THE JAGUARS.

The jaguar (*felis onca*) is the largest of the carnivora found on either of the American continents; and its size, strength, and ferocity are such that it is often called the South American tiger. It is found both in North and South America, generally between the tropics, and as far north as the Red River, La.; and the larger specimens are but little smaller than the average tiger of Asia. The hight at the shoulder is frequently nearly three feet. The skin is beautifully marked with black circles enclosing grayish spots, on a ground color varying from light brown to ashy yellow; but the configuration of the marks varies widely on different specimens, and sometimes even on the same animal. Humboldt states that 2,000 jaguar skins are annually exported from Buenos Ayres, and they are much valued for their beauty.

The habitat of the jaguar is generally a thick forest. especially in the neighborhood of a river, as the animal swims well, and will catch fish for its meals when flesh is scarce. When driven by hunger, it does not hesitate to visit the abodes of man, and its strength enables it to kill and carry off a horse or a cow with ease. Its favorite mode of attack is to leap on the victim's back, and, by placing one paw on the head and the other on the muzzle, to suddenly break its neck. It, however, rarely attacks man, and then its hunger and ferocity are such as to make it terrible. It is very fond of turtles, and extracts the flesh from the shell with great skill.

A recent writer asserts that the variation of the marks on the skin of the jaguar is due to climatic influences, the species being found over territory ranging from 32° south latitude to 25° north, from the Argentine Republic to Texas. Like its Asiatic cousin the tiger, the jaguar cannot be tamed, long confinement, ample food, and kind treatment doing nothing to check its ferocity. It is therefore a constant source of alarm to the neighborhood where it lives, which alarm is not diminished by the fact that its predatory excursions are always made at night. It is exceedingly subtle, approaching its prey noiselessly, and walking behind bushes or other screens till near enough for action; it then makes some slight noise with its tail, which alarms the victim and seldom fails to induce him to move to find the cause of the disturbance. The jaguar then springs on the neck of the prey, tears the throat to pieces (or breaks the neck, as above described), and carries off some portion of the carcass; next day it will probably return for another meal, and this gives an opportunity of tracking the beast to his lair. But although the jaguars are numerous in the region which we have mentioned as their home, their sagacity enables them to keep well concealed and out of the range of the rifle.

The family group depicted in our illustration is now in the Zoölogical Gardens, Cologne, Germany, and the specimens are of great beauty. Jaguars are also to be seen in the Zoölogical Gardens in London and in Amsterdam, and others were, and probably now are, in the Jardin des Plantes in Paris.

The Manufacture of Lubricating Oils.

The records of the Patent Office contain almost the only description of the improvements that have been made in the manufacture of lubricating oils. These records are inaccessible to the great majority of people, but they are of great value to any who are interested in the manufacture of oils, frequently containing suggestions that lead to other discoveries and to valuable improvements. We give below descriptions of two improvements in lubricants, which the *American Manufacturer*, of Pittsburgh, Pa, has compiled from the Patent Office records.

The first invention consists in a compound of residuum formed from the distillation of petroleum oil, Carolina tar, and petroleum, or any liquid fatty substance for producing a cheap and durable lubricating oil that will not gum in using. The function of this residuum is to give body and consistence to the compound. The Carolina tar contains an acid, and separates all granulous substances which are injurious to the lubricating qualities of the oil. The introduction of petroleum oil is to reduce the compound to a proper gravity.

To prepare the oil, take the following relative proportion of the above ingredients, the quantity of each being proportionately increased or diminished, according to the aggregate quantity of the compound desired: To about 1,600 gallons of the residuum, add about 150 gallons of Carolina tar, and boil them together in a tank with steam heat for about 6 hours; then turn off the heat and let it settle for 6 hours; then draw it off into another tank and add a sufficient quantity of petroleum or other liquid oils to reduce the mixture to a proper gravity for lubricating purposes. The proportion of Carolina tar to the above quantity of residuum may vary 20 gallons either way; but the relative quantities stated are found to best answer the purposes of manufacture.

