to the vaporizer or the tube or valve used for inhaling purposes.

This vaporizer consists of a simple vessel, of any material, with a close fitting cover and small tube in the center of the cover for attachment or connection between the inhaler and the vaporizer; the attachment consisting of an india rubber or other tube passing from the pipe on the vaporizer to the apertures in the cover of the inhaler.

The bottom of the vaporizer being fixed above a lamp or on any other heating surface, the medicine, water, or any other agent to be administered in the form of a vapor or steam having been previously placed inside, the sponge is removed from the inhaler; and the connection by means of the tube between the vaporizer and inhaler, being established the vapor or steam passes abundantly and efficiently to the nose, mouth, throat, or lungs, either or all, as may be required.

It is claimed that this improved instrument furnishes a cheap, convenient, and efficient apparatus, which greatly economizes the material used and administers it in such a way that the vapor cannot become charged with the impurities discharged from the lungs.

IMPROVEMENT IN EARTH CLOSETS.

A very simple and excellent improvement has been lately patented in this country by Mons. Goux, of Paris, France, which promises to give a new impetus to the earth closet system, and widely extend its employment.

The earth closet, as commonly made, consists of a tub or holding vessel, to receive the excreta, and another vessel or holder containing dry earth; there is also a lever and valve arrangement, so connected with the earth chamber that when the lever is operated a small quantity of earth is thrown down upon the excreta, which is thus deodorized. This plan although valuable, is, in practical use, attended with some little trouble, as the chambers must be frequently looked after, the contents of one, when full, removed, and the other chamber filled when empty.

The improvement of Goux consists in lining the interior wall of the tub or excreta holder with earth, or any other suitable deodorizing absorbent; and thus prepared it is ready for use, requiring no further attention until it becomes filled, when its contents are removed to the manure heap, and a fresh earth lining substituted. The earth lining absorbs the noxious effluvia and liquids, and the closet thus made is odorless. There is no machinery about it. It is admirably fitted for family use, and it presents this striking advantage, that its products form a manure of the highest value, which may be collected and transported without nuisance to any body. The product is, in fact, odorless, although it is a rich fertilizer.

This form of earth closet has been extensively introduced in London, where a company has been formed and a large and profitable business inaugurated. The company employs a large number of drays and men, who go around to regular customers, removing the filled tubs and substituting fresh ones, a work of only a minute in each case, with nothing disagreeable about it. The fertilizer thus produced and collected brings the highest prices, and the demand is much greater than the supply. In this country the invention is now being introduced, and may be seen in operation at the establishment of A. L. Osborn, 424 Canal street, New York.

Sheet Metal Knobs for Tea-pots.

Sheet metal knobs for teapots aro at present usually made in two pieces of equal size and shape, each piece being first cut and then struck into proper form, the two then being united by lap joint and solder. The manufacture of such knobs involves five distinct operations, the last of which is difficult and tedious. The appearance finished knob is never perfect, as the joint is always more or less visible. This inveetion consists in forming the knob from one single star-shaped piece of metal by bending the arms of the same and striking up the center, so that the edges of the arms will come in contact with each other.

By the means described a knob is made by but three manipulations, to wit, those of cutting, striking up, and final bending of arms. If the arms are to be curved transversely to make the knob of conical instead of pyramidal form they can be so made by striking them in the desired manner at the beginning of the operation. The improvement has been patented James Britton, of Williamsburg, New York.

Shall we send our Children away from Home to be Educated?

The *College Courant* published at New Haven says on the above subject: The notion is quite prevalent that it is a good thing for children to go away from home while acquiring their education, so that they may see the world and learn how other folks live. There is doubtless much to be learned in seeing the world, and we would, by no means, deprecate the enlargement of mind which comes by travel; but the natural place for children is home, and their best society that of their parents and brothers and sisters. The teacher of a boarding school has the double office of teacher and parent, and, however well he may fill the former, it is impossible for him to fill the latter to the perfection which the parent can, and often does attain. The child almost knows instinctively that the love of a parent is disinterested, that his advice is without any selfish motive, and that his command must be obeyed; he therefore trusts his parent with a confidence, and obeys him with a good will, which he is not ready to yield to a stranger. It is the duty, therefore, of parents to keep their sons and daughters together at home till their minds are well disciplined by study, their principles well established, and their habits formed, and then they can safely see the world, and profit by the lessons it teaches. The high schools enables us thus to do. The young men and women graduating from our high schools find the same incentive to action in society that they found in the school, and do not leave behind them the forces which thus far have impelled them. There is no such violent change as must occur when one graduates from a school exclusively devoted to one sex.

The Pennsylvania Steel Company.

