such plan, we should think it quite possible to obtain a tolerably sharp impression in gold or platinum on a zinc plate, and from a sensibly dry paper print, provided the action of the chloride in the first instance is properly regulated, and the pressure to which the print and plate are together subjected is sufficiently great.—*British Journal of Photography.*

Scientific American.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

NO. 37 PARK ROW, NEW YORK.

O. D. MUNN. A. E. BEACH.

TERMS.

One copy, one year		$3 00
One copy, six months		1 50
CLUB RATES	Ten copies, one year, each $2 50	25 00
	Over ten copies, same rate, each	2 50

VOL. XXIX., No. 5 . . [NEW SERIES.] *Twenty-eighth Year.*

NEW YORK, SATURDAY, AUGUST 2, 1873.

Contents.

(Illustrated articles are marked with an asterisk.)

LATENT HEAT.

According to the material theory of heat, there is a certain substance called caloric, which makes bodies that contain it hot, and causes them to become cold when it is withdrawn. It was observed, in converting solid bodies into liquids and liquids into vapors, that the bodies took up a great deal of heat that was not indicated by the thermometer, and on this account the heat of liquefaction or vaporization was said to be latent, a name that it retains at present. Though this heat cannot be shown by the thermometer, its existence can readily be proved. Water is a substance which can easily be made to assume the condition of a solid or a vapor, being called ice in the former and steam in the latter state. Suppose that we have a pound of ice, at a temperature of 32° Fah., and that we mix it with a pound of water at 212°, the ice will be melted, and we shall have two pounds of water at a temperature of 51°. Now take a pound of water at a temperature of 32°, and mix it with a pound of water at 212°; the resulting mixture of two pounds will have a temperature of 122°. Hence we see that the ice, in melting, has absorbed enough heat to raise two pounds of water through a temperature of 122 —51=71°, or one pound through 142°, and we say that the latent heat of the liquefaction of water is 142°. The latent heat of the vaporization of water can be determined in a similar manner by condensing a pound of steam at 212° with a given weight of water at a known temperature, and also by mixing a pound of water at a temperature of 212° with the same amount of water as was employed in the case of the steam, and observing the difference of temperature of the resulting mixtures.

Thus, a pound of water at 212°, mixed with ten pounds at 60°, gives eleven pounds at 74°. A pound of steam at 212°, mixed with ten pounds of water at 60°, gives eleven pounds of water at 162°. In other words, the steam, on being condensed, has given out heat (which was not previously sensible to the thermometer) enough to raise eleven pounds of water through a temperature of 162°—74°=88°, or one pound through 968°, and we say that the latent heat of the vaporization of water is 968°.

The mechanical theory of heat is now generally adopted; it considers that heat and work are interchangeable, and on this theory we shall be able to explain what becomes of the latent heat. All solid bodies are supposed to be made up of molecules, which are not in contact, but are prevented from separating by a force called cohesion. If a body is heated to a sufficient temperature the force of expansion becomes equal to that of cohesion, and the body is liquefied; and if still more heat is applied, the force of expansion exceeds that of cohesion, and the liquid becomes a vapor. But in each of these changes work is performed, and the heat that is supplied is converted into this work. For instance, if ice is at a temperature of 32°, and heat is applied, this is converted into the work that is developed in changing into water, and we say that heat becomes latent; and when water is at 212°, and we continue to apply heat, this is converted into the work that must be done in changing the water into steam. From this statement, it will appear that what is ordinarily known as latent heat would be more properly called converted heat, since it has been changed into work.