The second invention consists in a lubricating compound made of mineral oil, plumbago, flowers of sulphur, and soapstone, to which may be added tallow, rock salt, and palm oil, in such a manner that the plumbago and soapstone act as vehicles to distribute the lubricating material, while the flowers of sulphur and the rock salt act particularly as coolers.

In carrying out this invention, mix the ingredients in the following proportions: Mineral oil, 4 lbs., 7 ozs.; plumbago, 10 ozs.; flowers of sulphur, 8 ozs.; soapstone, 4 lbs, 7 ozs. It will in some instances be found desirable to increase the body of such compound, and in such to have present a cooling agent, and to provide for such, to employ, in connection with the aforesaid ingredients, tallow, palm oil, and rock salt, and under such conditions that good results are produced when the proportions are made: Mineral oil, 3 lbs.; tallow, 2 lbs.; plumbago, 4 ozs.; rock salt, 4 ozs.; palm oil, 4 ozs.; flowers of sulphur, 2 ozs.; soapstone, 4 lbs., 2 ozs.

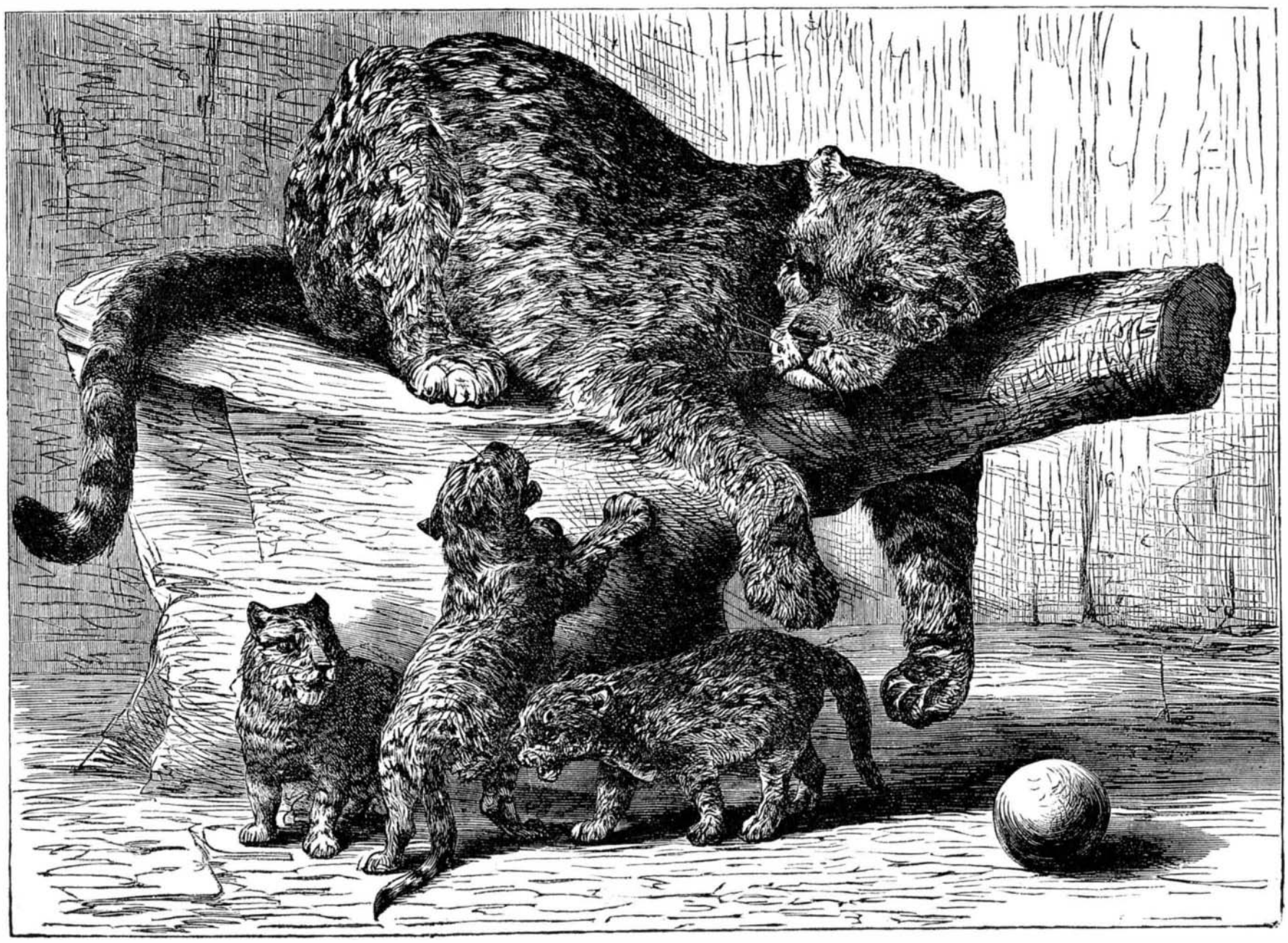
In mixing these ingredients together, heat the mineral oil slightly, and stir in the soapstone in a finely pulverized state; then add the plumbago, also pulverized, and finally the flowers of sulphur, stirring the mass until a homogeneous mixture is produced. If tallow, rock salt, and palm oil are used, melt the tallow; then add the mineral oil and palm oil, and, while this mixture is yet hot, stir in the remaining ingredients until a homogeneous mass is produced.

