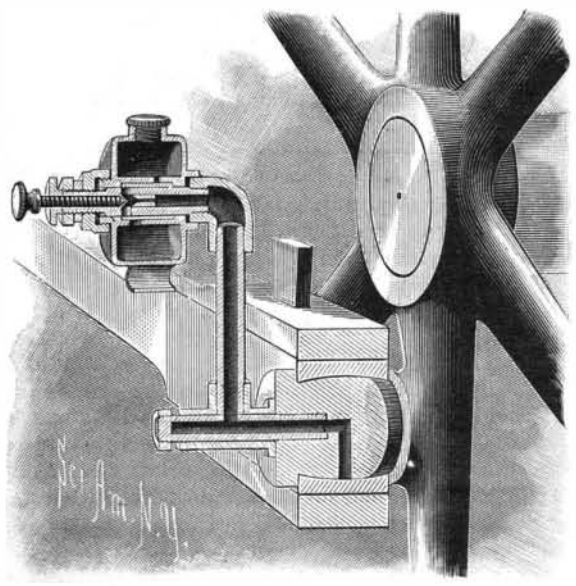
AUTOMATIC OILER FOR CRANK PINS.

The crank pin is formed with an aperture upon the axial line extending inward from the face, and thence at a right angle to the outer bearing surface. Screwed into the aperture is a hollow plug, to which a tube is attached at a right angle. On the outer end of the tube is a quarter bend that carries the oil cup and its parts. The oil cup is of cylindrical form, and is provided with a feeding cap at one side. At its center it is formed with a transverse tube forming a sleeve around a fixed tube screwed into the end of the quarter bend. The sleeve and tube are provided with apertures to allow the oil to pass through the tubes to the plug, so that a continuous passage is formed for the oil from the cup to the crank pin. The cup has an annular flange fitting over the quarter bend, and at its outer side is a similar flange that is threaded and receives a packing gland whereby the ends of the tube are made tight.



HARTNETT'S AUTOMATIC OILER FOR CRANK PINS.

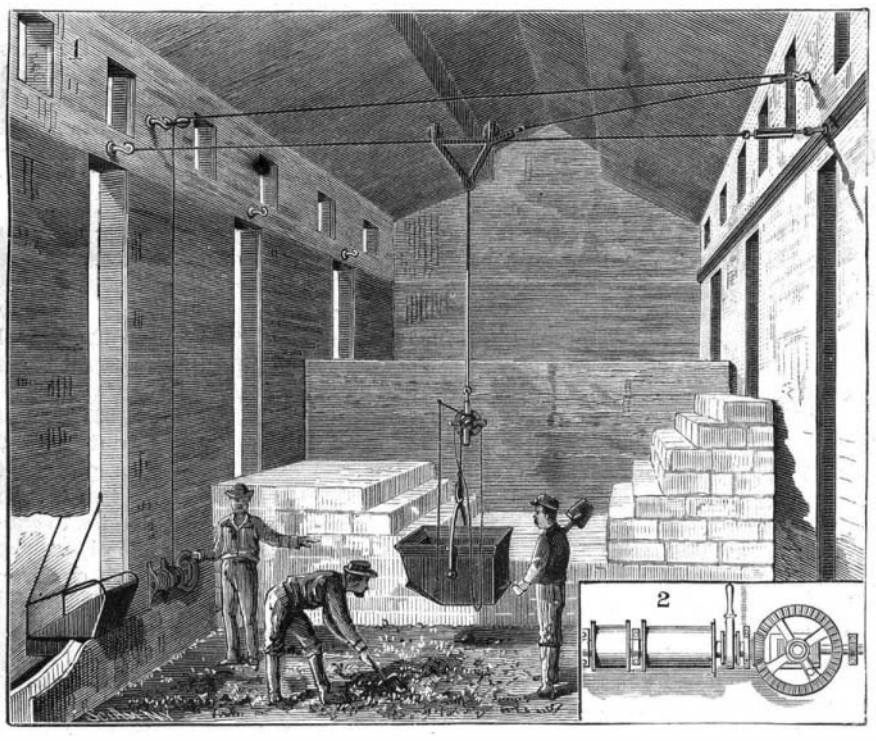
The outer end of the inner tube is screw-threaded and furnished with a set nut taking against the gland, so as to hold the cup up to place; and in the outer end of the tube is a screw plug that can be screwed in to more or less close the aperture, and thus regulate the escape of the oil. The tube holding the oil cup projects from the center line of the shaft, so that in the rotation of the crank pin the oil cup simply rotates with the shaft, while the plug in the crank pin, moving with the latter, a centrifugal movement of the oil is set up from the cup through the tubes to the crank pin, thereby keeping up a constant and uniform supply of oil that can be regulated according to the amount desired. In order to fill the cup while the engine is running, it is only necessary to take hold of it to prevent its rotation with the tube, when the cap can be removed. A loop on the under side of the cup is for convenience in taking hold of it to stop its rotation. In the space between tube and sleeve is a wire cloth, which, while allowing the oil to pass freely, prevents any sediment from finding its way to the bearing.

