1st magnitude, 0·005 s.; 2d magnitude, 0·013 s.; 3d magnitude, 0·03 s.; 4th magnitude, 0·08 s.; 5th magnitude, 0·02 s.; 6th magnitude, last stars visible to the naked eye, 0·05 s.; 7th magnitude, 1·3 s.; 8th magnitude, 3 s.; 9th magnitude, 8 s.; 10th magnitude, 20s., 11th magnitude, 50 s., 12th magnitude, 2 m.—mean magnitude of the asteroids; 13th magnitude, 5 m.; 14th magnitude, 13 m.; 15th magnitude, 33 m., 16th magnitude, 1 h. 23 m.—last stars visible with the average of large instruments.

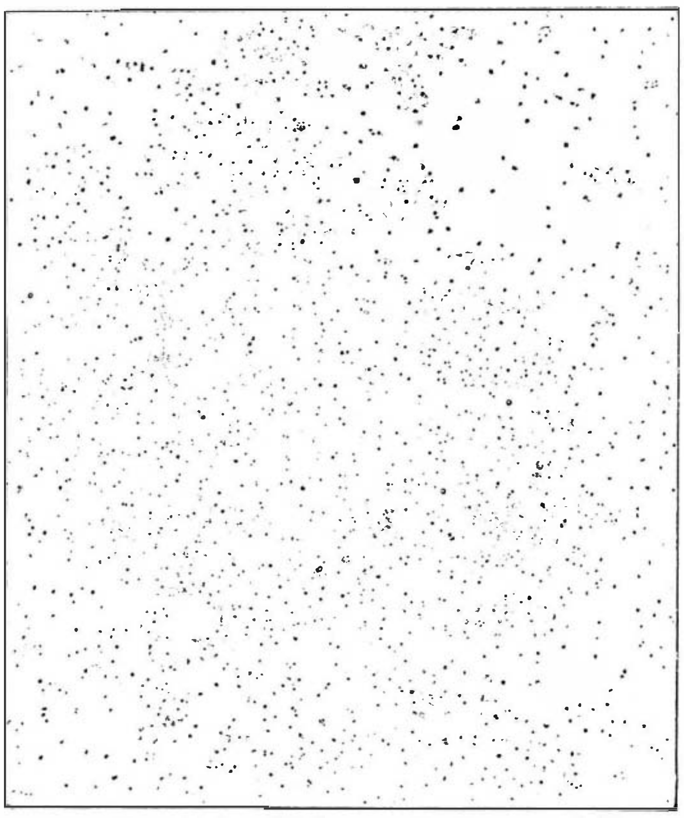


Fig. 2.—PHOTOGRAPH OF A PORTION OF THE CONSTELLATION CYGNUS.

All these figures represent a minimum. In order to obtain good reproductions upon paper, the time of exposure must be tripled.

It will be seen from this table that between the first and last magnitudes the time of exposure varies from 1 to 1,000,000. (The proportion adopted between the brilliancy of two consecutive magnitudes is 2,512.)

Aside from the construction of celestial charts, we may mention as another very important study the discovery of asteroids, which has now become possible through photography. The small stars appear upon the negative as, so to speak, a mathematical point, while the planets are distinguished therefrom by a small, well defined dash that indicates their proper motion, with magnitude and direction, during the time of the exposure. It is thus that we have been enabled to obtain the track of a small planet of the eleventh magnitude, showing its course through an exceedingly well defined line amid the fixed stars. In the same way it is possible to study the motion of the satellites around their planet, and perhaps to discover new ones.

The study of double and multiple stars will be greatly facilitated, and it will be possible, likewise, to apply photography to researches on the parallaxes. Finally, we must cite photometry as one of the branches of astronomy that will now be enabled to collect very useful data through the use of photography.

Let us remark, in conclusion, that this recent progress has perceptibly increased the power of human vision. It permits, in fact, of obtaining the image of a star that would remain invisible with instruments of the same aperture as those that photography employs.—*La Nature.*

Dialyzed Pitch.

The healing properties of vegetable resins are well known, and extracts therefrom in various forms are extensively employed in medicine; but they are more or less objectionable, as heretofore no means of removing or separating the foreign and hurtful substances have been used. Mr. Charles J. Ulrici, a chemist of Havana, Cuba, has succeeded in obtaining, by dialysis, a new and pure preparation, which is believed to be of importance for medical purposes.

The first operation is the filtration of the pitch to separate certain substances, which in its natural state are incorporated with it, such as vegetable remains, carbon dust, bits of leaves, earthy matters, deposits of smoke, and other impurities. These substances are separated and removed by the filter, while the heat applied drives out a portion of the bad or poisonous principles, which become volatilized by the heat.