The object of the flowers of sulphur and of the rock salt is to keep the journals cool; and the soapstone and plumbago also have somewhat the same effect, while they are used particularly as vehicles to distribute the lubricating material uniformly over the journal, and to prevent the journal from coming in contact with the box.

Brave Boys.

At Rochester, N. Y. lately, says the *Democrat*, one Friday night a man threw a small dog into the river from the railroad bridge. Instead of passing over the falls, as was expected, the dog reached a large piece of ice close to the brink. He was seen there Saturday, Sunday, and Monday, but no one ventured to rescue him. An attempt was made to induce him to jump into the river by throwing stones at him, but it failed. The moaning of the dog, during the night, was painful to listen to. About noon on Tuesday, two small boys passed over the bridge, and, seeing the dog, determined to rescue him. Neither one of them would go alone, but each challenged the other to go with him. They started, walked through the cold water to where a single misstep would have sent them to their death below the falls, picked up the poor dog, and regained the bridge in safety, to receive the hearty compliments of those who had witnessed their daring adventure. The dog when rescued had been on the ice just above the brink of the falls for four days, and was so weak that he could not stand up. It would afford a great deal of satisfaction to many that witnessed the dog's misery to see the man who threw him into the river properly punished.

To SOLDER German silver, pour out some spirit of salt in an earthenware dish, and add a piece of zinc. Then scrape clean the edges to be soldered, and paint over with the spirit of salt. Apply a piece of pewter solder to the point and melt with the blowpipe.



FEMALE JAGUAR WITH HER YOUNG.

British Trade Mark Registration.

A new act of Parliament takes effect January 1, 1876. Its provisions, so far as they go, are good enough, but it is our duty, says *Iron*, to call the attention of our readers to the important fact that no very great space of time is afforded them for registering their trade marks. An office for registration is to be opened not later than January 1, and it is also enacted that *no person shall be entitled to institute any proceedings for any infringement of a trade mark after the first of July next, unless such trade mark be registered.* Six months, then, comprise the margin allowed for the registration of existing trade marks in the United Kingdom—no very long period when we consider the tardiness of our country in adopting a system long since recognised and enforced in others. There will be a great deal of work to be got through in the first six months of the ensuing year, but, with the experience of the Patent Office to guide them, the Commissioners of Patents have ample means for forming a system.