The Pennsylvania Steel Company, one of the most important industrial establishments in the country, has its works on the Susquehanna, about three miles below Harrisburgh. Its Bessemer department was started in June, 1866, and the annual product of Bessemer steel is about 18,000 tons. The building now consists of a melting building 81 by 52, and 39 feet high, with a hipped roof and lantern 18 by 44 feet. Adjoining and divided by a thick wall is the converting room, 114 feet long by 100 feet wide and 25 feet high in the clear, for a pair of five tun converters. Connected is the engine room, containing a pair of engines of 500 horse power for driving enormous air condensing pumps for the air-blast. Specimens of all the iron are carefully tested before it is allowed to go into the furnace. A visitor to the works describes the operations as follows:—

The iron is first melted in blast or cupola furnaces, of which there are five, located in the second story of the melting building—one of which is reserved for melting the Franklinite iron separately. While the iron is in process of melting, the workmen kindle a fire of hard coal inside the converters—it being necessary to prepare them for business in that way. Three fourths of a tun of coal is thus consumed each time a converter is used after being cooled off. The converter is of iron, made in parts and bolted together; it is lined with fire brick and a mortar of pounded quartz; it is egg-shaped with an opening at the top, like the neck of a crooked squash cut short. It is suspended on trunnions, with ratchet apparatus propelled by hydraulic power for turning it at will on its side or bottom upwards. It has a false bottom, and through the inner bottom are ten holes about five inches in diameter. Over these holes are placed what are called *tuyeres*, made of fire-brick clay and hollow; the nozzles are pierced with a number of small holes to allow the influx of air. These tuyeres are about thirteen inches long; all around them to their tops is rammed moistened earth, well mixed with pounded quartz. This double bottom, after being prepared, is bolted to its place on the converter. Connected with the space between the upper and lower bottom of the converter is a large iron pipe leading from the air cylinder of the force pumps. Ten tuns of the melted metal are first drawn from the furnaces into a huge ladle in the room adjoining the converting room. Five tuns being a charge, there is enough to supply the two converters at once. All being ready, the enormous charge is, poured from the ladle, through an iron trough lined with a mortar of crushed quartz, into the converter, then horizontal. Instantly the blast of air is let on, and the converter slowly resumes its upright position, while a tempest of fiery cinders pours from its crooked neck. When horizontal this neck serves as a tunnel to receive the metal; when upright, it deflects the stream of fiery cinders into the wide-mouthed chimney. And now the molten iron, already heated to 3,000°, is urged by the furious blast to an unknown temperature.

The 500 horse power engines drive 6,000 cubic inches of compressed air per minute through the surging mass. The carbon in the air unites with oxygen, and, as combustion proceeds, the boiling mass grows hotter and hotter; impurities rise to the top and pass off in liquid slag, or in streaks of red and yellow gas, and finally in thick, full, white, roaring dazzling flame.

The foreman knows by the flame each instant change. In fifteen to twenty minutes the flame is thinner with a bluish tint, and then the hidden hydraulic power turns the huge converter slowly down until it is again horizontal. A quantity—I think about 7 per cent—of melted Franklinite iron containing carbon and manganese is poured in, and again the boiling and surging is renewed; but only for a brief half minute or less, and then all is quiet. The melted pig iron has lost about 17 per cent of its weight, and has become a homogeneous mass of liquid steel that pours out into the ladle, under its roof of slag, smooth, shining, and almost transparent.

Each filled ladle now takes half the charge into the converter; and from the ladle it is drawn into iron molds set on the outer limits of a depressed semi-circurlar area which surrounds one side of the converters. The molds are set with the large end down on an iron floor covered with loam. When cooled, the mold is raised by an immense hydraulic crane, and the enclosed ingot is jarred out by repeated blows of a sledge hammer. The ingot is then weighed and transported on a truck running on a tramway to the rail mill or rolling mill.

At every stage the iron is weighed, before it is melted, after it is melted, and after it is converted into steel. The steel rails are also weighed and tested. The ingots weigh about 1,600 pounds each.

In the rolling mill the usual process of heating the ingots, of hammering and drawing out through rolls is gone through with. In these works there is ample floor space and hight. There are eight frames arranged in pairs, with room for more, at one end and in one wing, with the boilers over them and sheet iron chimneys outside the building. In the center of the space between the furnaces and the rolls' there is ample room for piling ingots, and a hydraulic crane for unloading them from the converting room cars and loading them on the furnace buggies. So ample are the arrangements of the rolling mill that it can roll twice as fast as the Bessemer works can turn out the steel, and that part of the establishment is about to be duplicated. The ingots, heated from the furnace, are placed under a twelve tun steam hammer, and after being drawn out to twice their length, are cut in two, and are then passed through the rolls which draw them into proper length and shape. Passing from the rolls to a carraige, each rail is cut into lengths of 30 feet by swiftly revolving circular saws. They are straightened partially while hot, and completely when cold, under a straightening press.

