Ergotinine (Tanret's).

Upon request of the Pharmacological Institute of Strassburg, Gebe & Company have made many attemps to prepare this alkaloid, to which the oxytoxic effects of ergot are ascribed, and have at last succeeded. It is a substance which is very readily decomposed, being quickly altered by alkaline reagents, or even by a moderately elevated temperature. It soon assumes a red-brown color. Dr. Kober, of Strassburg, writes to Gebe & Company in respect to it as follows:

"You can scarcely realize how you have delighted my pharmacological heart by your ergotinine, for its action is most extraordinarily strong, and such as I never have attained in my own experiments. Frogs are placed by one-twentieth milligramme into a deep toxic condition, which is remarkable by its close resemblance to that produced by veratrine, inasmuch as the muscles—although promptly contracting—require from four to six hours for again relaxing. This peculiar condition lasts many days. A few milligrammes administered to Guinea pigs produce a condition resembling strychnine poisoning, inasmuch as they exhibit convulsive twitchings of the legs and dyspnœa, and finally die from paralysis. The intoxication may be very nicely studied in rabbits, which are affected already by injections of one-tenth milligramme into the circulation. At first the cardiac plexus is excited, then follows a stage in which the blood pressure is increased. This discovery is of the *greatest importance*, since it has been suspected, for the last twenty years, that ergot increases the blood pressure and thereby acts upon the uterus. Larger doses diminish the blood pressure in rabbits permanently, produce cramps lasting for hours, and cause death by asphyxia. It is remarkable that the alkaloid has no effect upon chickens, although the latter are very easily affected by ergot, and may be killed by feeding three times with ten grammes of the crude drug."

The hypodermic dose of the substance is ten to twenty drops of a solution containing one milligramme in one cubic centimeter.

This preparation, says *New Remedies*, is the *most expensive* drug so far quoted, since at lowest rate it must be put at 200 marks (50 dollars) per gramme (or 3⅓ dollars per grain, over $1,300 per ounce). Yet even this price is seven and one-half times *lower* than that charged by the French manufacturer, namely, 1·50 marks (36 cents) for one milligramme in solution.

CHEMICAL VAPORIZER AND DEODORIZER.

Our engraving shows a compact and portable apparatus for the radical destruction of sewer gas, foul air, and fungous germs in the atmosphere. This device practically applies the latest scientific discoveries of Prof. Robert Koch, and others, on treating by inhalation diseases caused by germs of sewer fungoid, for continuously charging the air with chemicals which produce artificially any desired atmosphere considered essential by physicians, for the prevention or treatment of diseases.

This apparatus enables practitioners to administer by inhalation active volatile drugs during the night, bringing within the range of curable complaints several fatal diseases which have heretofore resisted scientific treatment.

The apparatus consists of a small case containing the vaporizing cylinders and a spring acted fan which draws in air and forces it through the cylinders containing the remedial or disinfecting agent.

The air thus charged is poured into the apartment in a continuous stream.

The vaporizer demands but little attention, and the chemicals used are inexpensive. All of the formulas or drugs recommended for use with the apparatus are furnished prepared for immediate use.

As the vaporizer makes no noise it can be put in the sleeping room, or it may be placed on a bracket in the hall on the floor occupied as sleeping apartments.

For the use of hotels and office buildings, a large chemical vaporizer, capable of supplying the entire building, is placed in the basement. Connecting pipes leading from the generator carry the vapor to the ice boxes, supply rooms, water closets, halls, sleeping rooms, and other locations.

This apparatus may be employed in diffusing grateful and invigorating perfumes, as well as the remedial and disinfecting agents. If desired, a double effect may be secured by charging the cylinders with different agents. The apparatus seems well adapted for the rational treatment and prevention of zymotic diseases.

