEW INVENTIONS.

Mr. J. F. Smiths, of Zionsville, Pa., has patented a fly net for horses, so constructed that the lash cannot slip into the ribs, but will be firmly knotted thereto in a simple and effective manner. The lash of the nettings is attached by passing it through the ribs from the outer to the inner side, then passing it over the lower edge, outer side and upper edge of the rib, and then through the same from the inner to the outer side.

Messrs. John Dimelow and Robert M. Peadro, of Round Rock, Texas, have patented an improvement in the manufacture of hydraulic cement and lime from rotten or decomposed limestone. They first burn the decomposed stone, then subject it to currents of air or steam in a tightly closed receptacle, and finally sift the material either with or without grinding, by which a strong cement is obtained.

Mr. Elisha S. Griffith, of Ghent, Ky., has patented an insect-killer which consists of a bar or rod having a bowl at each end and pivoted in the middle, so that the heavier bowl descends. The device is placed in a tobacco or other field at night, both bowls filled with fuel, and fuel in one of the bowls is ignited. As the fuel burns the bowl containing it rises, and finally assumes a position above the other bowl, whereupon its embers will drop upon and ignite the fuel in the lower bowl. The insects are attracted to the flames and are destroyed.

Mr. Charles Hill, of Sodus Point, N. Y., has patented an apparatus for drying fruit by means of artificial heat. An asbestos lined case is provided with a novel elevating arrangement for carrying trays for holding the articles to be dried. The trays have net-work bottoms, and the circulation of heated dry air through the case (which latter, by virtue of its asbestos lining, retains the heat) is relied upon for desiccating the fruit.

Mr. Silas M. Bragg, of Hickman, Ky., has patented an adjustable sawing and routing machine for the more rapid manufacture of bed-rails, friezes, etc. The table of the machine has a circular saw and router at each end, with a movable carriage, whereby the piece is presented in such manner as to be operated upon at both ends simultaneously. The table may be shortened or lengthened to operate on different lengths.

Mr. Thomas T. Lotherington, of Houston, Texas, has patented a stencil-brush by which the waste of ink accompanying the use of ordinary stencil brushes is avoided; and whereby the time commonly lost in dipping the brush is also saved. A reservoir for ink is formed in the handle of the brush, and a valve feeds the ink to the bristles at such times and in such quantity as may be desired by the operator.

Mr. William B. Atkinson, of Franklin, Ky., has patented a fish trap of the kind composed of two hollow skeleton or wire jaws hinged together and closed by cords for trapping fish. He has provided improved means for suspending and opening the trap, and holding the jaws at such an angle as will facilitate their closing.

Mr. Edward P. Haff, of Brooklyn, N. Y., has patented a device for putting up cord balls, such as balls of twine, knitting cotton, etc., which protects the balls from soiling when exposed for sale or in use, and controls the unwinding in such manner as to prevent tangling. For this purpose a protective case guard or wrapping constructed of paper or other analogous cheap material is employed.

Mr. Benjamin Slusser, of Sidney, Ohio, has patented an improvement in excavators, which is an improvement upon a self-loading ditching machine or excavator for which letters patent No. 72,098, dated December 10, 1867, were granted to him. The present improvement secures a more perfect co-operation of the apron with the plow, and greater convenience in discharging the contents of the machine when loaded.

Mr. Orlando E. Lewis, of Urbana, Ohio. has patented an improvement in boots and shoes, by which leather is economized, durability is increased, and comfort to the wearer is secured. The front portion of the upper is turned outward at the lower edge and stitched to the sole. The front or wearing part of the sole is made of two pieces of leather of equal dimensions and similar shape, extending backward to form the shank, which latter is stiffened in the usual way.

Mr. George F. Newell, of Greenfield, Mass., has patented an improved feeding mechanism for sewing machines, which relates to that class of feeds in which a longitudinally-reciprocating rod or bar is arranged at right angles to the feed bar and imparts motion to the latter through a bell crank lever. The invention consists in a novel construction and arrangement of mechanism for raising and lowering the feed-bar, pushing it forward and backward, giving it an interval of rest, and for shortening and lengthening the stitch.