Additional particulars regarding this patent may be obtained from the inventor, Mr. John M. Hartnett, of Lyons, Kansas.

HAND POWER APPARATUS FOR HOISTING AND CONVEYING BROKEN ICE, ETC.

The invention herewith illustrated shows an improved arrangement for hoisting and conveying purposes, which has been recently patented by Mr. Henry B. Conger, of Burlington, Vt. It is more especially designed for conveniently and rapidly removing valueless pieces or clippings of ice, as they accumulate in ice houses, to a point where they can be readily carried away, a work heretofore generally performed by hand barrows and dump sleds, slowly and expensively.

According to this invention, an inclined wire cable or rope is suspended from any point within a building to a point above or near the dumping spout on the other side, the cable supporting a traveling carriage, from which a bucket is so suspended that it can be easily raised or lowered and dumped automatically at the spout. The lower end of the cable is attached to a stationary hook over the dumping chute, but the other and higher end is connected to one extremity of a turn buckle, attached to an adjustable hook, whereby the cable is kept taut, and this hook is adapted to slide in a grooved bracket, extending longitudinally along the opposite side of a room or building. The invention covers special details whereby this hook may be easily located, and then securely fixed at any desired point in the sliding bracket. Suspended from the carriage which travels on this cable is an iron rod, on the lower end of which is a differential pulley supporting a bucket by means of a chain and bail, the latter so adjusted as to hold the bucket upright while it is being filled and moved, until the bucket is tilted and its contents dumped into the spout by its toe coming in contact with the nose of the spout, from the rapid movement of the carriage with its suspended bucket down the inclined cable. To haul the carriage up the cable, the hauling rope passes over the larger of the two drums shown in Fig. 2, the shaft carrying these drums being attached to the side of the building. The smaller drum carries a special cable for use in tilting the bucket when this apparatus is to be put to some different employment; the length of the dumping cable is then regulated according to where the load is to be deposited, and it can be so adjusted that the contents of the bucket may be distributed over a greater or less space as desired. The carriage with its bucket is drawn up the inclined plane by a crank on the gear wheel shown in Fig. 2, and is held while being filled by a friction brake on the larger drum, the bucket being lowered and raised by means of a differential pulley; the brake being loosened, the weight upon the hoisting rope rapidly reverses the movement of the drum, when the bucket runs down the cable and dumps itself. This apparatus, as will be readily conceived, can be used in the building of railroads by extending the wire cable over tripods at each end and made fast to the ground, conveying the earth for cuts and filling of ravines, doing away with horses and carts; also for building trenches for sewers and water pipes, first by opening the trench and commencing laying of pipe, and then extending cable as before, taking out the earth and dumping back on pipe, thus handling the earth but once; also for conveying from one building to another, and, in fact, in connection with nearly all kinds of excavation, being especially advantageous where it is desirable to lift and remove earth to a distance, it being claimed that it is thus practically applicable up to 600 or 700 feet.



CONGER'S HAND POWER APPARATUS FOR HOISTING AND CONVEYING BROKEN ICE, ETC.

