SOMETHING ABOUT ALLIGATORS.

The odd photograph reproduced in the accompanying engraving shows four rather unhappy-looking baby alligators. Probably as long as this species of saurian has been known, the young have been kept as curiosities, and most amusing pets do the little fellows make. Unlike the young of other wild animals, which are sometimes domesticated when small, they grow very slowly, especially when out of their natural environment, and are consequently well adapted for this purpose, as a number of years elapses before the alligator is large enough to be troublesome or even dangerous. Alligators do not appear to be very intelligent, the recognition of the person who feeds them in captivity being about the limit of their mental attainments. The older ones are sluggish and lazy, though they sometimes fight viciously with each other, and are capable of doing terrible execution when aroused.

If properly taken care of, the young alligator will thrive even in unnatural circumstances. His main requirement is sufficient heat, and if his box or cage be kept at too low a temperature, the little reptile becomes languid and almost torpid, refuses to eat for long periods, and frequently dies at the end of some weeks. If, however, the temperature of the air be raised, or the tank wherein he lies be warmed by the addition of a little hot water, he soon revives, and attests his continued interest in life by renewed activity and the reappearance of his appetite. Unlike the older members of his family, the young 'gator in captivity is quite lively; sometimes of an investigating turn of mind, and usually combative, his antics are often diverting. If he can escape from his cage, he will travel considerable distances, and unless overcome by cold will wander indefinitely, subsisting as best he can.

Many people who have attempted to keep young alligators have made the mistake of trying to feed them on a vegetable diet, for the alligator is first and last a carnivore. The diet of the young, who should be fed nearly every day, is very simple, and consists of bits of fresh meat, insects, and worms. They often show great fondness for the ordinary earthworm, and will frequently refuse all food but these. The larger specimens in captivity are fed about three times a week on fresh meat or small live animals, and they require little attention other than this. The older ones, particularly the males, will, if possible, eat the small alligators with avidity, and to check these cannibalistic tendencies, the reptiles must be properly segregated.

Alligators seldom breed in captivity, and while the females sometimes lay eggs, the latter are usually unfertile. However, eggs that have been found in a natural condition in the curious cone-shaped mud nests are easily hatched by the application of heat, and while the young are at first feeble and helpless, they usually survive if carefully handled. Alligators live to be of great age, and there is a number of authentic records where individuals have been known to exist for nearly a century.

A NOVEL PROCESS OF REANIMATION.

BY DR. ALFRED GRADENWITZ.

Any methods so far suggested for restoring asphyxiated persons to life by artificial respiration, valuable though they prove in many cases, are still rather imperfect. Far better results would be obtained by acting simultaneously and intensely both on respiration and on the circulation of the blood.

Considering the well-known process of artificial breathing in the case of a horizontal supine position of the patient, it will be seen that with each inspiration, following a compression of the thorax, the latter owing to its elasticity will rise distinctly, drawing in air into the lungs, but that at the same time the abdomen is lowered in a most striking manner. The latter phenomenon is due to the external atmospheric pressure acting on the bowels through the soft and yielding wall of the abdomen, thus considerably obstructing the flattening of the diaphragm. The internal compartment of the breast will accordingly be increased only to a small degree, thus greatly reducing the effects of artificial breathing, and the same is true of expiration. As regards the other factor of importance in connection with reanimation, viz., the circulation of the blood, artificial respiration will no doubt exert some unfavorable influence on that factor also, the motion of the blood being interfered with to a degree the greater as the inspiratory pull is more intense and the pressure of expiration in the thorax stronger. This twofold undesirable effect will doubtless greatly diminish any chance of success in the event of the heart having stopped.

Now, Dr. R. Eisenmenger, of Szászváros, Hungary, has had the idea of trying artificial breathing by simply acting on the abdomen without producing any motion of the thorax. By means of an apparatus constructed by him he is able to diminish or to increase the atmospheric pressure acting on the abdomen to any desired extent.