Mr. Walden Pickett, of Andover, Ohio, has patented an improved fruit crate, more particularly intended for holding boxes or baskets of small fruit, but which may also be used for peaches and other fruits The crate is made in two sections and provided with a lid or cover. Each section accommodates a prescribed number of boxes, and is provided with removable bars having rabbeted ends, which permit their easy insertion between the slats of the sides of the sections. When baskets are packed the bars are removed; but when boxes are packed, which require less space than baskets, the bars are placed between the side slats to fill the space. The sections have also slatted bottoms, and are provided with false bottoms with slats made to fit between the slats of the principal bottom, which are used when large fruits are packed.

Mr. David Williams, of Eagleport, Ohio, has patented an improved kettle holder for supporting kettles and other kitchen utensils of different sizes over a fire. It consists of a legged ring and one or more inwardly beveled rings provided with downwardly and vertically projecting pins, the latter rings fitted to rest in and upon the legged ring, the pins serving also to keep the smaller rings in place.

Mr. Thomas F. Darcy, of New York city, has patented a reversible center-plate for furniture, such as the seats and backs of chairs, sofas, and the tops of tables, which permits of one side being upholstered in one style while the opposite side may be upholstered in another style. Devices for holding the plate firmly when reversed are supplied.

Mr. John D. Parker, of Kansas City, Mo., has patented a composing-stick gauge for printers' use, by which instead of setting the composing stick by leads (which often vary in length from imperfect cutting, thus giving trouble in locking forms), it is accurately set. The gauge consists in a metallic plate divided into rectangular sections of different lengths in "em" measurement.

Value of Sawdust.

We should hardly credit so large a story from a less reliable source than the *N. W. Lumberman,* but we presume the editor has the statistics at hand to confirm his assertions:

"In New York there are about 500 venders of sawdust, having a capital of $200,000 invested, and doing a business amounting to more than $2,000,000 annually. Forty years ago the mills were glad to have sawdust carted away; twenty-five years ago it could be bought for 50 cents a load, but the price has increased, and now it brings $3.50 a load at the mills. It is used at the hotels, eating houses, groceries, and other business places. It is wet and spread over floors in order to make the sweeping cleaner work. Plumbers use a great deal about pipes and buildings to deaden walls and floors. Soda-water men and packers of glass and small articles of every kind use it, and dolls and some living creatures are more or less stuffed with it. Yellow pine makes the best sawdust, as it is the least dusty, and has a pungent, healthy smell. But any white wood dust will do. Black walnut sawdust will not sell and is burned."

How to Grind a Glass Plate.

It is sometimes useful to know how to impart a finely-ground surface to glass suitable, say, for a focusing screen. Mr. C. S. de Joux good-naturedly sends us, all the way from Mauritius, a simple method he has practiced, which certainly deserves to be recorded. Finely-ground sand or river mud—or, what is better still, the sediment from a grindstone—is well stirred up in a bowl of water, and after a few minutes the upper half of the liquid decanted off. The decanted liquid contains all the finer particles, and these, after subsiding, are collected in a watch glass. The sheet of glass is laid on a damp cloth spread upon a table, and the watch glass and mud used as a muller, the convex side of the watch glass supplying a good hold for the fingers. In a quarter of an hour a satin-like polish will be obtained, admirably adapted for focusing. A rinse with water will show if the grinding has been uniform.—*Photo. News.*

Cheap Paint.

Three hundred parts washed and sieved white sand, forty parts of precipitated chalk, fifty parts of rosin, and four parts of linseed oil are mixed and boiled in an iron kettle, and then one part of oxide of copper and one part of sulphuric acid are added. This mass is applied with an ordinary paint brush while warm. If it is too thick, it is diluted with linseed oil. This paint dries very rapidly and gets very hard, but protects woodwork excellently.—*Corps. Gras. Ind.,* 7, 13, 151.

Malaria in Italy.

