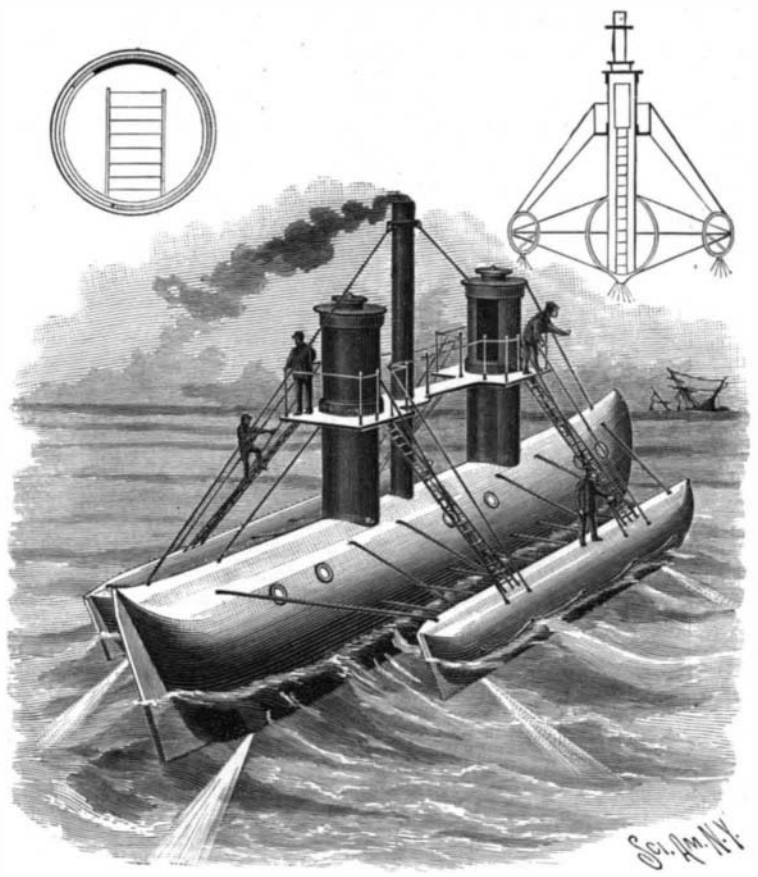
A JET PROPELLED LIFEBOAT.

The illustration represents a lifeboat of strong and simple construction, arranged to be propelled by means of jets discharged either forward or backward, and provided with substantial floats rigidly connected with the hull on each side to hold the boat steady and break the force of the waves. This boat forms the subject of a patent issued to William F. James, of Denton, Texas. One of the small figures is a sectional view of one of the revoluble hatches, of which the boat has two, and the other is a cross section of the boat on the line of its front revoluble hatch. The central hull has bulkheads forming five watertight compartments, of which the middle one is used as an engine and boiler room, while from the two adjacent compartments ladders extend up into outlet towers, closed at their upper ends by revoluble hatches. Each of these hatches opens on a platform supported above the deck, and ladders lead from the platform to the top of the floats. The propulsion of the boat is effected by means of a pump located in the engine compartment, by which water is drawn in centrally at the bottom of the hull, and expelled through pipes at its rear or front end, according as the boat is to be propelled forward or backward. This suction of a powerful pump in the center of the vessel is designed to materially assist in keeping the boat steady in the water. Similar pipes also extend from the pump to the front and rear ends of the floats, the vessel being steered either to the right or left by forcing water through one of the pipes in one of the sets, and the auxiliary pipes in the floats being also used when desired in the propulsion of the vessel forward or backward. Other pipes lead to openings in the sides of the floats, where their discharge is directed downward and outward, to assist to turn the vessel, to keep it from drifting on to a wreck or rocks, and to keep it from capsizing when in the trough of the sea. The pump is also connected by suitable pipes with the various compartments and the interior of the floats, to pump out water, should they become accidentally flooded. As the boat has no rudder or screw propelier, it is designed to stand the roughest weather without being damaged or disabled, and when the boat approaches a wreck the platform and hatches may be readily reached by those who are rescued, the interior of the central hull being then conveniently accessible.



THE WILLIAM F. JAMES LIFEBOAT.

The Inheritance of Acquired Characters.