We can readily determine the amount of work that is performed in any given case, and will now show how the calculation is made. A unit of heat is the amount of heat required to raise a pound of water one degree in temperature. The mechanical equivalent of heat is the amount of work that is performed by the conversion of one unit of heat into work. This has been determined to be equal in amount to the work required to raise 772 pounds one foot high, or one pound 772 feet high. And as heat and work are mutually convertable, if a body weighing one pound, after falling through a hight of 772 feet, were to have its motion suddenly arrested, it would develope sufficient heat to raise the temperature of a pound of water one degree. Let us apply these figures to the work done in changing water into steam. Two kinds of work are here performed. If a pound of water at a temperature of 212° is converted into steam, the latter will have a volume of about 27¼ cubic feet. Suppose that the water is evaporated in a long cylinder, of exactly one foot cross section, open to the atmosphere at the top. Then when all the water has disappeared, we shall have a column of steam 27¼ feet high, which has risen to this hight against the pressure of the atmosphere. The pressure of the air being nearly 15 pounds per square inch, the pressure per square foot is 2,115 pounds; and the external work performed by the water, in changing into steam, will be an amount required to raise 2,115 pounds to a hight of 27¼ feet, or about 57,644 foot pounds. And since 772 foot pounds of work require one unit of heat, the external work will take up 57,644÷772=74·67 units of heat. But we have seen that the total number of units of heat required to change water into steam is about 968 (more accurately, 966·6); hence the internal work will be equal to an amount developed by the conversion of 966·6—74·67=891·93 units of heat into work; and this will equal 891·93 × 772=688,569 foot pounds.

We have received, of late, quite a number of inquiries on the subject of latent heat, and have endeavored in this article to present the matter in so broad a light as to answer all these questions. It is exceedingly important that those who are endeavoring to effect improvements in the economical working of prime movers should understand these things clearly, so that they can work intelligently, knowing in what direction improvements are needed. We shall probably refer to the use of the steam in a subsequent article.

FRENCH TELEGRAPHY AT THE EXPOSITION.

A correspondent of the New York *Evening Mail* writes to that paper from Vienna as follows:

"I am sorry we are not represented in telegraphic apparatus, as we have several things in America that would be worth seeing. The French telegraphic department is the best in the exhibition, and some of the inventions are exceedingly interesting. There is a machine that prints an autographic despatch, not chemically like the other autographic instruments, but on white paper with printers' ink. It cannot be described in writing, and so I will not attempt to say how it is made, except that there is synchronous action of two rollers; one may be in New York and the other in San Francisco, or in any two other places connected by a telegraph wire. A written message, a draft, a sheet of music, the portrait of a burglar, anything that can be drawn with a pen—not with a pencil—may be telegraphed from one end of the world to the other and reproduced with printers' ink on white paper, like that whereon the patron of the *Mail* reads this letter.

"Then they have a machine by which four operators can work over a single wire at once in one direction, just as one operator does with us; and by putting on four operators the other way, you can make the capacity of one wire equal to that of eight by the old system. We are now using in America a system by which a wire may be operated both ways simultaneously. The French machine is exactly four times ahead of us. They have, also, an electro-magnet that works over a hundred miles of wire."

It is evident that this correspondent is not fully posted in regard to the state of telegraphy in his own country.

The instrument first above described is the "autograph telegraph" of E. Lenoir of Paris. It is a modification of the Bakewell and Casselli instruments, invented years ago. The message to be transmitted is written on a prepared slip which is placed on a roller and turned, under a transmitting stylus. Every line in the original message produces a corresponding dot in ink on the paper at the other end of the wire. By turning the roller often enough and so repeating the transmission, the letters are dotted out at the receiving office. In an example now before us, done on the instrument described by the correspondent of the *Evening Mail*, each letter is composed of a number of dots and dashes, each representing a telegraphic-signal. In making the capital letter B, for example, some forty-two signals were employed. It is almost needless to say that instruments that involve the making of so many signals to form a single letter cannot compete in rapidity with the simple system of Morse, or the various printing instruments in common use here. The Lenoir machine is more of an electrical curiosity than a business machine.

In respect to the other instrument, by which it is alleged that eight operators can work at once on one wire, this is the invention of M. Meyer, and its capacity is greatly overrated. Mr. George B. Prescott, electrician of the Western Union Telegraph Company, during a recent visit to the continent, made an examination of this Meyer instrument. The capacity claimed for it by the inventor was only one hundred messages of ten words each per hour, which is slow work for eight operators.