Vegetable pitch may be said to be composed of two parts, one portion consisting of combined dense empyreumatic resinous matters of dark color; and, second, another of liquid nature, which holds in solution the first part. The acrid and nauseous odor of the raw pitch is due to the poisonous or hurtful substances, some of which are pyroligneous acid, formic acid, wood spirit, or methylic alcohol, aldehydes, acetones, methylic acetates, creosote, cyanides of ammonia, and benzines, and these substances, by means of bicarbonate of soda, become capable of being removed by the operation of dialysis.

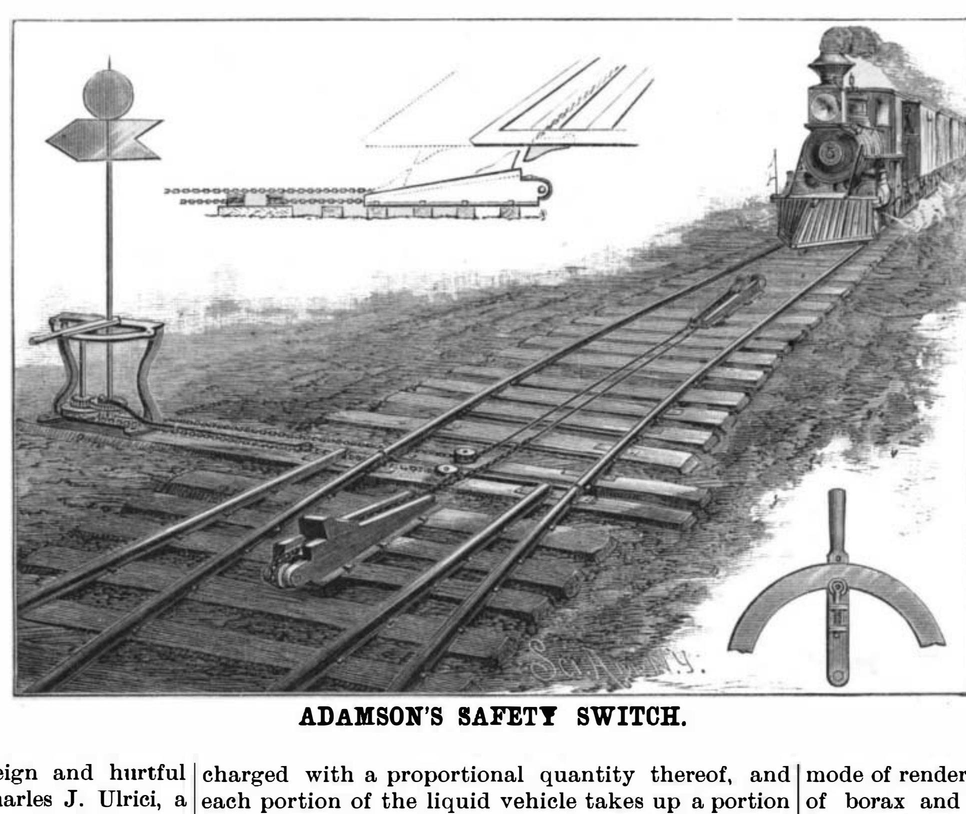
The dialyzing apparatus is made with vegetable parchment in the usual manner. The dialyzer is placed within a suitable vessel containing distilled water upon a level table, care being taken that the level of the exterior liquid is the same as the level of the liquid contained within the parchment or dialyzer. The whole is allowed to stand three days, at the end of which time the exterior water is removed and a new quantity substituted. The first water is then tested with sulphuric acid, and note is taken whether there is any effervescence or discharge of carbonic acid. If there is, the dialyzation is continued for three days more, when the exterior liquid is again tested in the same manner described. If there is no effervescence, then the operation of dialyzation is complete, and the poisonous and injurious principles contained in the mixture will have been extracted therefrom and carried over to the exterior liquid, together with the sugar and the bicarbonate of soda, that which remains in the dialyzer being a neutral solution of colloidal and chemical nature derived from the useful principles or components of the pitch, the poisonous or hurtful principles or components having been removed.

The dialyzed pitch is then concentrated by the application of a gentle heat to evaporate it slowly. It is then mixed with coarse sand, and then evaporate from this mixture, with gentle heat, a portion of the water. The sand, after losing the water, will remain damp. Allow this to become cool, and then place it in a lixiviating apparatus.

This operation has for its object to dissolve the concentrated and dialyzed pitch that is imprisoned in the sand. This is accomplished by means of a suitable liquid vehicle, whereby the dialyzed pitch will be liberated from the sand and taken up by the liquid vehicle, and in this manner is constituted the extract of dialyzed or colloid pitch. The lixiviation is prepared for use with a liquid vehicle composed of alcohol and glycerine.