Prof. Retzius has lately published an account of certain observations on the fœtus of Swedes, which, in connection with similar observations recorded by Surgeon Havelock Charles on the Punjabite, he believes to support the Lamarckian view that acquired characters are inherited. He endeavors to show that the evidence in support of the theory is to be found in our own skeletons. Some years ago, Prof. Arthur Thomson pointed out that in certain races of men who habitually adopt a "squatting position," the tibia and astragalus present additional articular facets, allowing greater flexure of these bones upon one another than is possible (or at any rate normal) in Europeans and other civilized races who have given up squatting, and in which these facets are absent. Accompanying these facets there is a retroversion of the head of the tibia. Both these characters are present in apes and in certain prehistoric races, and Surgeon Havelock Charles described, a year or two back, a series of instances of their presence not only in the adult Punjabite, but in the fœtus. At the meeting of the British Association at Oxford, Prof. A. Macalister exhibited these specimens, as well as similar specimens taken from British infants, and a discussion followed on the meaning of these peculiarities. Now Retzius ("Ueber die Vererbung erworbener Eigenschaften," Biol. Untersuch., N F. vii) records these same characters in fœtal Swedes, from an early age, even up to eight months; and reviewing the facts, he comes to the conclusion—in which I think most of us would agree—that the presence of these characters, viz., the retroversion of the head of the tibia, and "Thomson's facets," is a more primitive condition than their absence in normal Europeans of the present day; that they have been inherited from early times; and in those peoples which habitually adopt the "squatting" position they have become gradually further developed. This last conclusion is perhaps open to question; it is quite possible that even in these races they are less developed than in ancestral forms. But Retzius proceeds to contend that Europeans have undergone gradual change in their skeletons from generation to generation; they no longer sit on their haunches, and have gradually lost the power to do so, and as a consequence "Thomson's facets" have disappeared; and he concludes that "it is, therefore, we Europeans who, on account of changed habits, have undergone changes, and it is in us that these changes have gradually been inherited."

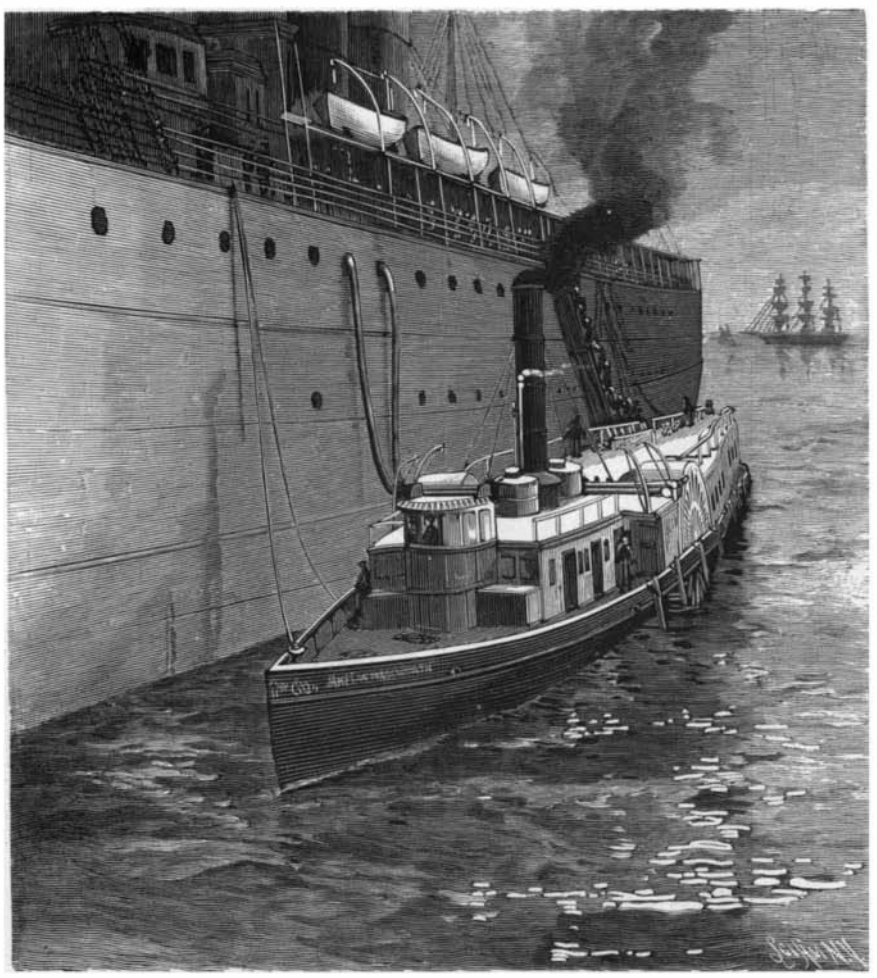
But here it seems to me that Darwinians would join issue with Retzius. His own and other observations show that the changes are not inherited; for the characters of the bones are inherited from the ancestral apelike forms, and it is, surely, only on account of individual habit that the peculiarities are not present in the adult. It is by no means clear what is the "acquired" character on which Retzius hangs his views. Is it the osteological peculiarity, or the habit of using chairs to sit upon, instead of employing the squatting posture? His own researches show that the osteological characters are not acquired, while the habit of walking upright and sitting on chairs is distinctly acquired, and it is in relation to this acquirement that the osteological peculiarities cease to be evident. Young children, as we know, can and do sit upon their haunches, and can move their legs and ankles in a way that an adult, unless he is fairly athletic, finds it impossible to do; and it appears probable that the disappearance of the facets in the adult is closely connected with the ossification of the bone, which will obliterate the facets now no longer brought into use. It would be interesting to examine in this connection the leg bones of "contortionists" and others who make a free use of their legs and ankles, for a very little practice enables even civilized men to employ exaggerated movements of their limbs. Another point to which attention might be directed (which indeed may have been looked into) is the character of the articulation of the bones of the great toe in those races which make use of this digit. A casual observation on the skeleton of an Andaman shows that the articular surface of the first metatarsal with the entocuneiform is distinctly more rounded than in a European—a feature in which there is an approach to the condition in the apes. It might have been presumed that some difference, similar to that in Europeans and Punjabites, would be found in digitigrade and plantigrade mammals; but the result of a brief examination of skeletons of such forms is sufficiently surprising to be referred to: for instance, in the lion there is a facet of the same kind as, but not really homologous with, Thomson's facet, at the lower end of the tibia. This is absent in the bear and the dog: it is also absent in the sea otter. It is present, however, in the beaver and other rodents; it exists in some ruminants, as well as in the horse, but is only slightly developed in the tapir, and is absent in the Suidæ.—Nature.