Readers of *Iron* will, of all people, the least need reminding of the importance of securing the legitimate trader in the enjoyment of the peculiar device by which he distinguishes his goods. To the public it is an indisputable advantage that cutlery or other goods should bear not only the name, but the mark of the maker, while the strict inviolability of his cognisance is to the latter of vital necessity. As the ancient craftsman hung out a sign over his shop to tell his business to the large majority of clients who could not read his name, so have modern manufacturers, whose goods are carried all over the world, among men of every color and language, adopted marks which speak a language equally comprehensible to the Tartar and the Guacho. No stronger proof of the value of a symbol which has been impressed upon goods of special quality can be brought forward than the evil persistence with which the most celebrated trade marks of Sheffield were pirated in the days when commercial treaties as yet were not. The mere name of the maker, which might appear sufficient for every purpose to those who have not given much thought to the subject, practically affords the slenderest kind of protection. It would be impossible to restrain another maker of similar name from putting it upon goods made in imitation of those which have acquired world-wide renown, and a trick not unknown in local elections in the West of England—the finding of a man of straw bearing the same name as a popular favorite—would be easy of perpetration. In the case of the Messrs. Coats, a firm of the same name in the United States having imitated their wrappers, and thus seriously interfered with their trade, the courts stopped the imitation, but of course could not prevent the use of the name. This restriction, however, proved sufficient, as purchasers at once saw the difference in the wrappers, and the mere similarity of name did little harm. Glenfield starch, again, has often been inquired for as the starch "with a long chimney upon it," and Asiatic customers exist who buy certain English goods by the trade mark alone. It is needless to multiply instances of the superior importance of the symbol to the name: suffice it to recall the fact that one special kind of knife, which had a great reputation in certain parts of South America, went completely out of fashion in consequence of the market being flooded with inferior German imitations bearing the same mark. The advantage of a distinctive sign has received ample recognition at the hands of those best qualified to appreciate its importance. A single firm has spent in a couple of years as much as $15,000 in protecting their marks from infringement—a very practical test of the value they set upon them.

[We suppose we need not remind readers of the SCIENTIFIC AMERICAN that, under the American patent law, all trade marks, no matter how long they have been in use, may be patented, or, in other words, registered. Full information can be had at this office. No manufacturer should neglect to avail himself of this important protection.]

Preparation of Ebonite.

The use of ebonite, one of the newer preparations of india rubber, is constantly increasing, on account of its better applicability to many purposes in the arts than its near ally, vulcanite. The two substances are quite similar, being composed of india rubber and sulphur, with some preparation of gutta percha, shellac, asphalte, graphite, etc., although these latter are not essential. In vulcanite the amount of sulphur does not exceed 20 to 30 per cent, whereas in ebonite the percentage of sulphur may reach as high as 60. An increased temperature is also required for this preparation. The approved formula consists in mixing together 100 parts of rubber, 45 of sulphur, and 10 of gutta percha, with sufficient heat to facilitate the combination. In manufacture, a sufficient quantity of this mixture is placed in a mold, of a desired shape, and of such material as will not be affected by the sulphur contained in the mass. It is then exposed to heat of about 315° Fah. and a pressure of about 12 lbs. to the square inch, for two hours. This is done most readily by placing the mold in a steam pan, where the requisite pressure and temperature can easily be kept up. When cold, the ebonite is removed from the mold, and finished and polished in the usual manner.

The Dioptric Light.

We published in our issue of December 4, 1875, an illustration and description of a dioptric light, the invention of Major-General Meigs. We have since received a number of communications relative to its being an old device. One is from Mr. W. C. Gayton, of Chicago, Ill., in which he claims that the spherical lens has been in use in England for more than 30 years. It is much used by lace makers, he states, who require a strong light; and a single candle, if surrounded by a circle of these glass globes filled with clear water, will give light enough for four or five women at this work, which is very trying to the eyes.

C. G., of Upper St. Clair, Pa., states that another form of the device consists of a globe half filled with water and half with lard oil. This forms the lamp, and a globe of water is suspended at a little distance, so as to throw a clear light on the work.

THE NEW NEBULAR THEORY—POSSIBLE WORK FOR THE ASTRONOMERS.

In a recent issue we published a brief note calling attention to a recent experiment, made by a French scientist, in which a cloud of metallic particles, carried from an electrode by the electric current, assumes, in the midst of an environing liquid, a gyratory spiral movement, under the influence of a magnet. It will suffice to glance at the annexed engravings (taken from *La Nature*), which well represents this experiment, to recognize the forms of the spiral nebulæ described by Lord Rosse, some of which have the curvature of their branches directed opposite to the course of the hands of a watch, as shown in Fig. 1, as in the case of the nebula of *Coma Berenices*, etc., and others in the same direction, as is seen in the nebula of *Canes Venatici*. In view of this somewhat striking analogy, M. Gaston Planté's suggestion, that the nuclei of these nebulæ may be constituted by electrical action, and that the spiral form may be determined by the presence of highly magnetic celestial bodies in the vicinity, seems not wholly improbable. The gyratory motion in opposite directions would then be explained, as the experiments show, by the nature of the pole of the magnet which happened to be turned toward each nebulous mass, as indicated by the positions of the arrows in the engravings, and the magnets, A and B.