The operation of lixiviation makes a complete extract of the pitch which is imprisoned in the sand. Every portion of the liquid vehicle, when it comes in contact with the sand containing the pitch, becomes charged with a proportional quantity thereof, and each portion of the liquid vehicle takes up a portion of pitch until the whole has been completely dissolved and all the pitch contained in the sand joined to the water, alcohol, and glycerine, these three bodies being powerful and inoffensive solvents, and being the vehicle of which most fluid extracts are made.

This compound or fluid extract of dialyzed pitch thus prepared is of great medicinal value, as the hurtful substances have been removed. It is used for various medical purposes, such as the treatment of bronchitis, of throat diseases, of ulcers of all kinds, herpes, chronic rheumatism, scrofula, sores, and diseases of the skin.



ADAMSON'S SAFETY SWITCH.

A RAILWAY SAFETY SWITCH.

The invention herewith illustrated shows a plan of constructing a switch by which a train moving on the main track will automatically close an open switch and bring the rails into alignment. To this end, sliding blocks are mounted to slide in inclined ways securely fastened to the ties in the center of the track beyond the ends of the switching rails. These sliding blocks have eyes at each end, to which are attached chains, one communicating with a rod connecting with the sliding block at the other end of the switching rails, and the other passing around a sheave in the inclined way, then around another sheave in the center of the track, to and around a chain wheel mounted in the switch stand. A dog or catch is pivotally connected to the under side of the locomotive, and when the train approaches a switch set for a siding, as shown in the engraving, this dog strikes the sliding block, moving it in the manner indicated by the dotted lines in the small view, drawing the chain to revolve the chain wheel in the switch stand, and thus moving the switch bar to bring the switching rails in conjunction with the main rails. The switch lever rides above a circular rack which projects from one side of the switch stand, and has a yielding roller catch. The various parts are so arranged that when the main line is open the sliding blocks will be at the lower ends of their inclined ways, so they will not then engage with the dog on the lower side of the pilot; but if the train is to be switched, the dog is raised by a simply arranged device, so as not to throw the switch to the main line. With some slight changes in details, which are set forth in the patent, this form of switch is also adapted for use where there is a switch or siding on each side of the main track.

This invention has been patented by Mr. Robert Adamson, of Auburn, N. Y.

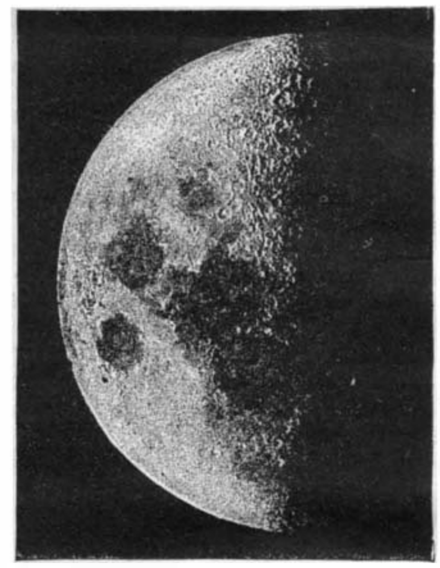


Fig. 1.—PHOTOGRAPH OF THE MOON.

Monument to Friedrich Wohler.

The great German chemist Friedrich Wohler died in 1882. In recognition of his eminent services, the German Chemical Society at once proposed the erection of a monument at Gottingen, where most of his life's work was accomplished. A sum of $4,000 has been collected, but as this is not sufficient for the purpose, an appeal has been made to American chemists to aid in honoring one who has done so much to elevate their calling to the rank of a true science. The American committee particularly appeals to those who formerly studied under Wohler, and to all who are interested in the science to which he devoted his life. Contributions may be sent to Prof. Ira Remsen, Johns Hopkins University, Baltimore, Md.

THE following is given as a cheap mode of rendering fabrics uninflammable: Four parts of borax and three parts sulphate of magnesia are shaken up together just before being required. The mixture is then dissolved in from 20 to 30 parts of warm water. Into the resulting solution the articles to be protected from fire are immersed, and when they are thoroughly soaked, they are wrung out and dried, preferably in the open air.—*New York Times.*

The Price of Life.

BY EDWARD ATKINSON.

We have become so much accustomed to measure the price of things in money that it is a little difficult to forget the rates of wages, earnings, or profits, and look only at the actual results of toil. But reflection will show that that for which men and women really work is not money, but subsistence. The price paid for shelter, food, and clothing is the price of sustaining life. It is therefore an urgent problem for millions how to get a good subsistence for less money than they now spend for a poor one. The way for the working classes to improve their condition is to produce more or waste less. When each one has found out this secret for himself, the labor question will be practically settled. All there is in it is how to answer the all-absorbing question, "What is the price of life?"

The magnitude of this problem to the people of the United States appears from the fact that 90 per cent of them trust to their daily work for the daily price of their own lives and of those who depend upon them. In the "working classes," in the narrow sense of that term, are reckoned laborers, servants, mechanics, and factory operatives. with whom may be included teachers, clerks, salesmen, saleswomen, seamstresses, and the like. In the strictly working class may also be included 90 per cent of all the farmers who own their own land, but who work harder than any of their hired men. To all such persons the price of life is the one question which is ever before them.