THE DISINFECTING BOAT OF THE NEW YORK STATE BOARD OF HEALTH.

BY T. O'CONOR SLOANE, PH.D.

The most important work of the New York State Board of Health is, perhaps, that done in the port of New York under the administration of Dr. A. H. Doty, health officer of the port. The department under his superintendence has charge of all ships arriving at the port of New York, inspecting them and their passengers, to determine the state of their bills of health, quarantining passengers from an infected port, if necessary, and in general conserving the safety, not merely of the city and State, but to a great extent of the entire country. The admission of infected matter, whether the source of infection be passengers, clothing or cargo, might spread disease far and wide through the land.

On the shores of Staten Island, near Fort Wadsworth, is the health station of the port. It includes, besides the official residences, an office building recently completed, with laboratory and full disinfecting appliances, a dock and fleet of vessels, the most novel and characteristic of which we describe in the present issue.



THE NEW YORK STATE HEALTH BOARD'S DISINFECTING STEAMER JAMES W. WADSWORTH.

This boat, the James W. Wadsworth, represents a complete disinfecting plant, adapted to the treatment of suspected persons, of clothing, bedding, luggage of all descriptions, and of holds of ships. She was arranged to produce a perfect disinfecting boat, the work being done under the superintendence of Mr. E. M. Skinner, of the Department of Health.

Near the stern of the boat and placed amidships is the sterilizing oven. This is a double sided boiler-like structure which is open at its fore and aft ends and which is traversed by an iron cage running on wheels. Its ends are closed, when it is in operation, by doors fastened with lag screws making a hermetical joint. The oven is connected to the steam boiler, so that it can be heated by steam between the walls of the oven, giving dry heat, and if desired, steam can be blown directly into the oven, so as to give wet heat. The oven is used for disinfecting clothing, bedding and baggage of all descriptions. Fore and aft of it are hatchways leading to the upper deck. The material to be treated may be lowered through the after hatch directly into the cage, which is then rolled into the oven. The oven is closed, steam is turned on, and the articles are disinfected and passed out by the forward hatch, the cage being withdrawn through the forward end of the oven. The cage traversing fore and aft comes directly under one or the other hatch as desired. On either side of the oven are separate rooms fitted

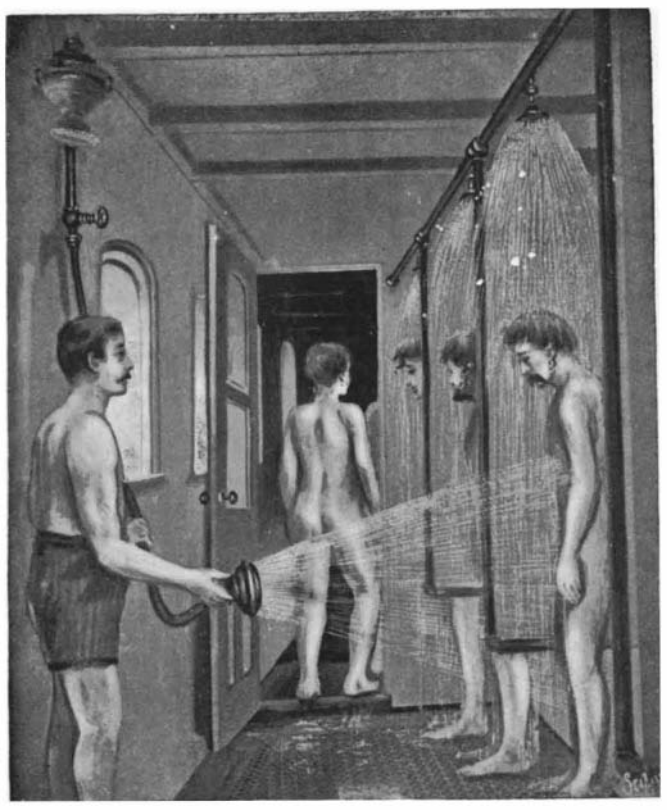
with stalls for bathing, each set of bath rooms having a disrobing apartment immediately aft and a dressing room immediately forward.