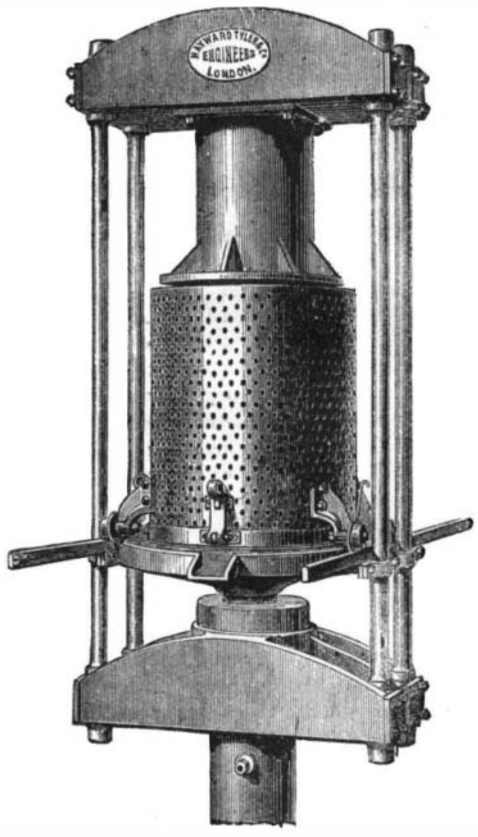
Further information may be obtained by addressing the Chemical Vaporizing and Deodorizer Co., 94 Greene Street, New York city.

MORITZ GROSSMAN, in his Year Book for 1883, gives the following recipe for cementing rubber or gutta-percha to metal: Pulverized shellac, dissolved in ten times its weight of pure ammonia. In three days the mixture will be of the required consistency. The ammonia penetrates the rubber, and enables the shellac to take a firm hold, but as it all evaporates in time, the rubber is immovably fastened to the metal, and neither gas nor water will remove it.

IMPROVED HOP PRESS.

Various presses have been contrived at different times for extracting the wort from spent hops, but as a rule the objections to them have been their very complicated character and consequent expense.

The press here illustrated is fitted with two circular wrought-iron boxes, holding about six bushels each, which are filled and pressed alternately, and are arranged to run in and out of the presses on wheels and rails. The pressed hops are discharged from the bottom of the press, which opens downward like a door, and can be run into any suitable receptacle, or through a chute into the yard. One of these new hop presses has just been constructed for and fitted at Messrs. H. & G. Simonds' Brewery at Reading, and has proved highly successful. The pump which works the hydraulic press is driven by a strap from the main shafting, so that the attendant has nothing to do but open and close the valve; but the pump can also be made to work by hand.



IMPROVED HOP PRESS.

DR. HUBBARD'S CHEMICAL VAPORIZER AND DEODORIZER.

Destruction of Steam Boilers.

The Dusseldorf Society for the Supervision of Steam Boilers consider the following to be the chief causes of the destruction of steam boilers:

The corrosion of steam boilers on the outside is principally due to the action of the heating gases and of the moist masonry. The products of combustion very frequently contain sulphurous acid, which in contact with moisture is gradually converted into sulphuric acid, and as such corrodes the iron. The moisture of the brick work causes direct rusting. With regard to interior corrosion, the following points are to be noted:

When an upper and a lower boiler are used, the feed water is let into the latter, which the fire gases reach last, and therefore is not so hot as the other. It is often noticed that the separate plates of this boiler are pock-marked with little grooves. When fresh water containing air is warmed, little bubbles of air containing much oxygen form, and as there is very little motion in this part of the boiler, they adhere to any rough spots on the iron and are destructive to it. It is easy to see that rough iron is attacked more readily than smooth; and of course, the action is most powerful in the grooves themselves. If steam bubbles attach themselves to any spot whatever in a steam boiler, where the temperature is not very high from its being heated with hot gases only, rusting will take place. Here too the atmospheric air in the feed water would be the destructive agent.