A HANDFUL OF ALLIGATORS.

The apparatus consists of a lateral vaulted shield fitted with flexible extensions which can be fitted air-tight on its edge, while the convex part carries an aperture, to which a tube can be fitted. Now this shield is placed above the abdomen and the lower part of the thorax, so as to cover as with a bridge the whole of the former, while the tightened edge is made to rest on resisting parts of the body. In the space left between the body and the shield and which is inclosed air-tight, the air is alternately drawn out and forced in by means of suitable bellows.

The accompanying diagram illustrates how respiration is produced by means of this device. Supposing *I* to represent the thorax, and *I I* the abdomen, *c d* will be the diaphragm and *c b* the wall of the abdomen. If the atmospheric pressure acting on *c b* be decreased by means of the bellows, this action will be transmitted through the yielding walls of *I I* and *I*, drawing atmospheric air through the air channels, *e a*. The volume *I* will thus be increased and the diaphragm will be displaced toward *c g d*, while the wall of the abdomen is shifted to *c f b*. Inspiration by this artificial process will accordingly be quite analogous to what takes place in the case of natural respiration. If now the atmospheric pressure above *c f b* be increased, the latter will take the position *c h b*, while *c g d* is shifted to *c i d*, resulting in the air from the lungs escaping through *e a*. The inert diaphragm will thus perform passively the same motions (but for the excursions being greater) as under normal conditions of life, by virtue of the rhythmical increase and decrease of the atmospheric pressure acting on its concave surface.

The pressure in the thorax and abdomen is considerably reduced during inspiration, and as the blood vessels in this compartment are subjected to lesser pressure than those lying outside of them, the blood will be made to flow from the periphery toward the place of smaller resistance, thus fully supplying with blood any organs of the thorax and belly, including the right half of the heart and lungs. During expiration the blood will be thrown out again from the breast and abdomen, owing to the increase in pressure on *c b*, and on account of the valves inserted in the circulation (in the heart and veins) it will be allowed to flow only in one direction.

The fact that in this novel process the lungs are filled with blood at the same time inspiration occurs is of the highest importance, as it greatly facilitates the exchange of gases. Successful results can thus be obtained even in cases where both spontaneous respiration and action of the heart have ceased. In fact, the heart will be enlivened on one hand by the blood traversing it and on the other by the oscillations in pressure, which act in a way analogous to what has been called heart massage.

It has been shown of late years that both animal and human hearts, after being separated from the body, can be restored to activity even two days after death has occurred by throwing salt solutions or other convenient liquids rhythmically through them, and that they will go on beating for hours, until their energy is all exhausted, when the definite standstill ensues. The diagram illustrates the action on the heart occurring in Dr. Eisenmenger's process.

The movable wall of the abdomen, *c b*, which is alternately pressed down and drawn upward by the process above described, will transmit this reciprocating motion through the bowels of the abdomen to the diaphragm, which is made to perform analogous movements, resulting in an inspiration and expiration through the air channels, *e a*. The heart, which is located in the compartment *I*, is thus alternately compressed strongly by the diaphragm, *c i d*, as it is thrown upward, and expanded violently as this muscle is thrown downward to *c g d*. The artificial negative pressure in *I* and *I I* will obviously result in hyperæmia (excess of blood) in the vessels both of the breast and abdomen, when the blood will flow toward the right half of the heart from the upper vein of the throat, as may be distinctly observed by the pulsation of the latter. By virtue of the lively aspiration, the blood will even traverse the right heart in the direction of the open valves and get into the pulmonary arteries.

If at the beginning of the other phase of the process the pressure within the abdomen is increased, part of the abdominal blood will first be conveyed toward the heart, while another part retrocedes into the lower extremities to the extent allowed by the valves of the veins. As the pressure increases in the abdomen the diaphragm is thrown upward through the intermediary of the bowels, thus compressing the veins of the thorax and the heart and lungs which had been filled by previous actions.