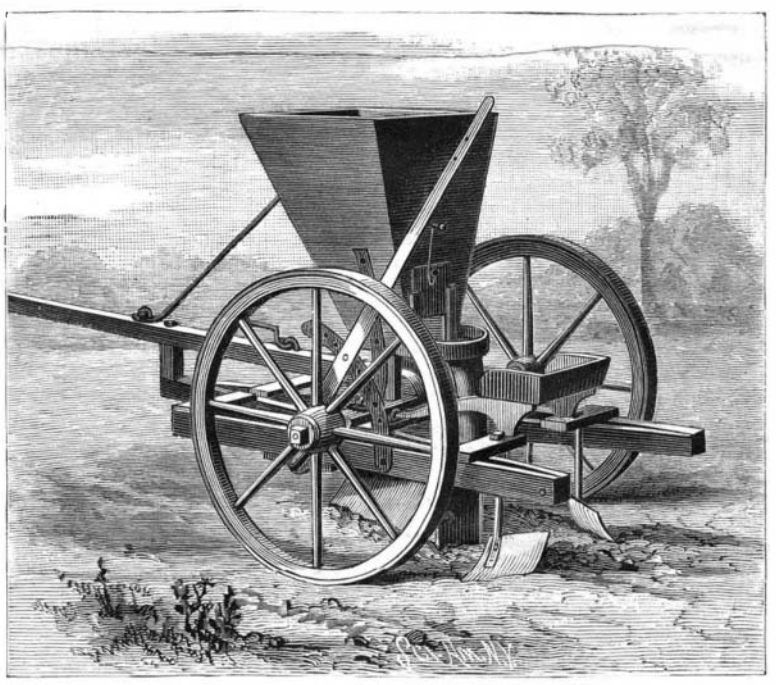
Solidification of Nitrogen and of Carbon Monoxide.

Nitrogen is solidified at a temperature of —214° and under a pressure of 60 atmospheres, its critical point being —146° under the pressure of 35 atmospheres. By carrying the rarefaction to 4 mm. of mercury, the author has succeeded in obtaining a temperature of —225°. The solidification point of carbon monoxide is —207° with a pressure of 100 m. of mercury. Oxygen stills remains liquid at a temperature considerably below —211°.—*Olszewski.*

COMBINED POTATO AND TREE PLANTER.

The engraving shows a planter designed to facilitate the planting of potatoes and small trees and to promote accuracy in such planting. The axle is bent at the inner side of each wheel so as to form a crank, the straight middle part of which rocks in bearings attached to the side bars of the frame of the machine. To the inner sides of the rear ends of the side bars are secured the ends of two bars whose forward ends are secured to each other in the central line of the machine. The forward parts of the side bars are connected with the inclined bars by short cross bars, and the rear parts are connected with the inclined bars by short bars whose inner ends project to serve as supports for the standards of the covering plows. The end of the tongue is secured to long cross bars attached to the side and inclined bars a little in the rear of the middle part of the axle.

The upper end of the plow standard passes through the forward long cross bar and tongue, so that it serves as a bolt for securing the latter in place. The forward edge of the standard is made sharp to act as a colter, and formed upon its lower end is a plow. Suitably connected to the opposite sides of the rear part of the standard and to the frame are plates, the rear parts of which, by means of a right and left screw working in U-shaped keepers secured to the inner surfaces of the plates, may be moved further apart or nearer together, according as a wider or narrower channel may be required. Secured by nuts to the inner ends of the short rear cross bars are standards; by adjusting the nuts the covering plows can be adjusted to work deeper or shallower in the ground. The covering plows are made in the form of mould boards arranged with forward ends inclined outward.



HAMRE'S COMBINED POTATO AND TREE PLANTER.

The seed hopper is made with inclined front and sides and vertical back, and the bottom is secured to the top of a pedestal, the lower end of which rests upon the forward cross bar and is recessed to receive the tongue. The hopper is so secured that it can be readily detached from the frame, together with its attachments. In the lower edge of the back of the hopper is the discharge opening, which is provided with a gate. Attached to the gate is a cord which may be wound around a pin to hold the gate at any height to regulate the discharge of seed. The bottom of the hopper extends rearward to form a feed platform, which is rounded and formed with a flange to prevent the potatoes from rolling off. In the outer part of the platform is an opening leading to a spout made of such a length that its lower end enters the space between the rear upper parts of the plates. The dropper's seat can be easily removed when necessary. To one of the crank arms of the axle is rigidly attached the end of a lever, by which the machine can be readily adjusted to open a channel of the required depth, and to raise the plows from the ground for convenience in turning round. The lever is locked in position by a pin passing through holes in the lever and in a curved catch bar. To the inner side of the outer part of the lever is secured a strap which engages with a headed pin on the side bar of the frame, to hold the lever in position when lowered to raise the plow from the ground. When the machine is to be used for planting trees, the hopper and its attachments and the seat are detached, and the young trees are placed upon the machine or in a box on the frame. As the machine is drawn forward an attendant places the seedlings singly and in the proper places in the furrow between the plates, and soil is thrown around them by the covering plows. This invention has been patented by Mr. E. J. Hamre, and particulars can be obtained from the Rev. J. G. Riheldaffer, D.D., Minnesota State Reform School, St. Paul, Minn.