Growth of the Petroleum Trade.

According to the annual report of the New York Chamber of Commerce, just issued, the exports of petroleum in 1870 were 37 per cent greater than those of the previous year, and nearly all this increase, or 33 per cent, is accounted for by the shipment from the port of New York. The total export from the United States in 1870 was 141,208,155 gallons, against 1,500,000 in 1860, and 99,281,000 gallons in 1868, showing an increase of nearly 42,000,000 gallons in two years. The first sale noticed for export was in May, 1861, when 100,000 gallons were sent to foreign markets. Antwerp, which has since led all other ports in the importation of petroleum, took in that year 5,671 gallons, increasing the amount in the following year more than 800,000 gallons. Great Britain took 579,000 in 1861—and in 1862 increased her importation to 3,238,000 gallons.

The continued growth of this trade for ten years—from 1,500,000 gallons in 1860 to 141,000,000 in 1870—is a wonderful exhibit, not only on account of the rapid development of the oil interest, but also because the yearly increase has been steady. The daily average product of the Pennsylvania oil district in December, 1867, was 10,400 gallons; in the same month of 1870, it was 15,214 gallons—a fact which shows the inexhaustibility of the wells in that region. In regard to the home consumption, it is estimated that it is equal to one half the quantity exported—making in round numbers an aggregate consumption of 11,000,000 gallous annually. This enormous amount, reckoning the price at an average of twenty cents per gallon, represents a value of more than $42,000,000 for a single year—certainly a remarkable return for a product unknown to commerce ten years ago.

Lint.

Next to cotton, the vegetable fiber most extensively used for textile fabrics is flax, the Latin name of which is *linum*,—hence come the names of linen and lint. The fibers of cotton and flax, viewed under a microscope, will be found to be different; the fiber of cotton is angular, or bladed, while that of flax (linen) is perfectly round and smooth. It is this difference in their natural formation that constitute the superiority of linen over cotton as a material for dressing wounds, or as a fabric for clothing the body. Lint is the unwoven fiber of linen. By wear, and much washing, which it necessarily undergoes, linen becomes softer than when new; it undergoes a partial decay, and the much prized linen eventually becomes "rag." In this state it is fit only to be converted into paper or lint. Lint is, in fact, the woolly fiber of old linen, "thrown" or slightly "felted" together (as manufacturers term it) into the material form so named. The flax plant yields not only linen by means of its fiber, but it also, by expression, gives a valuable oil from its seeds, known in commerce as linseed oil. The residue, after the oil is expressed, is called linseed cake, and excellent food for cattle. Each product of the flax plant, both in peace and in war, has its value either as linen, linseed, or lint.

AN extensive sugar planter, of Louisiana, who has over fifty Chinamen employed, informs us that while this class of laborers are physically incapacitated to perform as much work as the negroes, (man for man), still they are, upon the whole, quite as serviceable and more reliable than any other available class of laborers now in the South, white or black; and inasmuch as there is a great deficiency of farm labor in the cotton and sugar producing States, he informs us that the capitalists of the South are taking steps to insure a large importation of Chinamen in the coming fall and winter, for the purposes alluded to.

JOHN CHINAMAN AS A PLANTATION HAND.—Says the *Illustrated Agriculturist*, (St. Louis); a planter at Irish Bend, Parish of St. Mary, has had twenty-six Chinamen at work for him the past eight months, on his sugar plantation; and he infinitely, and for every reason, prefers them to negroes. They take good care of their teams, never beating or abusing them. They get $13 for twenty-six days work, and ordinary rations. This would indicate John as the coming laborer in the Southwest.

IT is intended to hold a grand exhibition of architectural models, plans, appliances, work and materials, at Berlin, in the course of next year. The funds have been subscribed, and the Emperor of Germany will appoint a commission, to carry out the scheme, immediately on his return to the capital.

THE POLAR EXPEDITIONS.—A letter has been received from a gentleman on board the *Polaris*, reporting the safe arrival of the ship at Upernavick, and her departure thence on September 5, steering due north. All well. From Gotha, Germany, we hear of the German expedition, and its reported success in reaching the open Polar sea. The sea is reported to be "free from ice, and swarming with whales."

EDUCATION enters the mind through the gates of the senses. It is commenced very early, many children requiring to be taught even to nurse. Remembering that James Watt commenced the study of Greek at the age of seventy, it would be difficult to fix a period at which it terminates. As a general rule more lessons are learned outside than inside of our school houses.