The double system, referred to by the correspondent as in use here, is the Stearns duplex instrument, by which two operators may work in contrary directions over one wire. One hundred and forty-six messages have been sent per hour over a single wire by this system, using the Morse key. The American system is therefore about fifty per cent faster, although employing only two operators, than the Meyer French plan with eight operators.

The Stearns duplex system is only limited in its rate of transmission by the skill of the operators. The fastest operator has been able to reach a rate of 2,500 words per hour. Two operators having this ability would be able, by means of the Stearns instrument, to send over one wire 5,000 words per hour, or 2,500 words each way. A rate even higher than this has been experimentally obtained.

The above French telegraph instruments are not indicative of an advance or improvement over the devices in common use here. Simplicity in the instrumentation is the aim of the American telegrapher for ordinary work. Give him a Morse key and a sounder, and he is ready for instant work anywhere, from the lonely summit of Mount Washington to the crowded Babel of the stock exchange.

The observations of Mr. Prescott were that the French official consumes more time in preparing to transmit a message than is taken here to send a telegram across the continent.

ANOTHER ARCTIC EXPEDITION BEGUN.

The Tigress sailed from this port on the 13th of July *en route* for the arctic regions, in search of the remaining survivors of Captain Hall's expedition and his steamer, the Polaris. On the 15th of October, 1872, in latitude 80°02, this ill fated steamer became jammed in the ice; and in view of imminent danger, a large portion of her crew and provisions were got out upon the ice. Soon afterwards, in a heavy gale of wind, the ship broke adrift. The vessel was at this time destitute of boats, and was in a leaky condition, with thirteen souls on board. The persons left on the ice, after floating southward for several months, were finally rescued by a seal hunting vessel and carried to Newfoundland. The last they saw of the Polaris was on the 16th of October, when she appeared, under sail and steam, heading for a bay in Northumberland Island, a sheltered position where she anchored. It is supposed that here the Polaris was frozen in, as the ice in those regions commences to close in September; so that, if she remained any length of time at her anchorage, she must have been nipped hard and fast until the present month of July, when the breaking up of the floes begins. It is believed, therefore, that unless the ship managed to alter her position before being shut in, she could not move until about this time; and as her coal must of course be exhausted, she cannot have proceeded very far under sail alone. On these grounds, it is conjectured that, if the Polaris be afloat at all, little difficulty will be experienced in finding her.

The Tigress goes to Disco, Greenland, whither the Juniata, another United States vessel, has preceded her, having left New York some weeks ago, laden with provisions and coal. Starting from Disco, the Tigress will begin the important part of her cruise completely stocked, that is, with two years' rations for the forty souls composing her crew, and with all the coal she has room for, sufficient for twenty-two days full steaming. From Disco, the ship will proceed to Upernavik, where dogs, sledges, etc., will be taken aboard, and thence she will shape her course directly for Northumberland Island. If the Polaris is not where she is expected to be, and the search has to be protracted over the vast and dreary wastes in the neighborhood of the pole, there is little chance of the Tigress returning to civilization under a period of some fourteen months.

The Tigress was originally built for the seal-hunting service. She is a bluff bowed vessel, some 150 feet long by 30 feet beam. Her sides are very thick and solid, averaging from 24 to 30 inches through, and her bow is armored with plank and iron plating to enable her to resist the ice. Her motive power is a 60 horse vertical compound engine, and a two bladed propeller, capable of driving her, at best speed, about 7 knots per hour. The *personnel* of the expedition consists of Commander James A. Greer, U. S. N., commanding, Lieutenant Commander H. C. White, Lieutenants Wilkins, Berry and Sebree, two engineers, two ice pilots, one of whom is Captain Tyson of the Polaris, and a surgeon, besides about twenty-nine men, many of the latter being seal fishers and members of the former crew of the Tigress. The Esquimaux who were rescued from the ice go back home in the Tigress. This is the first arctic expedition which has sailed strictly in Government service and under military discipline.