The passengers to be disinfected are received from the ship upon the upper deck of the Wadsworth. Descending to the main deck, the women pass to the right and the men to the left to the disrobing rooms. Removing their clothes, these are passed by them and the attendants to the sterilizing oven amidships, where the articles are thrown into the cage, rolled into the oven and treated at a temperature high enough to destroy all germs. The immigrants meanwhile go into the bath rooms and are sprayed, in extreme cases a disinfecting solution being used. After the treatment in the bath they go forward and enter the dressing room, into which their clothes are passed after treatment in the sterilizing oven. It will be seen that the feature of this portion of the boat is having the baths and sterilizing oven all parallel with each other, so that, as the passengers are disinfected in the bath rooms, their clothes are being treated in the oven immediately by their sides. After dressing, the passengers go further forward and are ready for admission to the country.

For the disinfecting of ships a sulphur furnace is provided. This is forward in the boat, and holds eight pailfuls of sulphur divided among four pans in which it is burnt, producing sulphurous acid gas. A fan blower exhausts the gas from the furnace and delivers it through distributing pipes lying athwart the upper deck. To these pipes hose can be attached either on the starboard or port sides for the purpose of disinfecting ships. A very few minutes' operation of the powerful apparatus suffices to fill every nook and cranny of the ship with sulphurous acid gas. Near the upper deck is maintained a large tank for solution of bichloride of mercury. In this a solution of bichloride of any desired strength is kept, and a complete system of piping, with force pump, is supplied for its distribution. It can be used in the bath room for sprays, and lines of hose can be taken into ships for washing down the wood work and other portions wherever disease germs may be suspected.

Lead lining of the bulkheads and floors is used wherever it is thought advisable, and the lines on which the work is carried out are such that any one passing from the stern to the bow of the boat must go through the disinfecting department. Dr. A. H. Doty, in carrying out his ideas on this boat, has produced a wonderfully efficient apparatus, and one which may be accepted as a model for future work.

The principal iron work, such as the disinfecting tank and sulphur furnace, were executed by the firm of Volk & Murdoch, of Charleston, N. C. Our thanks are specially due to Capt. Edward Crawford, chief disinfecter of the department, for information and courtesies received.



THE BATH ROOM.

How to Win Foreign Markets.

One of the greatest competitors of the United States for the foreign trade of the world is Germany. The manufacturers here are "carrying the war into Africa" by endeavoring to establish a large market for their goods in Germany itself. In response to letters sent over to Consul Wamer, at Cologne, inquiring as to the best suggestions for introducing American manufactures and products in the German market, he writes:

"I have repeatedly, in my reports to the Department of State, called special attention to what I consider to be the best method of extending American trade abroad, and that is the sending out of proper representatives, men who are thoroughly acquainted with the class of goods they wish to introduce, and who, further, have a knowledge of the language of the country they may visit. This is the way in which Germany has, to a great extent, built up and extended her foreign trade. I am sure that, if the American merchants would try this plan, they would soon be convinced of the great advantage it has over the present one of scattering advertising circulars broadcast through Europe.

"What the merchants here wish to see are the goods and some one who can satisfactorily explain to them their character and quality. I will give here an illustration of what happened in this respect in recent years with a firm who wished to introduce in Germany a very useful and practical patented machine. After having tried in vain to do so by sending out advertisements, an agent was sent over who thoroughly understood the construction and working of this machine. This agent has now been in Germany for about two years, and he informed me the other day that he had a business during the past year of about $200,000 with this one machine alone.

"I think that if the various trade journals that are taking the greatest interest in ascertaining through the consuls the new enterprises, etc., requiring American manufactures, would work with a view of interesting American manufacturers and exporters in this method of doing business abroad, they would achieve vastly better results than by their present mode of procedure. This should be observed especially in the case of patented articles, where, in many instances, there is no person directly interested and on the spot to prevent any infringement of the patent. Not infrequently I have heard of excellent American inventions copied or slightly altered and put on the market by Germans and sold at a much cheaper price and under their original name, thereby injuring American trade.