The question whether it is possible to saturate the human system with some substance which, without prejudice to general health, would counteract the germs of malarial infection and enable persons to live in malarial districts with impunity at any time, is being studied by M. Tommasi-Crudeli. In the end of the seventeenth century arsenious acid (commonly called arsenic) was largely employed in the treatment especially of the graver forms of the disease, and though displaced to some extent since the discovery of quinine, is still used as being cheaper and sometimes efficacious where quinine is not. In some cases, too, the system will not bear the dose of quinine necessary. Now, M. Tommasi-Crudeli knows of cases where men had to pass the summer in the most unhealthy districts of the Agro Romano, and who were every year attacked by the fever till the last two years, when by a regular use of Fowler's arsenical liquor they have both enjoyed immunity and regained appetite and vigor. He is about to make experiments on animals to find (1) whether such immunity may be secured in a constant way; (2) what is the *minimum* daily dose of arsenious acid (in proportion to the body weight) which will make the system refractory to the malarial ferment. An extensive distribution of such a poisonous substance among an agricultural population would, no doubt, be attended with danger; and M. Tommasi-Crudeli suggests the use of the arsenic in some such way as that lately adopted at Caserta in the treatment of a grave malarial epidemic. The substance was supplied in the form of gelatine tablets (made by Decian, of Venice), each divided into 50 square pieces, easily detached, and each piece containing so much arsenic (2 mgr.). For the preventive purpose the proportion would be reduced.

The nature of malarial fever has been further elucidated by the researches of MM Cuboni and Marchiafava. In the former researches by MM. Tommasi-Crudeli and Krebs (1879) it was a curious fact that the characteristic form of the *bacillus* was not found in the circulation of persons who had the fever, though largely in certain parts, the spleen and bone-marrow especially. It now appears that during the ingress of the fever, and also during the last period of the febrile intermittence, the blood of the whole body contains a considerable number of individuals of the parasitic species. These are mostly spore producing; and when, in the second period (up to the crisis) they are all, or nearly all, destroyed, one sees in the blood merely a number, sometimes enormous, of the small spores which have been liberated, and which in favorable conditions produce a new generation of *bacilli* in the same blood.

Think while you Read.

The *Teacher's Journal,* in an article on methods of study, reminds the student that the first essential to successful study is the power of concentration of thought. This power is largely a matter of habit and cultivation. Read five pages of history in a lackadaisical manner. Close the book and write out all you can remember. Then compare your production with the printed matter, and you will be able to judge of your proficiency. Read five pages more with fixed attention and a resolution to retain the subject, and compare as before. You will find a marked improvement. If your memory is treacherous read but very little, and always write out the subject. When you hear a sermon or address, *hear* it, and afterward reduce it to writing. Read no novels, and do not read aloud to please others unless you care (nothing) for the article yourself. A practiced reader can read aloud for hours and carry on an independent train of thought all the time. This ruins the faculty of study as well as the memory. Dismiss all other subjects but the one in hand. Let the ear be deaf to all sounds, and the eye blind to all sights. Let the sense of touch sleep, and smell and taste be as though they were not. A lesson learned in this state of mind will stay with you, and will not need to be "crammed" again the night before examination. It will be like lines carved deep into the rock, or chiseled on the Rosetta stone. The other method is the dim tracing of obscure letters in the sand, which the next wave obliterates.

MEDICAL GYMNASIUM.—A medical gymnasium was lately opened in Paris. It has been built in the Chausee d'Antin, at an expense of £20,000, by a public company. About seventy mechanical contrivances of different descriptions have been arranged in a series of rooms. The greater number of these are worked by a steam engine, and all of them can be graduated by screws, so that the extent, duration, and velocity of motion can be regulated according to the direction of the physicians.

Photographing Music.

An English paper tells of a gentleman, who, on being asked to sing, produced from his pocket a little case which contained his music, photographed down to the size of note paper. He had duplicate copies of each song, and handed one to the accompanist, singing from the other himself. The expedient saved all the bother of bringing a roll of music, unfolding it, collecting it again, and so forth.

DRYING POTATOES.—Benjamin Wing, of Rochester, has been largely engaged in the business of supplying the Northwestern army, and his practice is to first slice the potatoes, then put them in a steam box three or four minutes to keep the starch in. and then subject them to drying. If not placed in the steam box, the starch would come out. When used, they are soaked, and are then like fresh potatoes.