Toughened Filter Paper.

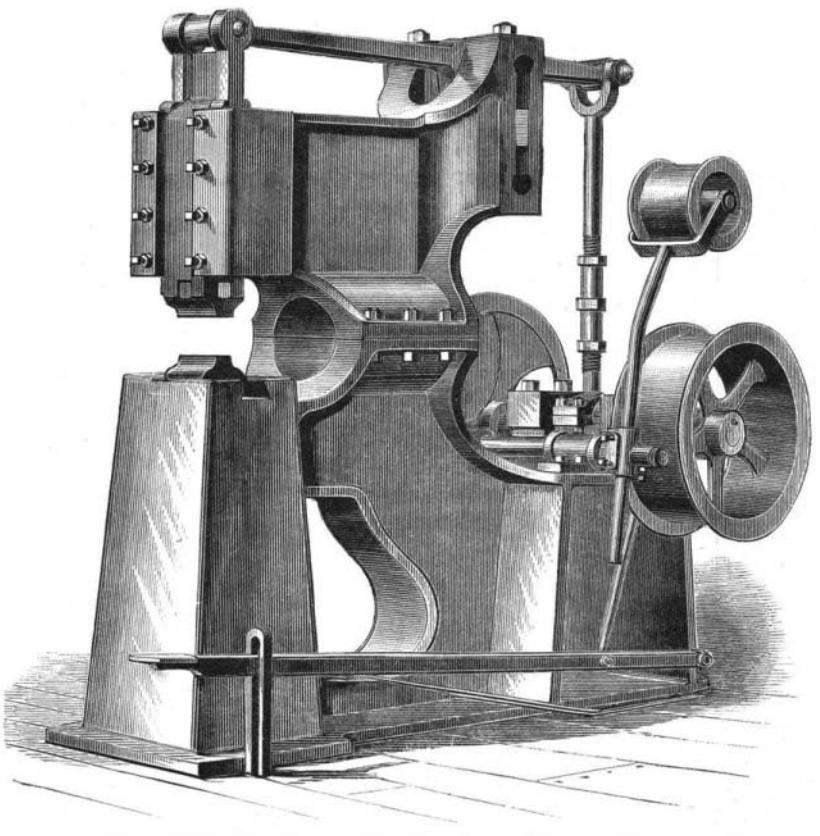
At a recent meeting of the Chemical Society a paper was read on "Toughened Filter Paper" by E. E. H. Francis. Filter paper which has been immersed in nitric acid, rel. den. 1·42, and washed with water, is remarkably toughened, the product being pervious to liquids, and quite different from parchment paper made with sulphuric acid. Such paper can be washed and rubbed without damage, like a piece of linen. The paper contracts in size under the treatment, and the ash is diminished; it undergoes a slight decrease in weight, and contains no nitrogen.

Whereas a loop formed from a strip one inch wide of ordinary Swedish paper gave way when weighted with 3 to 5 ounces, a similar loop of toughened paper bore a weight of about 3 pounds. The toughened paper can be used with the vacuum pump in ordinary funnels without extra support, and fits sufficiently close to prevent undue access of air, which is not the case with parchment paper. An admirable way of preparing filters for the pump is to dip only the apex of the folded paper into nitric acid, and then wash with water; the weak part is thus effectually toughened.

THE "VULCAN" CUSHIONED POWER HAMMER.

The hammer herewith illustrated presents several important features to commend it as one of the most useful of American machine shop appliances. The improvements it embodies are such as will be at once recognized by a hand accustomed to the use of power hammers, or who has had experience in the stamping out of work with dies, a branch of machine construction which is every day finding new channels of development. Its special adaptation for die work is a consequence of the fact that the ram moves in permanently fixed vertical slides, whereby it must necessarily descend each time in the same place, and deliver a true and square stroke. Perfect elasticity of stroke, with cushioning, are obtained by means of four rubber cushions, mounted above and below the fulcrum bearing of the helve, which is a solid steel forging, so that the latter is, in fact, mounted on elastic bearings. The effect of this arrangement is to almost double the stroke of the ram and produce a quick, sharp, and elastic blow. The ram, rebounding instantly, does not in the least chill the iron, as in the case of hammers resting on the work. The hammer, being constructed on the dead stroke principle, the helve is connected to the crank shaft by a connecting rod, the length of which may be adjusted by means of a right and left hand nut, so that the distance between the dies can be quickly increased or diminished, as desired. The force of the blow can be completely controlled by means of the treadle. The machine is built entirely of iron and steel, with the exception of the rubber cushions and the necessary brass work. This design makes it superior to any modification of the trip hammer, it being impossible, when the helve works on fixed pivots, to forge square when the work varies in size; but, as will be readily perceived, it is impossible to forge out of square with this hammer, no matter what may be the size or shape of the work, unless the dies are specially made. Expensive foundations are not needed, since the anvil is heavy enough to receive the force of the blow.