There is a somewhat subtile distinction between the cost of life and the price of life. The cost is the force consumed. In respect to each individual, it is the effort which he makes, be it great or small. The true cost of life is the measure of the actual work performed by each person in order to secure the shelter, food, and clothing which are necessary, together with the additional comforts and luxuries which each person can afford to enjoy, including leisure. By "leisure" is meant the control of a part of each day free from the urgent necessity of working for mere subsistence. It may be that he who attains such leisure will adopt the definition of this word which is given by the "old Bohemian" in his cookery book. He says that "leisure consists in the diligent and intelligent use of time."

In contrast with this broad view, the cost of a man's life to the community, whether he be capitalist or laborer, is just what he consumes out of the annual product, and no more. The price of a man's life to himself is what he pays out of his earnings for his necessary consumption. A man can live at a very low price to-day, and if he be intelligent, he may earn the price at the cost of very little labor.

To measure the price of life, let us suppose that a single man in the city of Boston puts the question to himself, "At what price can I live independently by myself in a small room, or chumming with a companion in a better room?" The answer is that $200 a year is the price of a very comfortable subsistence. If he can earn $200 for eight or six hours a day's work, he will also live at a low cost and enjoy a large modicum of leisure.

If the man is really poor, or if he desires to save a large part of his earnings, the price of his life in money may even be reduced to $150 a year. But he must be a very intelligent man who can live comfortably on that sum. He must be rather more capable than the average man. It takes a great deal of intelligence to get the most comfort for the least cost. How is it to be done?

1. Shelter. Two young men can find a decent room in one of several parts of Boston, tolerably furnished, which can be hired for $100 a year, or $50 for each, including the care of the room and the modicum of heat which they will need in winter. If they choose to take care of their own rooms and to buy their own fuel, they can do still better.

2. Clothing. If the man knows where to buy and what to buy, he can purchase a full and comfortable supply of clothing, including outer and under garments, hats, boots, and shoes, overalls and the like, at a cost of $45; that is to say, within this sum may be included one-third part of the wear of a best overcoat, of a best pair of shoes, and of a best suit of clothes for Sundays and holidays; also a good, warm woolen suit for every day wear, at a cost of $8.50, to be used up in the year, and all other necessary articles of good quality. If the man cannot afford $45 per year, he may dispense with a best overcoat; and if he be willing to wear very durable satinet garments in winter, he can save from $5 to $8 on the $45. A very warm and durable suit of satinet can be purchased for $5.50. None of these garments will be of the so-called "slop-shop" order, made at starvation wages by poor sewing women. The fabrics will have paid a profit to the mill owner; the making of the garments will have been profitable to the clothier; the cutters will have earned $15 to $20 per week, and the shirt makers $10 to $12 per week. And the sewing of the woolen garments will have been done in the farm houses of New England, bringing to the wives and daughters of the household a little money income where it is most needed.

3. Food. A very economical kind of life is thus far simple and easy. The difficulty arises the moment we touch the question of food. To the working classes—again using this phrase in its narrowest sense—one-half the price of life consists in the price paid for food.

From the best information which can be obtained, the price of an adequate supply of food served in the ordinary way, either in boarding houses or in workmen's families, is from 20 cents to 30 cents a day for the mere cost of the materials. How much is wasted in bad cooking after the materials are bought, each reader can imagine for himself. The average cost of the materials in the cities of the East is not far from 25 cents per day. On a larger scale, the inmates of the jails of Massachusetts are supplied with food in a perfectly nutritious and suitable manner, the food being of excellent quality, at a cost for materials of from 13 cents to 15 cents a day.

Probably no single man or woman in Boston or New York could obtain at any restaurant, or at any cheap boarding house, a suitable supply of nourishing food, well cooked, at a cost of less than 30 cents or 35 cents, probably more. In some of the factory towns, like Lowell, mill operatives who have their rooms elsewhere, but who get their meals in the factory boarding houses, are served with good, nutritious meals, three times a day, at $1.60 to $2.50 a week, or from 28 cents to 35 cents per day. But in these cases the houses in which the meals are served belong to the factory corporations, and yield little or no rent.

It would therefore seem to be difficult for a single man, after having expended $120, viz., for rent $50, clothing $45, washing $15, and heating say $10, to obtain an adequate supply of food without coming to the ordinary rule of spending as much for food as for all the rest of his subsistence, or at least $120 to $150. But yet even this supply involves a very great waste if the daily ration be considered in respect to the absolute nutrition required.