Hence, if care is taken to keep the water in motion circulating around in the boiler, the chief cause of internal corrosion will be for the greater part neutralized.—*Polyt. Notiz.*

Detection and Estimation of Lactic Acid.

R. Palm says that when lactic acid is added to a clear or slightly opalescent solution of basic acetate of lead, *i. e.*, acetate of lead mixed with five or six parts of alcoholic ammonia, a white amorphous precipitate of plumbic lactate will be immediately formed.

The same precipitate is produced when acetate of lead is added to a mixture of lactic acid and alcoholic ammonia. The precipitate is soluble in a large quantity of water, in acetic acid, lactic acid, and caustic alkali, but insoluble in alcohol, and must therefore be washed with alcohol. It dries to translucent scales like dextrine. After heating with fuming sulphuric acid and igniting, it left behind 79½ to 77½ per cent of oxide of lead, so that its composition corresponds to a basic salt having the composition

$$3PbO,2C_3H_6O_3,$$

which requires 78·8 per cent of oxide of lead.

Lead for the Examination of Drying Oils.

The lead is obtained by precipitating with slips of zinc a 10 per cent solution of lead nitrate acidulated with a few drops of nitric acid. The precipitate obtained is agitated for a few moments with distilled water, washed by decantation two or three times; thrown into a funnel plugged with glass wool, washed quickly, first with alcohol and then with ether, and dried in a vacuum over sulphuric acid. To expel traces of ether, it is lastly exposed to the air in thin layers for about two hours.

For the examination of an oil, one gramme of the lead is spread out in a rather large watch-glass, and the oil in question is allowed to fall drop by drop from a pipette drawn out to a point, placing the drops in such a manner that a space may remain between them. The lead gradually sucks up the oil, so that every fragment is coated with an excessively thin film of oil. If the oil has been added in too great quantity it forms a thick coating, which dries at the surface, and forms a solid pellicle, which protects the lower part.

About 2 parts of oil at most should be used for 3 parts of lead. The watch glass should have been first tared; the lead is then weighed, and afterward the oil added. The watch glass is then exposed to a mean temperature and to full light, which materially aids oxidation. With drying oils the increase of weight sets in after about eighteen hours, and is generally at an end after three days, when it remains constant.

With non-drying oils the weight generally does not begin to vary until after four or five days. Numerous series of experiments have shown the following numbers as the limits of the increase of weight of oils in presence of finely divided lead: Linseed, 14 to 15·5 per cent; nut, 7·5 to 8·5; cotton, 5 to 6; beech nut, 4 to 5 per cent. The non-drying oils give an increase of weight from 1 to 3 per cent, and it is only after the lapse of some months that we find an increase of 4 to 5 per cent.—*A. Livache.*

The Petroleum Fields of the World.

The relative importance of the oil fields of the world are succinctly stated as follows, in the July *Century*, by E. V. Smalley, in his graphic and fully illustrated article on "Striking Oil:" "Nearly all the petroleum that goes into the world's commerce is produced in a district of country about a hundred and fifty miles long, with a varying breadth of from one to twenty miles, lying mainly in the State of Pennsylvania, but lapping over a little on its northern edge into the State of New York. This region yielded, in 1881, 26,950,813 barrels, and in 1882, 31,398,750 barrels. A little petroleum is obtained in West Virginia, a little at various isolated points in Ohio, and a little in the Canadian province of Ontario. There is also a small field in Germany, a larger one, scantily developed, in Southern Russia, and one still larger, perhaps, in India. The total production of all the fields, outside of the region here described, is but a small fraction in the general account, however. Furthermore, the oil of these minor fields, whether in America or the Old World, is of an inferior quality, and so long as, the great Pennsylvania reservoir holds out, can only supply a local demand in the vicinity of the wells."

Boring an Oil Well.

A letter from Bradford, Pa., to the *Drug Reporter* gives a very clear description of the above operation as follows:

The machinery used in boring one of these deep oil wells, while simple enough in itself, requires nice adjustment and skill in operating. First comes the derrick, sixty feet high, crowned by a massive pulley.