Fig. 1.

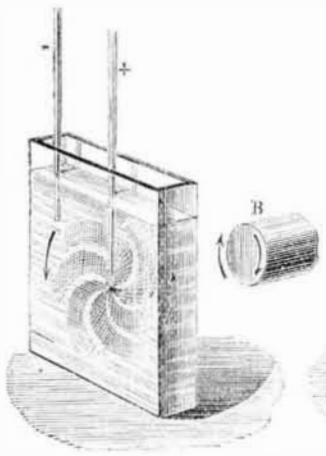
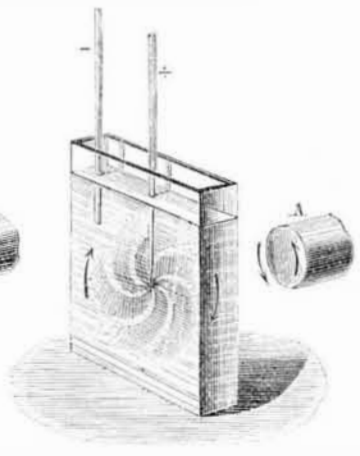


Fig. 2.



If this view be accepted, the next step is to examine known stars in the vicinity of the nebulæ, in order to determine which, by their position, are capable of exerting this magnetic influence, or to explore the heavens about the axes on which the spirals appear to revolve, in order to discover new bodies to which the same result may be attributed. Then, if a star be found satisfying the conditions, it will become necessary to search along the line passing through the centers of the nebula and the star, to find out whether there is, in relation to the other magnetic pole of the star, a second nebula, the spirals of which, turned in opposite direction to the magnetic currents of that pole, appear nevertheless to the observer as if rotating in the same direction as the first nebula. These three bodies would then constitute a symmetrical system, and the hypothesis that such might exist is not inadmissible in view of the vast profusion of cosmic matter distributed through stellar space.

Such researches as are above described would require the most powerful instruments; and if they should lead to the results indicated, decisive proof might be considered as deduced in favor of the electric origin of the heavenly bodies.

M. Planté, in answer to the objection which might be raised, that there does not appear in space any conducting medium leading an exterior electric current to the center of the nebulæ, recalls other experiments made by him with powerful electrical sources. He states that he has observed small luminous rings, composed of incandescent particles, quite detached from the electrode. These rings, the interiors of which were agitated by liquid currents, moved in the space comprised between the electrode and a larger luminous ring formed about them by the impact of the electric wave against the sides of the voltameter.

These rings, he considers, are true electrical nuclei, separated from the principal flow which generated them, and analogous to the nuclei of isolated stars or to stellar agglomerations, such as those which constitute the annular nebulæ of *Lyra, Cygnus*, and the Milky Way. He adds the somewhat startling assumption that the large luminous ring, which forms the limit of the development of the electric wave in the voltameter, might even reveal to us the existence of an immense annular nebula, which, though to us invisible, might envelope all others, and form the extreme wave of the general electrical movement of the Universe.

Mr. Lick's Mammoth Telescope Again.

We are pleased to learn from our California exchanges that, at a meeting held on December 7, of the Regents of the University of California, a communication was received from Mr. Lick, apprising them of his bequest of the sum of seven hundred and fifty thousand dollars, to be expended under his direction in the construction of an astronomical observatory and the purchase and erection of the largest and best telescope that art and science can produce. The spot selected for the placing of this telescope is upon the summit of Mount Hamilton, in the county of Santa Clara. This mountain is some 1,400 feet higher than Mount Diablo, and is said to be free from fogs at all times of the year. The county of Santa Clara has charged itself with the building and maintenance of a good road to the summit; and the Regents of the University have made application for a section of the land, to be listed to the University, with a view of devoting it to the purposes for which it is designed by the generosity of Mr. Lick. It is estimated that the purchase and placing of the telescope and other scientific apparatus will cost about $300,000, leaving a fund of $450,000 for its maintenance and for instruction in this department of Science.