The science of nutrition is now being investigated in the most thorough manner, especially in Germany, where the utmost economy has become necessary in order that there may be food enough to go around. What are some of the results? Assuming that the average expenditure of working people is 25 cents a day for food material for each adult, it can be conclusively proved that a sufficient and appetizing daily bill of fare can be served at one-half this cost in Boston to any one who knows what to buy, how to buy it, and how to cook it. This method would imply to a large extent the substitution of the stew pan for the frying pan, of oatmeal, farina, and the like for pale pie and doughnuts, and of good, well-made bread, like that which is sold in New York by the Howe National Bakery at 3 cents a pound, for dyspeptic biscuit served hot.

The trimmings of the best joints of meat are now thrown into a scrap heap, and sold in every market at from ¼ cent to 1 cent a pound, to be rendered into fat. I am assured by a market man in our principal market here that enough good meat is wasted every day from that market to feed 1,000 people or more. Of course, when people become intelligent enough to make a selection from this food which is now wasted, the price may rise in some measure. But when that which is now wasted is substituted for sirloin and rump steak, the price of the best cuts may be reduced. This is the reason why the best cuts even of American beef are cheaper in London as compared with the prices in New York and Boston. The English know how to make use of the coarse parts of beef and mutton much better than we do. The average of the whole beast is higher in price in England than it is here. We pay the highest price for what we call the best part, and we waste the rest, or else it is sold at a small price to the keepers of the jails, to be served to persons in a form which makes it better food than three-quarters of the workingmen outside the jails can secure for a much higher cost. I have myself purchased this good meat, which is now wasted, at 1 cent a pound, in parcels of ten pounds, at which price the market man said he would select any quantity at any time. Adding to this ten pints of water, with suitable seasoning, I have made a rich and nutritious bouillon. Rejecting the bone and leaving the stewed meat in the broth, ten pounds remained of very nutritious and appetizing food, at a cost not exceeding 12½ cents for the ten pounds of food, including the fuel with which it was prepared. It was cooked in an airtight vessel surrounded by hot water. In the same vessel—a pine box—in which this bouillon was prepared there were cooked at the same time seven pounds of solid beef in another vessel and two pints of oatmeal in four pints of water, making in all about twenty-five pounds of food material thoroughly cooked with 1 cent's worth of kerosene oil burned in a hand lamp.

In a smaller vessel of the same kind, three pounds of solid meat can be thoroughly cooked in its own juice in one hour and a quarter, with ¼ cent's worth of oil burned in a common lamp, which may also serve the purpose of lighting the room while the cooking is going on.

The singular merit of this apparatus is that a very ample supply of food for a large family may be put into the various receptacles at night, the lamp may then be lighted, and in the morning everything will be ready to be served. In this method no overcooked food is possible. After the chemical changes caused by heat are accomplished, the further effect of the application of heat is merely to keep the food hot, or to render it more tender if it be tough meat. The walls of the vessel being non-conducting, the food will keep hot for many hours after the lamp is extinguished.

If this apparatus proves as useful in common practice as it appears to be in what I may call my cooking laboratory, a difficult question may perhaps have been solved. Given this or some other cheap application of fuel to the conversion of food, and it is entirely possible to buy an ample and nutritious ration, in considerable variety, in the city of Boston, at not exceeding 7 cents a day, and to prepare it for use within 8 cents a day.

At 14 cents a day, a day's ration may cost, in round figures, $1 a week, or $52 a year, and consist of one-half to three-quarters of a pound of good meat, three-quarters to one pound of bread, one-half to one pound of potatoes or some other vegetable, one-half pound of oatmeal, one-half ounce of butter, one ounce of sugar, a large bowl of tea or coffee with a spoonful of condensed milk, an orange, an apple, or some dried fruit.

Add 1 cent's worth of kerosene oil for cooking, all but the bread, which must be baked elsewhere, and we have food and fuel for cooking it at $1 a week. This economy is possible in what may be called laboratory practice. How long will it take to make it common practice? How long will it take to alter the taste of the people from fried food and hot biscuit to stewed food and sound bread? If this can be done, as it now seems possible, the price of a well-conditioned life in the city of Boston for food, shelter, clothing, fuel, and laundry may be covered by the sum of $172, leaving within the limit of $200 a year $28 for sundries or luxuries.

Either in this way or by way of combinations on a more moderate scale, like the "commons" table at Harvard College, at a less price, the price of life may be brought within a very small sum. The waste of food appears to require more attention than any other economic question that is presented to us at the present time, and, as was suggested at the outset, the true labor reform movement might well consist in teaching the workman how to help himself to get a good subsistence for less money than he now spends for a poor one. The price of food is half the price of life, and half the price of food is wasted for want of knowledge how to buy it and how to cook it. Five cents a day saved per capita would come to over $1,000,000,000 a year. Do we waste a thousand million dollars' worth a year or not? This problem was better comprehended by our Puritan ancestors than by their descendants or by our adopted citizens. How to get a good living out of small resources has become almost a lost art.—*Bradstreet's.*

Carbonic Acid and Steam Reaction.