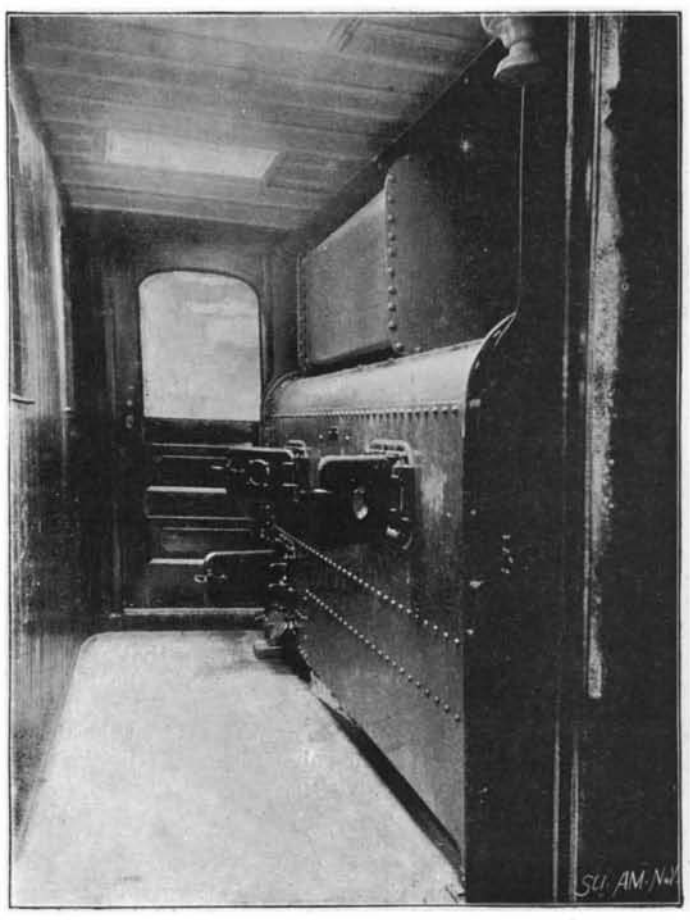
"Perhaps it would not be an unwise plan for leading American firms to unite in sending abroad competent persons to study the requirements and tastes of foreigners and to report the information for the benefit of the firms concerned. This is especially recommended where technical knowledge is required to explain the working and construction of machinery.

"Complaint has also been made that American merchants confine their trade too much to agents at seaport places in Europe, instead of putting themselves more in connection with the merchants in the interior.

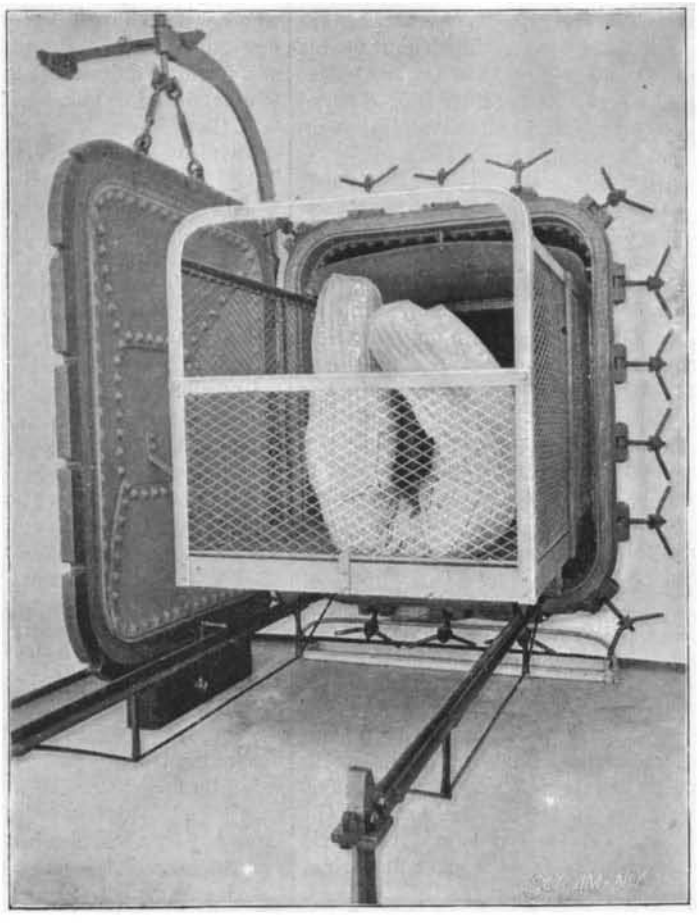
"I would further suggest the practicability of establishing a central bureau in the United States, supported by the contributions of exporting merchants. This bureau would send out capable men to study and ascertain the requirements of foreign countries and the best means of supplying them, and report such information to the central bureau for the benefit of its members."