The derrick is a most essential part of the mechanism, and its shape and height are needed in handling the long rods, piping, casting, and other fittings which have to be inserted perpendicularly. The bore or drill used is not much different from the ordinary hand arm of the stone cutters, and the blade is exactly the same, but is of massive size, three or four inches across, about four feet long, and weighing 100 or 200 pounds. A long solid rod, some thirty feet long, three inches in diameter, and called the "stem," is screwed on the drill. This stem weighs almost a ton, and its weight is the hammer relied on for driving the drill through dirt and rock. Next come the "jars," two long loose links of hardened iron playing along each other about a foot.

The object of the jars is to raise the drill with a shock, so as to detach it when so tightly fixed that a steady pull would break the machinery. The upper part of the two jars is solidly welded to another long iron rod called the sinker bar, to the upper end of which, in turn, is attached the rope leading up to the derrick pulley, and thence to a stationary steam engine. In boring the stem and drill are raised a foot or two, dropped, then raised with a shock by the jars, and the operation repeated.

If I may hazard a further illustration of the internal boring machinery of the well, let the reader link loosely together the thumbs and forefingers of his two hands, then bring his forearms into a straight line. Conceiving this line to be a perpendicular one, the point of one elbow would represent the drill blade, the adjacent forearm and hand the stem, the linked fingers the jars, and the other hand and form the sinker bar, with the derrick cord attached at a point represented by the second elbow. By remembering the immense and concentrated weight of the upright drill and stem, the tremendous force of even a short fall may be conceived. The drill will bore many feet in a single day through solid rock, and a few hours sometimes suffices to force it fifty feet through dirt or gravel. When the debris accumulates too thickly around the drill, the latter is drawn up rapidly. The debris has previously been reduced to mud by keeping the drill surrounded by water. A sand pump, not unlike an ordinary syringe, is then let down, the mud sucked up, lifted, and then the drill sent down to begin its pounding anew. Great deftness and experience are needed to work the drill without breaking the jars or connected machinery, and in case of accident there are grapples, hooks, knives, and other devices without number, to be used in recovering lost drills, cutting the rope, and other emergencies, the briefest explanation of which would exceed the limits of this letter.

The exciting moment in boring a well is when a drill is penetrating the upper covering of sand rock which overlies the oil. The force with which the compressed gas and petroleum rushes upward almost surpasses belief. Drills, jars, and sinker bars are sometimes shot out along with debris, oil, and hissing gas. Sometimes this gas and oil take fire, and last summer one of the wells thus ignited burned so fiercely that a number of days elapsed before the flames could be extinguished. More often the tankage provided is insufficient, and thousands of barrels escape. Two or three years ago, at the height of the oil production of the Bradford region, 8,000 barrels a day were thus running to waste. But those halcyon days of Bradford have gone forever. Although nineteen-twentieths of the wells sunk in this region "struck" oil and flowed freely, most of them now flow sluggishly or have to be "pumped" two or three times a week.

"Piping" and "casing," terms substantially identical, and meaning the lining of the well with iron pipe several inches in the interior diameter, complete the labor of boring. The well, if a good flowing one, does all the rest of the work itself, forcing the fluid into the local tanks, whence it is distributed into the tanks of the pipe-line companies, and is carried from them to the refineries. The pipe lines now reach from the oil regions to the seaboard, carrying the petroleum over hill and valley hundreds of miles to tide-water.

A Historical Expedition.