In a paper by A. Naumann and C. Pistor on "The Reaction between Carbonic Oxide and Steam"—*Journal of the Chemical Society*—experiments are described, made with a view of ascertaining the temperature at which carbonic oxide and steam react to form carbonic anhydride and hydrogen. The method consisted in passing carbonic oxide, freed from carbonic anhydride and oxygen, over water heated at 80 degrees, so as to obtain an approximately equimolecular proportion of carbonic oxide and vapor of water. The mixed gases were passed through a porcelain tube, the temperature of which was roughly determined by introducing into it certain salts or spirals of various metals; the resultant gas was then analyzed by the usual methods. The following results were obtained: At 560 deg. no reaction took place, at 600 deg. 2 per cent, at 900 deg. 8 per cent, and at 904 deg. 10·5 per cent of the carbonic oxide was converted into carbonic anhydride. All the conditions which militate against a reaction between carbonic anhydride and hydrogen are favorable to that between steam and carbonic oxide, inasmuch as such a change would be exothermic— +10,720 cal.— and the resultant carbonic anhydride is very stable at high temperatures, while the steam is readily decomposed into hydrogen and oxygen, the latter of which can burn the carbonic oxide.

Frosting Brass Work.

Boil in caustic potash, rinse in clean water, and dip in nitric acid till all oxide is removed; then wash quickly, dry in boxwood sawdust, and lacquer while warm. This will give brass an ornamental finish.

Bacteriotherapy.

"Bacteriotherapy" is the designation appropriated for a new method of treatment introduced by Professor Cantani, based upon the recognized phenomenon of the "crowding out" of one species of microorganisms by another better suited to the prevailing conditions (*Brit. Med. Jour.*, Aug. 29, p. 403). In a first experiment, daily inhalations of *Bacterium termo*, an organism assumed to be harmless, on the strength of experiments on animals, were administered to a patient suffering from tuberculosis, through the medium of a culture in gelatine diluted with meat broth and diffused by an ordinary spray producer. Professor Cantani reports that the tubercle bacilli in the sputum gradually became fewer, being replaced by the bacteria, and in less than a month had disappeared altogether, the sputum being no longer capable of conveying tuberculosis to animals. Meanwhile the patient had gained flesh and improved in every way. It is admitted that, outside the body, these bacteria do not always so successfully dispose of the tubercle bacilli, and that the two kinds of organisms even sometimes occur together in tubercular cavities; but the explanation suggested is that in the case reported the bacteria were introduced in large quantities and probably in a vehicle more favorable to them than to the bacilli. Does this foreshadow a recrudescence of contributions to the official materia medica from the animal kingdom?—*Pharmaceut. Journal.*

The Palace at Jeypore.

Mr. Sala has had the good fortune to visit the Great Palace of Jeypore, and writes about it thus in the London *Telegraph:* Seven stories of such wild and lovely structure as you would expect to see only in dreams rise here one above the other in rose red and snowy white balconies, oriels, arches, pilasters, lattices, and domes—gay everywhere with frescoes and floral ornaments. In this lowest floor, which is kept —like the second and third—as a winter residence, we are permitted to inspect a priceless volume, the abstract of the Mahabharata, in Persian, made by the orders of Akbar the Great at a cost of £40,000, and illustrated in the most exquisite manner with colored and gilded miniature pictures of an incredible delicacy. The Shobha Newas, floor above, is full of strange paintings on the wall, and arcades embellished with gorgeous shells of copper, silver, and foil. Next we ascend to the Cnhabl Newas, or "hall of splendor," shining with polished marbles and colored enameling. Above this is the Shish Mahal, the pavilion of glass, with endless patterns wrought in little mirrors let into carved plaster work, and above that we step forth upon the Mokt, or "crown," of the palace, where the vast flat roof is encircled with shady alcoves and open chambers, vaulted by graceful curved cupolas. Beneath lie the green palace gardens, full of pomegranates, palms, and bananas; and beyond, the spread of the countless busy streets and lanes, girdled by the walls, and overhung by the encircling hills, topped with forts and temples. It is vain to attempt any description of that enchanting prospect, more absorbing than any which India herself can offer. Nature and man have here allied themselves to produce the most perfect and lovely landscape conceivable. In green and gold, in rose color and white, in distant, dim blues and grays, the gardens and the city, and the far off walls and mountain ridges of amber, group together at our feet—a picture to delight the eye and feast the mind. But how can words reproduce Govinda's temple, between the upper and lower gardens; the snow white sides of the Badal Mahal, or "Cloud Palace," on the edge of the lake; the dark ramparts of the fortress in the mountains, and those long lines of rose red streets which intersect Jeypore? To complete the rich colors of the scene, a feast is being given to Brahman men and women on one of the many flat roofs of the upper palace, and attendants go about bearing the Maharajah's bounty in the form of cakes and sweetmeats amid some three or four hundred men and women clad in holiday dresses of crimson and purple, saffron and blue, glittering like flowers in the sun, which shines upon the "City of Victory" as if its people were indeed his children. Whoever has viewed that prospect from the palace roof of Jeypore has seen India in her inmost grace and beauty.