It will be readily understood that these oscillations in pressure as produced artificially by a rhythmical increase and decrease in the atmospheric pressure acting on the abdomen will exert a kind of massage on the heart, a distinctive feature from the usual action being that not only the increase in pressure but the adjustable decrease in pressure are allowed to exert their effect. If ordinary massage be called positive, the Eisenmenger process can be appropriately called an alternately positive and nega-

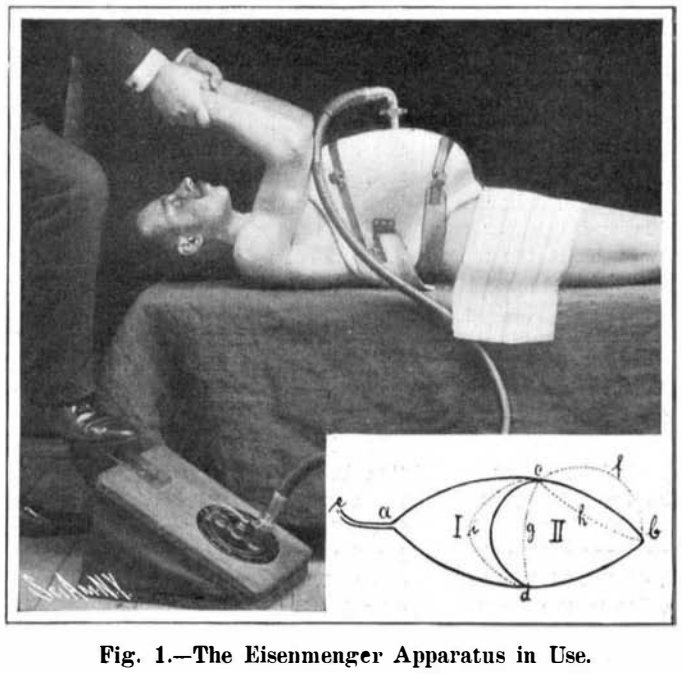


Fig. 1.—The Eisenmenger Apparatus in Use.