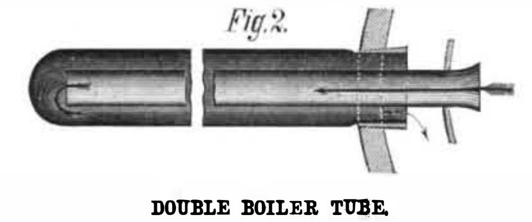
Professor Nordenskiöld's present expedition to the northern regions is not connected with ordinary polar researches, as his efforts will be mainly devoted to attempts to reach the interior of Greenland, the coast of which presents a forbidding wall of "icy mountains," as designated in Bishop Heber's hymn, "From Greenland's Icy Mountains." The professor believes that the interior of Greenland is not only habitable, but measurably fertile. As a supplement to his interior explorations, Nordenskiöld will seek on the southeast coast for relics of the old Norse colonies which were founded in the eleventh century, and which gradually passed into oblivion after a historical existence of several hundred years, their principal records being found in the Icelandic sagas, and a memory of them in occasional historical references. The poet Montgomery, in one of his longer poems, gives a semi-historical account of the Greenland settlements and their destruction based on the theory of a cataclysm of intense cold.

[Translated from the REVUE INDUSTRIELLE.]

RADIAL TUBULAR BOILER, BY L. HERVIER.

The engravings represent a unique steam boiler, in which the tubes are exterior to the boiler proper, and are double, providing an annular space around the central tube for the action of the heat, and also an annular space between the double walls of the boiler, the actual generation of steam taking place in the tubes and the annular chamber, the upright cylinder, corresponding to the upright boiler in general use, being mainly a water receptacle.

Fig. 1 shows the boiler, with a portion of its enveloping masonry removed to exhibit the tubes. The upper portion



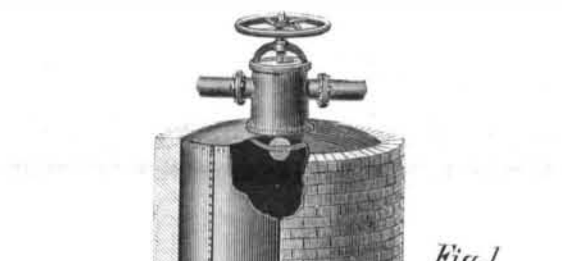
DOUBLE BOILER TUBE.

of the figure is a steam dome, from which steam is taken for use, and to which the safety valve and steam gauges are attached.

The lower portion, or the boiler proper, is double, the exterior walls receiving a large number of tubes, shown in section in Fig. 2, which project radially into the flame space of the furnace. These tubes are open at the boiler end, and closed at the outer end, and are secured firmly in the shell of the boiler by means of conical rings, as seen in Fig. 2.

The inner concentric shell is also pierced for tubes of a smaller diameter, which project into the closed outer tubes, and are open at their ends. These are fastened by being expanded at their inner ends in the usual way. The arrows in Fig. 2 show the course the water takes in its expansion by heat. It passes from the interior cylinder through the small tubes into the annular spaces surrounding them, and back through the larger tubes to the annular space between the outer and inner shells of the upright boiler or cylinder.

The inventor says that the projecting tubes, being exposed to the direct heat of the furnace, soon bring the boiler under pressure, even when it is filled with a large amount of



HERVIER'S TUBULAR BOILER.

water, because the steam does not pass through the body of the water in the interior of the boiler; but the mixture of water and steam which fills the annular envelope is less dense than that of the central portion, and as a result the steam rises in the annular space very rapidly, the water being displaced and drawn through the smaller internal tubes, as seen in Fig. 2.

This circulation is quite regular, and it favors the production of steam, and it hinders the deposition of scale, compelling it to settle through the body of cooler water to the bottom of the cylinder, whence it may be removed by a convenient hand hole.

The Refuse of Furnaces for Building Purposes.

On the utilization of the refuse material from blast furnaces for mortar for building purposes, Mr. W. Mattieu Williams, F.S.A., relates some interesting experiences. It is far from a new idea to make a conglomerate from the slag of a furnace for building purposes, and Mr. Williams thinks he has heard of its use in finer work, and he concludes from the chemical nature of the cinder heaps found around furnaces that their composition renders them well suited for many purposes where lime mortar is now used.