The perfect ease with which this hammer can be operated by the most ordinary workman, it simplicity of construction, and the rapidity with which a large class of work can be turned out with its help, are points which have been already well attested in a practical way in leading machine shops. It is adapted for all kinds of forging and die work, such as edge tools, agricultural implements, springs, machine forging, file makers, tool makers, etc. In the making of all these classes of goods, the exactness with which the hammer can be made to do its work, and the nicety with which its action can be controlled, are points which largely affect the amount of subsequent labor necessary in the finishing, as also the ultimate quality of the goods, and in these respects the hammer shown in the accompanying engraving has elements of superiority which practical men will unhesitatingly concede. The manufacturers of the Vulcan hammer are Messrs. W. P. Duncan & Co., of Bellefonte, Pa.

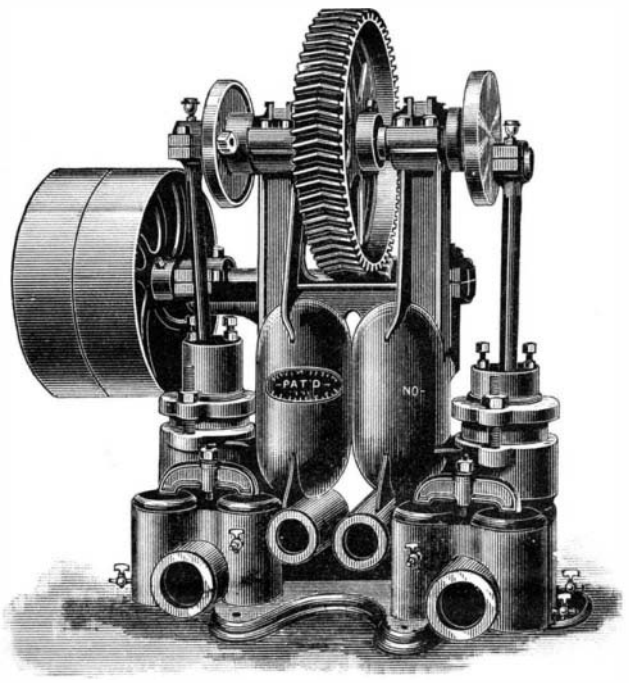


THE "VULCAN" CUSHIONED POWER HAMMER.

DR. EDWARD VANDERPOOL, of New York, recommends Fowler's solution of arsenic in neuralgia of the stomach, in six to ten drops three times per day. His experience with it appears to have been highly satisfactory in the cases reported.—*Independent Practitioner.*

DOUBLE PLUNGER GEARED PUMP.

The accompanying engraving represents a well designed and durable pump for feeding boilers or tanks, and for use in tanneries, paper mills, breweries, etc. The pulley shaft is mounted horizontally about in the center of the frame, and carries a pinion meshing with a large wheel journaled in the upper ends of the frame



DOUBLE PLUNGER GEARED PUMP.

standards. Owing to the form of teeth used, the action of these wheels is exceedingly smooth and noiseless, and the wear upon the contact surfaces is reduced to a minimum. The strength of the pinion teeth is increased by side flanges. At each end of the main shaft is a disk crank, finished on edge and face, and provided with steel crank pins made large to decrease the wear. The connecting rods are united to the crank pins by a cap and box, so that all wear can be easily taken up when necessary, and are fitted with brass oil cups. The lower ends of these rods are connected to the center of the plunger by a new device, designed by the makers of this pump, by means of which wear can be taken up by simply screwing up set bolts on the upper end of the plunger. The suction and discharge pipes, which are tapped to standard pipe threads, are clearly shown in the cut. There are similar openings for discharge pipes on the opposite side of the pump.