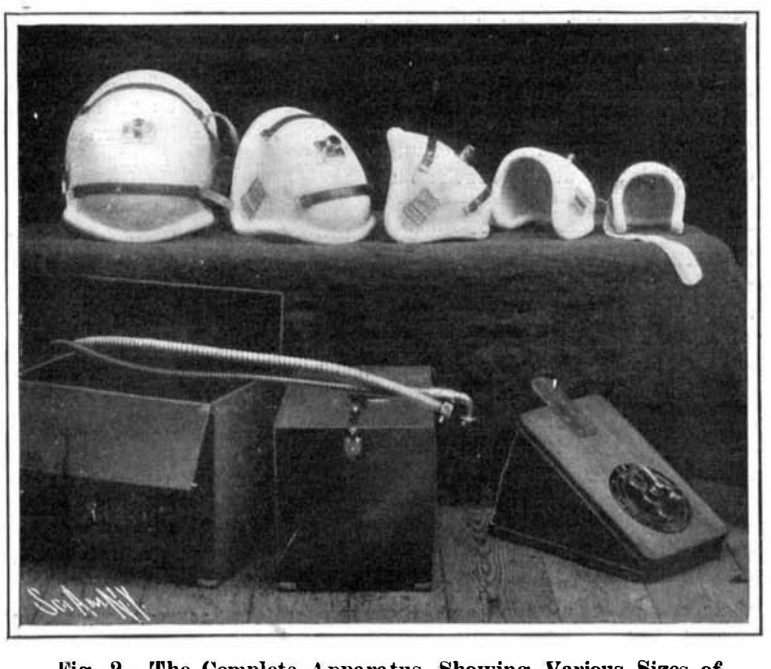
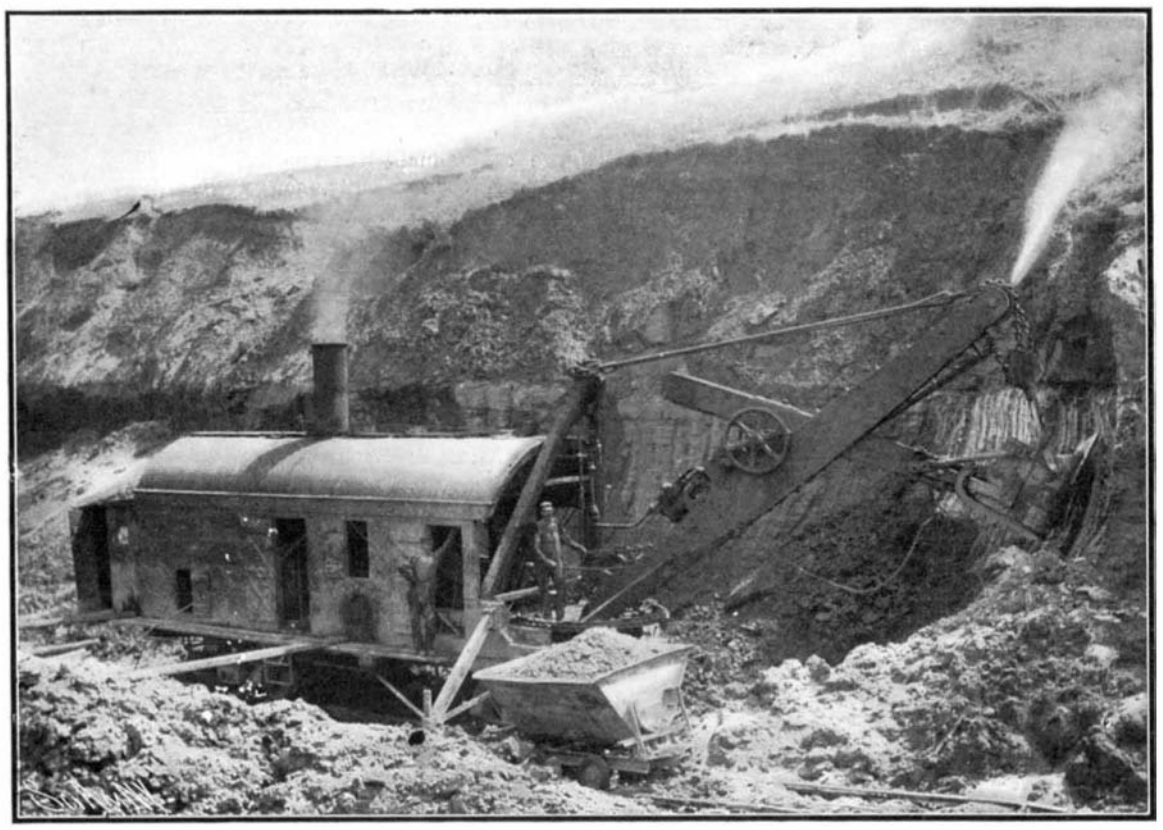


Fig. 2.—The Complete Apparatus, Showing Various Sizes of Abdominal Shields.

A NOVEL PROCESS OF REANIMATION.

tive massage. Now the latter will obviously have a most powerful influence on the motion of the heart and blood. Another advantage of the process over direct massage is the fact that at the same time the heart is acted on, the lungs are fully ventilated, artificial respiration being produced simultaneously. This process of heart massage in connection with simultaneous artificial respiration will warrant success even in most hopeless cases, another good point being the fact that it can be continued for a long time without fatigue.

Experiments made on fresh corpses (that is to say, in the case of absolute standstill of the heart) have shown the blood to be sucked into the right heart and into the lungs and afterward to be thrown through the vessels of the lungs into the left heart, whence it must be thrown into the arteries, owing to the increasing pressure. These experiments have really borne out the fact that the above process not only warrants an artificial respiration more analogous to the natural process than any other method, but at the same time an artificial circulation of the blood. Owing to the revivifying effect it exerts on the organism the apparatus will be used to advantage also in the case of many affections of the body. It has been given a most convenient form and is constructed by Hermann Straube, of Dresden-Neustadt.