Consul Tingle, of Brunswick, in response to similar letters, suggests the following:

"An association of American firms, say forty in number, might agree to contribute $50 a month per member for a year to a common fund, which would thus amount to $2,000 per month, or $24,000 annually. A competent manager should then be selected and an import headquarters established in Hamburg. The manager should employ a corps of ten German traveling men. The larger towns in Germany should be visited in turn by the entire corps, each member of which would be thoroughly familiarized with four articles. An exhibition room would be hired, samples carefully arranged, and the different merchants of the city in the various lines personally called upon and invited to inspect the articles in which they were especially interested. The merits of the various samples would then be fully set forth and trial orders solicited. All orders, as well as business detail, would be handled and controlled by the Hamburg office. The corps of workers would remain long enough in one town to exhaust its possibilities thoroughly and would then move on to another, until, by the time the year was at an end, the entire empire would have been covered. Should the results warrant it, the arrangement could then be continued another year or individual firms could establish their own agents in Hamburg on the foundations already made."



THE SULPHUR FURNACE.



THE DISINFECTING OVEN.

Candles in China.

It is not generally known, says the Progressive Age, that several large firms at Tientsin occupy themselves wholly with the importation of candles. Very large quantities of these luminants are imported into Shanghai from Holland, but it is not often possible to find their place of manufacture, owing to the fact that large ports such as London and Hamburg are responsible for the shipment and the contracts of delivery. In the year 1894, 1,000,000 pounds of English candles were imported into Shanghai, and the present payment for a packet of from 9 to 10 oz. is 1·85 taels, and for a packet of 12 to 16 oz., 2·40 taels. These are the sizes mostly in favor with the Chinese consumers. Most of the import firms of Shanghai do business in this trade, but it is extremely likely that in the near future Japanese competition will threaten it; in this, as in other trades, busy Japan has commenced operations.

THE juice of a pineapple cuts the membrane from the throat of a diphtheria patient when nothing else will.

Science Notes.

The degree of LL.D. has been conferred by Harvard University on Prof. Alexander Graham Bell.

In 1894 the Academie des Sciences opened a subscription for the erection of a statue to Lavoisier, who died in 1794. Some $9,500 has been collected, and the execution of the statue has been given to M. Barrias. The Czar of Russia has been a large contributor.

A piece of furniture is now made to keep bicycles in. It is of handsomely carved wood and intended to stand in a hall. It comes in two parts. The lower, which is made a little higher than the wheels, opens with two broad doors, while the upper is much narrower, being intended to accommodate the handles and saddles. A shelf is provided to hold any extras one may have, as hats or gloves.

According to C. E. Benham, although a little of the color of the pearl is caused by striations or fine grooves on the surface of the nacre, the greater part of the color is produced by interference of the rays of light by reflection from the outer and inner surfaces of the thin layers of nacre forming the substance of the pearl. The colors of a pearl have, therefore, a similar origin to those of a soap bubble or the iridescence of ancient glass which has been scaled by time.

According to recent experiments described in the Medical Record, each pint of air breathed in by an adult contains about 15,000 microbes. In some places the number is as high as a million, but the average city number is about as stated. This microbe-laden air is taken into the air passages, and when it is thrown out it is quite sterile. The air has further been found to be sterile in the naso-pharyngeal cavity. The inference is that the nose is a most powerful microbe destroyer, and this fact shows also how important it is to draw the air through the nasal passages.

Mr. Witmer Stone refuses to accept the idea of Gatke that feathers can actually change their color without moulting, unless they are bleached or worn off. He also concludes that the annual moulting is a physiological necessity and is common to all birds; whereas the spring moult and striking changes of plumage effected by abrasion are not physiological necessities, but depend in extent on the height of development and coloration in the adult plumage, and do not necessarily bear any relation to the systematic position of the species.

Experiments made some time back with a new photochronograph have served to correct some of our notions connected with the velocity of projectiles. It appears that in the case of the gun employed, being a $3\frac{5}{2}$ inch field gun, firing a shell weighing 14¼ pounds, with a powder charge of 3¾ pounds, the projectile attained its maximum of velocity at a point situated 6½ feet from the muzzle, the increase of velocity from the muzzle up to this point being 2½ per cent. From this point the velocity gradually decreased, and at 99 feet from the muzzle it had fallen off so far as to be equal to the muzzle velocity.—Revue de l'Armée Belge.

Potassium platino-cyanide is still preferred by Jackson, the English physicist, as the fluorescent substance in experiments with Roentgen rays. He gets twice as much light as from calcium tungstate, and is able, with moderate electric energy, to see distinctly the bones in the thickest part of the body, the jawbones in action, and the outline of the skull. He uses two-thirds of an ounce of the potassium salt in a mucilaginous vehicle over a six inch disk of black cardboard, and affirms that Edison tried too little. Zickler, a German experimenter, has made radiographs with and without visible fluorescence, and finds the latter results equal or better than the former, with the same exposure, thus demonstrating that the rays have a direct chemical action on the plates.