The air chambers are large, and are so disposed as to form part of the frame supporting the pulley and crank shafts. The valve seats—both the valves and valve seats are made of bronze metal—are screwed into the valve chamber. The removing of one nut permits both the suction and discharge chambers to be examined. The bracket supporting the pulley shaft is so formed that it can be placed at either side of the frame, as may be found most convenient in setting up the pump.

Practically, the machine consists of two separate pumps, which may be operated together or singly, and which may be used to pump different liquids at the same time. Both shafts are of steel. All the journals have oil boxes with covers to keep out dust and grit from the oil holes. The body of the pump and valve chambers have drain cocks, so that the pump can be thoroughly drained in cold weather. The pump is compactly and strongly built, occupies but a small space considering its capacity, and all its wearing parts are large and well proportioned, insuring easy running and durability. The journals are made large, and are filled with No. 1 Babbitt metal. Additional particulars can be obtained by addressing the manufacturers, the Stewart Heater Company, of 40 & 42 Clinton Street, Buffalo, N. Y.

The Phelps Induction Telegraph.

A most interesting, as well as wonderful, experiment in telegraphy was successfully tried recently by the B. & O. Telegraph Company officials. They succeeded in telegraphing on a railroad train while going at the rate of 40 miles an hour by the Phelps induction system. [This system was described in the SCIENTIFIC AMERICAN for Feb. 21 last.] The experiment was conducted by Mr. Phelps, the inventor, and under the direction of the B. &. O. officials. Messrs. Joseph G. Pangborn, the Assistant General Passenger Agent, and Mr. McLaren, the Manager of the New York city B. & O. telegraph offices, went on the car, and Mr. Weaver, the B. & O. electrician, remained at the receiving office in New York. The experiment was tried on the Harlem River branch of the New York and New Haven Railroad.

Soon after the train was started, and while going at the rate of 40 miles an hour, the operator in the car called New York. A direct wire had been furnished through to Baltimore and into President Garrett's private office in the Central Building in this city. The gentlemen in the car awaited the answer with anxiety. Soon the instrument began ticking as loudly as if in a stationary office. New York had responded. The induction system worked. Major Pangborn then indited a telegram to President Garrett, saying that the Phelps induction system was a success. The telegram went direct to Mr. Garrett, and an answer was received by the experimenters on the car: "Your telegram has been delivered to President Garrett in his private office." Major Pangborn then wrote another: "President Garrett, I am telegraphing to you, on a train going 40 miles an hour, by the Phelps induction system. The wire in our car is 7½ in. from the wire laid on the ties of the track." While the operator was sending the dispatch, Major Pangborn noticed that the train had gone its 12 miles, and that it would soon pass over the wire in the wooden trench. He said nothing, but let the operator continue. The train left the box behind. As it passed over the end there was a fainter sound of the ticking of the instrument, but the message continued. The induction was so strong that the current had gone to the wire on the telegraph pole 40 ft. from the track. It seemed marvelous to the experimenters. Sitting in a car with no wire nearer than 40 ft., and to send and receive messages! When the train returned the experiments were continued, and it was found that the inductor worked as well as on the other track. The message was sent over the wire in the wooden trench on the other track, 11 ft. away. Of course there was a difference in the sound from the one received and sent when the car was over the wire and when 11 ft. from it. On the return the telephone was connected with the induction system, and a message on a wire 60 ft. away was heard. The sender was in New York; and he was sending a message to his wife in New Rochelle: "I will not be home to-night. Business detains me in the city."

Mr. Phelps stated that a system of bells could be placed on the engines and worked by the induction system, so that trains could telegraph to each other, and a system arranged so that when trains were within 1,000 ft. of each other a bell would ring, announcing the number of the train ahead.—*Baltimore American.*

GALLIUM.—Dr. L. Ehrlich, a German chemist, has succeeded in isolating the metal gallium by an industrial process. A preliminary experiment has yielded 0·6 grain of gallium from 80 kilogrammes of zinc blende. The method followed was a modification of that introduced by M. Lecoq de Boisbaudran, which by lixiviation of the zinc sulphate resulted in a small quantity of mud containing ferric oxide and gallium. The galliferous alkaline solution was then electrolyzed in a platinum capsule, and the metal deposited in fine needles. As the melting point of gallium is low, about 30·5° C., and its luster brighter than that of mercury, it may be found of useful application by and by.