Digging Out Shale With the Steam Shovel.

BRICK MAKING.

BY W. FRANK M'CLURE.

Brick making, like so many other industries of ancient origin, has undergone a very marked evolution in recent years. Machinery has taken the place of dynamite in the loosening of shale, one machine accomplishing the work of seventy-five men. After coming from the pug mill, the pasty material is cut into the shape of bricks by machinery which works automatically. Modern methods also provide for the using of exhaust steam and heat from the kilns for the heating of the drying house.

The demand for brick of nearly all kinds is increasing. The value of common brick alone according to recent statistics is more than forty per cent that of the entire clay products of the United States. The accompanying photographs were made in Cuyahoga County, Ohio—the State which leads all States in the production of clay products. And while in the amount of common brick the Buckeye State is exceeded by three other States, in the production of paving brick Ohio leads. Cuyahoga County yields vast quantities of the shale and clay used in the making of paving brick. It is said that the various brick-making industries of this section have a combined daily capacity of more than 500,000 bricks, besides many new kilns building.

At the site where the steam shovel in the photograph is at work, it is estimated that there are more than 25 acres of shale and clay. Beneath a depth of about 30 feet of clay there lies between 300 and 400 feet of shale, and beneath this lime rock. As yet the digging is done only in the side of the banks, and not below the surface. In fact, it will be many years before it will be necessary to dig below the level. The machine used for extricating the clay and shale is a steam shovel, which has a daily capacity of 500 yards of shale or 1,500 yards of clay. It is operated by two men. The scoop of this machine is also used in loading the raw products onto cars, which in turn deliver it to the brickyards.

From the cars the clay and shale are shoveled into grinders, which reduce these two products to a powder, which in turn is carried by a bucket elevator to a big hopper. After it has been sufficiently screened, the powdered clay and shale next go to the pug mill, that which will not pass the screen going back to the grinders again. In the pug mill—a sort of conical trough—the raw material is tempered with water, and kneaded by means of a device somewhat resembling a screw propeller in shape. From this mill it is forced through a mold into one long, continuous brick, and this, as it comes from the mill, is carried on a wide belt to a cutting machine, which automatically cuts the continuous brick into many bricks of just the desired size, the machine cutting sixteen bricks at one time. As the bricks come from the cutting machine, still soft and still resting on the belt, they are loaded onto flat cars and removed to the drying house, where they remain not less than a day and night. The capacity of a large drying house is about 100,000 bricks. The different apartments of this house are brick-lined.

The brick next go to the kilns for baking. One of the engravings gives a good idea of the manner in which these brick are piled within the kilns. Five or six men often work three full days in filling one kiln, which fact gives some idea of the size of the interior. After the entrance to the kiln has been closed and sealed, the fire beneath is started. The baking process is then continued for nine or ten days, the temperature maintained within being 2,300 deg. F. Then, when the kiln has been cooled, the bricks are taken out and are ready for shipment. Where fifteen or sixteen kilns are in use, the daily capacity of ordinary-sized brick may reach 150,000.