The observers at the Blue Hill Observatory, near Boston, have sent word to William A. Eddy, of Bayonne, that a three pound meteorograph, made by Richaud, of Paris, was raised by them by means of two and one-eighth miles of piano wire, on July 20, to a height of 5,961 feet above the hill, thus breaking all kite altitude records. Three Eddy kites, made by Fergusson, passed through and beyond the clouds, and were only visible at intervals between breaks in the clouds. The kites and instruments remained at the highest point half an hour and exerted a pull of from 110 to 120 pounds. The recording instruments showed that the air was very dry above the clouds and about 18° colder than at the earth's surface. The ascension was managed by Messrs. Rotch, Clayton, and Fergusson.

The farmers of North Holland, says a correspondent of the Gas World, have come into possession of a very interesting source of lighting. About forty years ago borings for water in the polders round the Haarlem Lake, at farms below the level of the surrounding sea, brought up inflammable gas; but, as this gave no light, it was neglected. Now, however, this gas is being systematically bored for, and it comes up mixed with sweet water, making this water effervesce. The effervescing water is brought under a gas holder, and the gas is liberated while the water flows on. About six cubic feet per hour are thus collected from each boring, and the singular result is that many outlying farms, away on the polders of North Holland, below sea level, are brightly lit up at night by incandescent burners.

Silver Mining—Method of Mining and Reducing.

BY WILLIAM P. KIBBIE.

Silver, like gold, has been known from the earliest times. The silver mines of Mexico were, until only a few years ago, the richest in the world. Their estimated yearly production is 1,500,000 pounds pure metal. The recent discoveries made in the western regions of the United States, however, appear to have increased the silver yield in this country to such an extent that our mines now produce two-thirds of the entire silver in the world. Chile and Peru come next, while in European countries, Spain is the most productive, the richest mines being those of Hiendelaeneina, in the province of Guadalaxara, which were first opened in 1846.

These mines have yielded millions of wealth, but their product since 1859 has very materially declined. Next in order are the Saxony, Austria, and Harz districts in North Germany. The silver mines in Norway are also valuable.

Great Britain has no silver mines, properly speaking, but since the introduction of a process for the desilverizing of lead smelted from argentiferous galena, a large quantity is annually produced in this way.

The forms in which silver is found are many, but only a few need be mentioned. Very frequently it is found native, in crystallized amorphous masses, which generally are of considerable size. One piece found at Kongsberg, Norway, weighed 500 pounds.

The quantity of silver found in the metallic state, however, is comparatively small. Its principal ores are sulphides or sulphurets—silver glance, or sulphuret of silver, containing, when pure, 87 parts silver and 13 of sulphur; brittle silver ore, or sulphuret of silver and antimony, having 68·5 silver and 14·7 antimony, 16·4 sulphur, and carmine silver ore. The greater part of the produce obtained in Mexico is gotten from these ores. Besides these a great deal of silver is found mixed with other metals such as copper and gold.

THE REDUCTION OF SILVER.

The process that is simplest in ordinary smelting is applied only to the richest ores. These are crushed and mixed with slag, lead and a fraction of iron ore and lime. The whole is then heated in a furnace with charcoal, which brings down the silver and lead at the same time as an alloy. The silver is afterward separated by cupellation.

Many of the richer ores, however, are not pure enough to be treated with advantage by roasting them with lead, etc.; and another plan, known as the amalgamation process, is now in common use. In amalgamation, the vein stuff is ground to a powder. A little sulphuret of iron and about 10 per cent of common salt is added, and the mixture heated in a furnace to a temperature sufficient to expel water, and in part arsenic and zinc. After about two hours the sulphur of the sulphurets takes fire, and is burned off as sulphurous acid, or converted into sulphuric acid, so that the metals become oxides and sulphates. The temperature of the furnace is next raised, when the chlorine of the common salt forms volatile chlorides with zinc, iron, and antimony, and a fixed chloride with silver. The contents of the furnace are continually stirred during the roasting, so that in a given time they form a coarse powder.

After being ground to a fine powder the product is mixed with water and iron in proportion of 10 cwt. and 1 cwt. respectively, the mixture being effected in wood casks shaped like a barrel. During the amalgamation the iron decomposes the chlorides in the roasted ore, forming chloride of iron, while the copper is somewhat reduced to subchloride and metallic copper.

If there is not enough iron present to convert the copper into subchloride, then the mercury will be wasted in the next stage by conversion into its subchloride. Quicksilver to the amount of 5 cwt. is next run into each of the casks, which are set in motion and continue for about 22 hours at the rate of about 13 revolutions per minute. The result of this is that the silver, being precipitated by the presence of metallic copper, is then dissolved by the mercury, but the amalgam so formed is a complex one.

In order to separate the amalgam from the earthy matter, the casks, which are only about two-thirds full, are now filled with water, the dilution casting aside all chloride of silver held in solution by the salt, and kept revolving for about two hours; after which, by means of a stop cock, the amalgam is to flow into the amalgam chamber, and the rest of the contents into the washer.