The Zinc Architectural Works.

On the night of March 5 the entire stamping department of the Zinc Architectural Ornament Works of Messrs. Bakewell & Mullins, at Salem, Ohio, was destroyed by fire. The plant will be replaced at once, and orders filled as promptly as circumstances permit.

Soda Lakes in Wyoming.

A newspaper published at Laramie with the significant title of the *Boomerang*, referring to a recent article in the SCIENTIFIC AMERICAN on the manufacture of soda at Owen's Lake, Cal., says that if the right kind of men, with plenty of energy and abundant means, were to take hold of the business in Wyoming Territory, they would find their reward. The writer affirms that in this Territory, Nature has done all that she could to save man trouble. Here there is no necessity for portable engines or for vats. It is not necessary to wait a year in order to gather a crop of soda. Not only have we a cluster of lakes of the solid stuff within two hours' drive of Laramie, and with a railroad running directly to their banks from this city, but similar lakes are found in various parts of Wyoming. No pumping or settling is required, the soda gathers itself and solidifies like ice. All that is necessary is to dig it out with a pick and shovel, haul it to the chemical works in this city, and work it up. The soda plant at Laramie has been greatly enlarged and improved during the past winter, and will now have a capacity one-third greater than it was originally designed for, yet it will not handle one-third of the yield of lakes on the Laramie plains. Thus far only one of these lakes has been drained and worked. There are two larger lakes, either one of which would keep a plant as large as that in Laramie going the year round, and in all the supply is inexhaustible, the deposits being constantly built up from some underground basin; but these lakes are not so extensive as others in the Territory which have not as yet been touched.

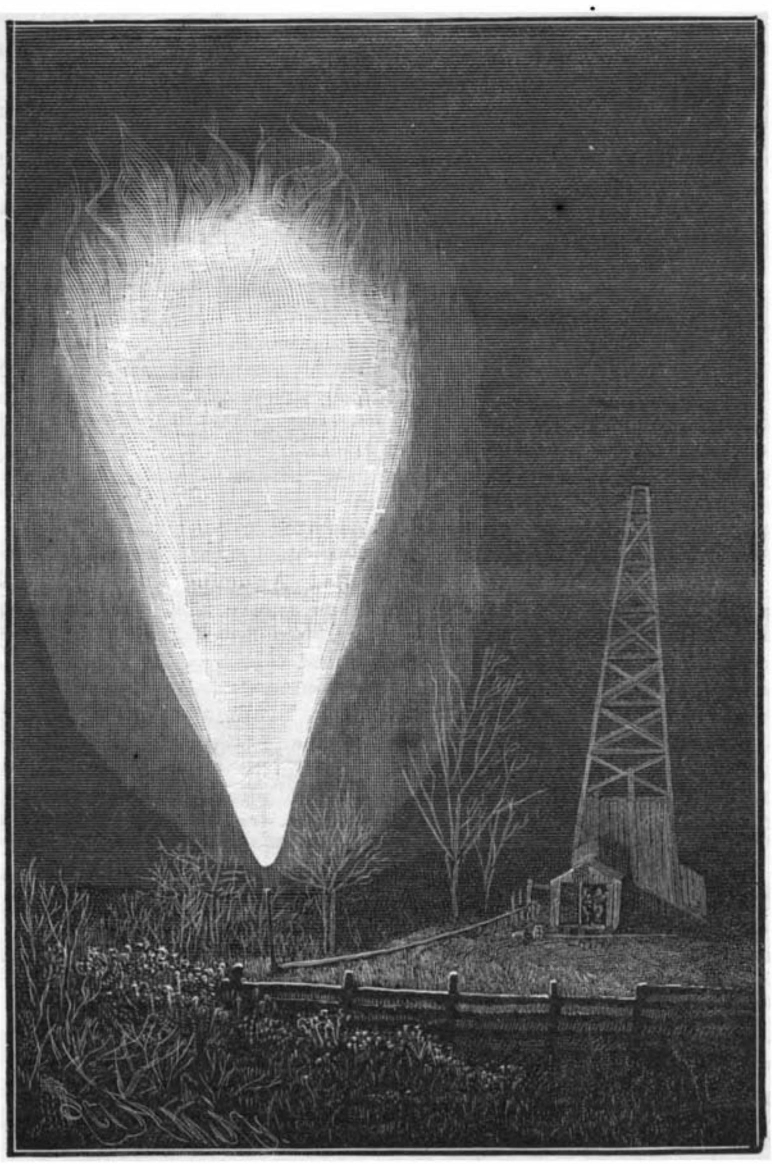
Natural Gas at Narrowsburg.