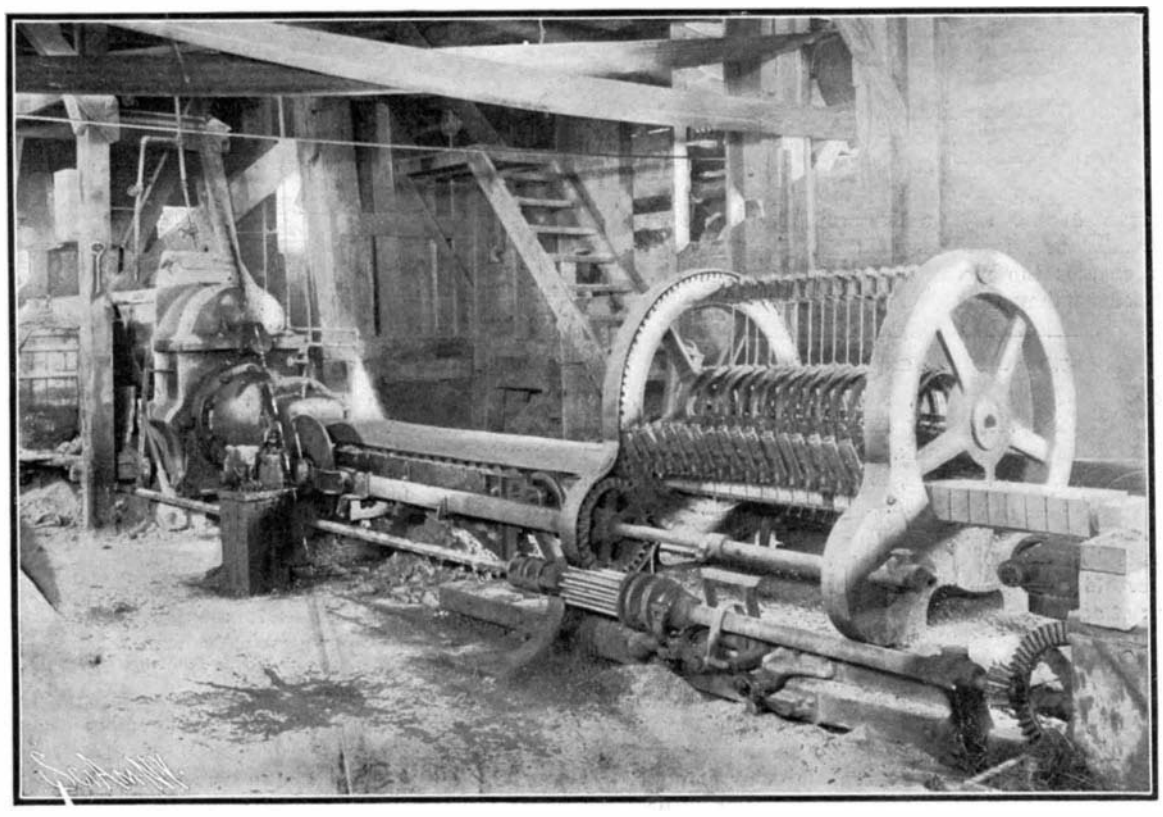
Some skill is required in operating the kilns while the baking is in progress. Cognizance must be taken of the heat-giving power of the fuel, the burning qualities of the brick, and the draft of the kiln. A uniform heat must be maintained. When the baking process has been finished dampers are opened, and the heat from the red-hot brick is forced by means of a fan to the drying house through brick-lined flues. This heat, together with the exhaust steam from the engine, comprises the economical method for heating the drying house heretofore mentioned in this article.

Besides common brick, front brick, and vitrified paving brick, there are the fancy and ornamental brick, enameled brick, fire brick, ornamental terra cotta, fireproof partitions, sewer pipe, drain tile, and some others, the manufacture of which requires slightly different methods of production, but all coming under the head of clay products.

Waldstein and Herculaneum.

Prof. Charles Waldstein, of Cambridge University, announces that influential personages have promised their support of his scheme to excavate Herculaneum, and that the plan will yet be carried out.

Dr. Waldstein declined to be more explicit, but he was evidently sanguine. It seems that the "influential personages" to whom he referred must be members of the Italian government. So far as enthusiastic approval and support in other countries went, he had all that he required before. It was only the attitude of the Italian authorities which prevented the success of the scheme and the commencement of work at Herculaneum a year ago.



Pug-Mill. Brick-Cutting Machine in the Foreground.

Interior of a Modern Brick-Kiln.

IMPROVED METHODS OF MAKING BRICK.