The quicksilver is next separated from the amalgam by means of bags through which the mercury flows by its own weight and is afterward squeezed through on a flat surface. The result of this operation is that the amalgam of mercury, silver, etc., is left in the bags, its actual composition being mercury 83 per cent, silver 10 per cent, copper and lead 5 per cent.

Finally, the quicksilver of the amalgam itself is separated by heat in a distilling furnace. Here the amalgam is put into a row of iron pots, which go into a large receiver. When heat is applied, the quicksilver volatilizes, and is condensed in a pipe attached to the retort, from which it is collected in launders. The impure silver left in the retort is refined by fusion and subsequent cupellation.

Cycle Notes.

A strong solution of washing soda (sodium carbonate) in hot water will be found to be excellent as a cleansing agent for dirty lamps.

It has been generally supposed that a bicyclist was comparatively safe in a thunderstorm, owing to the insulation from the ground afforded by the pneumatic tires. The recent death of a Chicago cyclist from lightning, while riding on the wheel, would seem to prove that this immunity does not exist. The tires, the machine, and the clothing of the cyclist are very liable to become soaked with rain, affording an excellent conductor for the electrical bolt.

Bicycling is to be made easy by a new "house-to-house cycle cleaning and insurance company," just floated in London with a capital of $1,500,000. It will establish depots for the cleaning, storing, repairing, and sale of cycles, and for an annual payment of $6.50 by subscribers will send people to their houses to clean their machines, will insure them for $500 against death and $250 against serious personal injuries while cycling, will store their machines when not in use, and teach them to ride.

According to English statistics, the yearly loss attributed to the bicycle craze is as follows in various trades and professions: Manufacturers of articles for riding and driving, £9,000,000 sterling; dealers in horses and forage, £4,000,000; carriage makers, £3,000,000; harness makers, £2,000,000; piano manufacturers, £3,000,000; watch makers and jewelers, £2,500,000; tobacconists, £1,500,000; horse cars and omnibuses, £600,000; owners of restaurants, £500,000; and physicians, £400,000.—Technische Zeitung's Correspondenz.

Covers to fit over wheels may be made of handsome cretonne or plain materials, outlined with some appropriate design. The seams should be bound with bright colored braids. These covers are very attractive and will serve the double purpose of protecting the bicycle and one's clothing, where the machine has to be kept in small rooms or halls in summer cottages. A cover made of rubber or waterproof cloth would be of advantage at the seashore or where the bicycles are kept in wire-inclosed piazzas. A rubber cover is also now made to fasten over lamps to keep off the dust.

The valve of a bicycle tire is sometimes the cause of grave trouble, and one may suspect that he has been the victim of a slight puncture, when all the trouble is in the valve. No matter how the valve is constructed, an essential part of every one is a rubber washer. As everybody knows, rubber will, in the course of a few months, lose its quality and become "dead," and when this happens it is not strange that the valve fails to hold air. Some valves are so constructed that a rider with the least degree of mechanical skill can remove the plunger in case of necessity and apply a new washer, thus making the valve airtight again; and, so far as riders are concerned, such a valve would seem to have points of superiority over any other. A widely used valve, however, is so made that the plunger and washer can only beg ot at from the inside, that is, by the removal of the entire stem, a job which no one but a regular repairer would undertake. The repair men, as a rule, speak highly of this valve; how far their opinion is formed by the fact that cyclists must come to them in case repairs are necessary, is a matter for conjecture. Happily, the valve in question does not get out of order readily. Many valves are constructed with a coil spring to hold the plunger in place; others accomplish the same end through the elastic power of the rubber forming the plunger. The pressure of the air when the pump is applied compresses the spring or stretches the rubber, allowing the air to pass into the tire, and the air pressure immediately restores the plunger to its position, with the washer held tightly in place. Riders have been known, when something appeared to be wrong with a valve, to put a drop of oil in it, forgetting that the effect of oil on rubber is anything but good, and that a valve is never in need of oil to make it work properly. The cap of a valve is commonly an essential part of it, although it ought not to be. At the same time, it will often happen that a valve which, when tested with the cap off, will show a slight leakage of air, will be found airtight with the cap firmly screwed in place. In fact, the caps of some valves are provided with a rubber lining at the inner end, so as to make as tight a joint as possible. In any event, it is unwise to use a tire when the cap of the valve has been lost, since dust and dirt are sure to enter and be the cause of trouble. Apropos of what is said about valves that leak and cause trouble, it not infrequently happens that a valve which allows the air to escape slowly when the bicycle is not in use will serve its purpose all right when the machine is ridden. The reason for this is that the air pressure on the inside of the valve is increased by the rider's weight and the washer thus pressed firmly into its place, shutting off the escape of air. Of course, such a valve is not a good thing to have, but at the same time a rider may feel reasonably safe in going out for a day's run, even if his tire was "flat" in the morning. In such a case, though, it would be a great mistake not to carry a pump.—New York Tribune.