New Alloy for Iron.

BY PROFESSOR SERGIUS KERN.

Experiments proved that, by using chromeisen instead of spiegelesen, extremely soft steel is obtained; rods made for experiments were very easily bent, even by hand. It is seen, from these attempts to replace spiegeleisen by chromeisen, that the use of the chrome iron alloys is limited, and the steel obtained is for most purposes too soft for the manufacture of such materials as rails, axles, tires, etc.

During some experiments with the chrome iron alloys, a strange phenomenon was observed. It is well known that chromium is extremely hard, and scratches even hardened steel; meanwhile an alloy was obtained which was malleable, and in a fresh state could be easily bent. It was also remarked that sometimes in opening the crucibles nothing but slag was found; but in breaking the crucibles, the alloy was found to be in the bottom of them. That may be attributed to the corrosive properties of the liquid alloy, which often penetrated even through the bottoms of plumbago crucibles.

The abovementioned alloy was analysed, and the following average composition was found:

Metallic iron, 96·40 per cent, metallic chromium, 2·30 per cent; carbon, traces; lime, silica, 1·30; total, 100·00.

By melting a mixture of cast iron, tin, and lead in the following proportions, a very liquid alloy is obtained:

Cast iron, 79·00 per cent; tin, 19·50 per cent; lead, 1·50; total, 100 00

The alloy has a very handsome appearance, and fills perfectly well the casting molds; thus it could be used for casting small articles. The alloy is to some degree malleable.—*Chemical News.*

Something New in Boiler Flues.

The National Tube Works Company, of McKeesport, Pa., says the *Times*, are now manufacturing wrought iron lap-welded tubes in all sizes up to fifteen inches diameter, the larger of which are now being adopted on our steamboats for boiler flues, instead of the riveted flues, and the following steamers are now using them for this purpose: Steamer Vince Shinkle, two boilers, forty seven inches diameter and twenty-four feet long, ten lap-welded flues in each, of eight inches diameter; steamer Cons Miller, two boilers forty-one inches diameter, twenty-four feet long, with six lap-welded flues in each of ten inches diameter; steamer Golden Rule, three boilers, forty-four inches diameter, twenty-six feet long, with three eight and three ten inch lap-welded flues in each. These tubes are giving perfect satisfaction, and the local inspector at Cincinnati says they have proven themselves all that could be desired. There are many advantages claimed for these tubes, as flues, among which we might mention the following: They are cylindrical in form, a point not claimed for the riveted flue, thereby lessening the chances of collapsing, if not absolutely preventing accidents of this kind. There are no rivet heads or laps to interfere with the draft, and consequently the flues are not liable to choke up with soot, are much less apt to scale, and, having a smooth unbroken surface, are of course much more easily cleaned, a fact that will be appreciated by the firemen. Another point claimed is that they are of uniform gage, having no rivets or laps, and must naturally require much less fuel, a fact that will undoubtedly receive due consideration.

Waterproof Tissues and Paper.

Les Mondes says that bichromate of potassa has the property of rendering glue and gelatin insoluble in water. Thus paper, and stuffs of cotton, linen, or silk, if once coated with this insoluble glue, become perfectly impervious. To render glue insoluble, it is sufficient to add, to the water in which it is dissolved, 1 part of bichromate to 50 parts of gelatin. The addition is only made at the moment when the liquid is to be used. The process is conducted in full daylight. The Japanese make their umbrellas with paper prepared in this manner.

The Brighton Express.

Brighton is fifty-three miles from London, and the railroad which connects these two cities is the famous one of the world for speed, for safety, and for the enormous wealth of its commuters. From fifty to sixty miles an hour is the rate of speed, and there are no stopping places. A billiard ball does not roll over the green cloth with more ease than this train moves. A correspondent of the *Evening Post* says: "I have seen the sea at Brighton, and fifty-three minutes afterwards I have seen the dome of St. Paul's through the fog of London. The tracks are kept in perfect order, and the cars are built of solid mahogany."