The slag refuse is composed of silicates of lime and alumina, intermingled with silicates of iron, manganese, and magnesia in variable proportions. When the silica is in excess they are glassy; when the proportion of lime is greater they are earthy. These earthy cinders pulverize spontaneously, and are those which, I believe, have been used directly for cement; but I should expect the best result from the glassy cinders (or "slags," as they are improperly called), as these contain sufficient silica to combine actively with the lime of mortar and thereby harden efficiently.

While on the subject I may mention a little device which I adopted in building the brickwork setting for the retorts, premising, however, that I began at this work quite as a novice, a purely amateur builder. At first I contracted in the usual manner with the bricklayer, at so much per cubic foot measured all over, I finding all materials, he only doing the work. The work was badly done in spite of all my vigilance, and the discharging of three or four bricklayers in succession, the fault being that the bricks were not laid closely enough, and the thick joints of mortar crumbled when the whole structure was heated. At last I found a remedy for this which was very simple. Instead of finding *all* the materials I only found the bricks, leaving the contracting workman to supply his own mortar, and of course paying him accordingly. The difficulty of making each brick to rest in firm contact with its neighbor with no more mortar between each than was necessary for filling up inequalities of surface, immediately disappeared.

Ready-made Houses.

The *Northwestern Lumberman* (Chicago) predicts, from the large number of inquiries regarding the ready-made house business, that it will eventually become a large industry and consume a large amount of lumber.

A gentleman visited the *Lumberman* office recently who wanted from twenty-five to fifty houses for a colony that is about starting to Dakota. Such houses for the people settling in that territory, and often in other sections, are just what is needed. In many parts of Dakota it is impossible to buy lumber, and often when lumber can be obtained the services of a carpenter are hard to secure. A ready-made house can be shipped to its destination and erected by any man of ordinary ingenuity. It saves all bother of running around the country after building material and men to put it together. A gentleman called at the office of the same paper a few days ago who wanted a house to set up on a lot in the city limits. He could rent the lot during the summer for a small sum, and thus avoid paying big rent, and at the same time have a house of his own to live in that could be handily moved whenever it was desired to do so. A late inquiry from Philadelphia was made regarding ready-made houses for export, and the same day came letters of inquiry relating to the same subject from West Virginia and New York. These letters, and hundreds of others, show that the ready-made house business is not carried on extensively enough to meet the demand. There is no good reason why a manufacturer of knock-down houses should not use 100,000,000 feet of lumber yearly in this city alone.

The Chicago Cable Roads.

By the courtesy of Superintendent Holmes your correspondent was allowed to examine the cable system of street railroads in operation at Chicago. There are four lines operated from the station on State Street, and one branch line on which the cars are moved by horses after leaving the cable. The cables enter the station at right angles from the street and pass around the driving drums, of which there are two of fourteen feet diameter for each cable. The drums are geared directly to a shaft operated by two engines of 1,000 horse power each, moving the cables at a speed of seven and eight miles an hour. The cables run over rollers in the tube laid between the rails, and are raised about eight or ten inches by the clutch when griped. This causes a slackening and tightening of the cables, and requires an automatic take up of the slack. For that purpose, at the station the cables pass around a tension drum carried by a sliding carriage that is connected to a weighted chain, which draws the carriage back more or less according to the slack on the cables. There is a constant back and forth movement of the carriage varying from six inches to three feet, the longer movement being when the most trains are running. The longest cable is operated a distance of two and a half miles, that being the length of the line.

These roads are no doubt a success on the point of economy, and there is no reason why the system should not entirely supersede horse roads. For some reason, injuries by running over persons have been frequent, though why it should be so more than with horse cars is not apparent, as the speed is not greater and the stoppages can be made as quick. It may be from the fact that there is no driver at the front of the grip car to watch passers by, the gripping lever being at the middle of the car. W.