The existence of natural gas at Narrowsburg was discovered in a curious way by Dr. L. A. Winslow, in 1856. He was spending the summer at the Murray House, in that village. The Delaware River at that place forms into a deep and wide lake-like body known as Big Eddy. On the Pennsylvania side of the eddy there is a whirlpool so strong that frequently rafts are drawn into it and kept whirling about for hours and sometimes days before they can be turned into the channel again. One day Dr. Winslow was rowing on the eddy. After lighting his pipe he threw the match, still blazing, into the river. Instantly a blaze started up in the water where the match had dropped. It burned with a faint blue light, and finally went out. Then, for the first time, Dr. Winslow noticed that many bubbles were floating about on the water, and that they appeared frequently, coming quickly up from under the surface. The Doctor, being something of a geologist and scientist, knew at once that the bubbles were made by a gas that must come from the ground or rocks at the bottom of the river, and that the gas was inflammable. He touched a match to several of the bubbles, and each one responded with a blaze. At night he illuminated the entire eddy with these miniature natural bonfires. Dr. Winslow sounded the eddy, and found that in places the water was ninety feet deep, with a rocky bottom, and at some places he could find no bottom at all. His theory was that the rocky bottom was filled with crevices of unknown depth, and from them gas issued and found its way to the surface, forming the constantly appearing and disappearing bubbles.

In the mud along the shores of the eddy, and on islands of similar formation, this gas also found its way from the depths to the surface. Dr. Winslow inverted a barrel with one head out over a spot on the New York shore where the gas came up out of the ground. He placed a small pipe in the other end of the barrel, and in a short time collected enough gas in the barrel to make a strong and brilliant flame at the end of the pipe when ignited, which burned steadily night and day.

A NATURAL GAS WELL.

The accompanying engraving is from a photograph of the mammoth Karg well at Findlay, Ohio. The photograph was taken by night, and the enormous height reached by the flame may be judged by contrast with the derrick in the background. The capacity of the well is estimated at forty million cubic feet per diem.



THE KARG NATURAL GAS WELL AT FINDLAY, O.

Taking Down an Iron Mast.

An interesting and very difficult mechanical feat was performed in Akron recently, in the taking down of an iron electric light mast 213 feet in height above ground. The mast was composed of fifty-five sections of boiler plate, each fifty inches in length and varying in thickness from one-half inch at the base to three-eighths inch, five-sixteenths inch, one-fourth inch, and at the top three-sixteenths inch. The diameter at the base was three feet, and at the top eight inches. The entire weight of the plate removed was eight tons. A change in the system of street lighting led to the abandonment of the mast, and the contract for taking it down and removing it was given to the Buckeye Machine Company, of Cleveland, whose efficient general manager and engineer, Mr. Ludwig Herman, had charge of the work. From the outset—the mast itself being bent out of plumb and in a dangerous condition—the task presented numerous and trying difficulties, but careful calculation, coupled with cool-headedness and superior engineering skill, were adequate to successfully grapple them all. The method of removal, briefly, was this: Around the lower sections of the mast, to a height of twenty feet, a staging was erected. This was composed of uprights 8"×8", caps 10"×10", sills 8"×8", braces 2"×10," and struts 6"×6," all securely bolted together. From this staging, by means of chain blocks and swivel rods and peculiarly shaped hooks which took hold under the lap of the successive sections, the mass was suspended while the work of cutting the rivets and removing the sections was carried forward. The hooks in question were held in place by an adjustable band three inches in diameter. After cutting away the lower sections, the whole mast was lowered four inches at a time, the hooks shifted to the lap above, and the lower section cut out again. In this way the work proceeded, the mast being held by ten guys, the manipulation of which required the utmost skill and patience. At one time, during an adverse wind, the top of the mast swayed fifteen inches out of line, but close watching and careful management averted all accidents, and the entire task was successfully completed in a remarkably short period of time. For the first three days one section each day was removed; then three, five, and twelve, and on the last day, twenty-seven.—*Iron Trade Review.*

Petroleum in New Mexico.

The report that an artesian flow of petroleum had been discovered in the southern part of Santa Fe County, New Mexico, between the mining villages of Golden and Wallace, has been confirmed, and samples taken to the capital and tested. The oil flows through tubing fifty-five feet down, and the flow is reported to be copious and steady. The crude oil burns freely and with a good flame. Several claims have already been located in the neighborhood of the well.

To Remove Nitrate of Silver Stains.

The following is suggested by Mr. George R. Underwood: Dip the fingers into a strong solution of cupric chloride. In about a minute the silver will be converted into chloride, and may then be washed off with hypo.