AN AUSTRIAN FARMER'S ENTERTAINMENT.

The special correspondent of the SCIENTIFIC AMERICAN, United States Commissioner Professor R. H. Thurston, has arrived at Vienna, and our readers may shortly expect from his pen some interesting and practical letters concerning the great exposition.

Professor Thurston was lately invited, as one of a select company, to visit the celebrated farm of Herr Ritter Horsky von Horckysfeld, in Bohemia, 200 miles from Vienna, to inspect the methods and appliances of agriculture as there practiced. A special train conveyed the guests to Kolin, where they were received by their farmer host, whose farm is 5,000 acres in extent. His plows, cultivators, seeders, threshers, harvesters and other implements are numbered by scores, and are operated by hand, animals and steam power, according to the nature of the work required or the formation of the ground. The yearly products of the farm amount to $50,000, and the amount invested in machines and other improvements is $500,000. The proprietor has, among other concerns upon the farm, a beet sugar factory which cost $250,000. Briefly, the process consists in macerating the beets in water, which dissolves out the sugar; lime is then added, forming saccharate of lime; carbonic acid is then introduced, which precipitates the lime, and the saccharine liquid is then evaporated in the usual manner.

One of the features of the occasion was a simultaneous trial of various agricultural implements. At a bugle signal given by the host, a crowd of operatives, boys, girls, men and women, with asses, mules, cows, horses and oxen, all started to work in strips over the appointed field. The scene was instructive and peculiar.

In the evening a banquet was given, and in reply to the toast of America, United States Commissioner Professor Horsford made an interesting speech in German. The toast to the ladies was answered by Professor Thurston in a very brilliant manner. At 10.30 P. M. the party returned to Vienna. We gather these particulars from an interesting letter in the New York *Tribune*.

Herr von Horckysfeld is 72 years of age, and is celebrated throughout Austria for his success as an agriculturist. The excursion party numbered 150 persons, and were entertained wholly at the expense of the venerable farmer.

THE USE OF ZINC.

Although the use of zinc as a component of brass and similar alloys was known to the ancients, it did not, for a long time, meet with any use alone. In consequence, the production of this plentiful metal was a limited one. At the beginning of the present century scarce 200 tuns of zinc were produced in all Europe, while to-day the total production is at least 125,000 tuns.

It would seem as if zinc, on account of its low melting point and its relatively great power of resisting the action of the atmosphere, were excellently well adapted to the manufacture of all sorts of things, but its brittleness restricted its use within narrow limits. In 1805 it was discovered, at Sheffield, that zinc heated to 212° Fah. lost its brittleness, and from that time forward zinc began to be used alone, and especially for roofing; but this use was soon abandoned on account of the difficulty of fastening the sheets, and has been but recently renewed. For a long time only large masses, like weights, were cast in zinc. This use was not nearly sufficient to consume the quantities of zinc which could be obtained in Silesia, and hence, in 1826, the Society for the Advancement of Industry in Prussia offered a prize for the discovery of a use for zinc, which should cause an essential and generally useful increase in the consumption of the metal.

The prize was won by Berlin. Krieger, the chief mining counselor, first ascertained that it was possible to cast hollow pieces as well as plates and solid masses, and he had a number of utensils made of zinc for his household, but did not extend it farther. It happened, however, that a friend of his, named Geiss, who was the proprietor of an establishment for making fine iron castings, was hunting around for a suitable material for casting large architectural ornaments, and the idea struck him of employing zinc. He had now found a material which melted at a low temperature, and which could be cast in molds of moist sand, which was easily worked when cast, and which, above all—for this is of the greatest importance in making very large pieces—could be easily soldered. Geiss, whose factory is still standing in Berlin, now began to experiment very zealously. Beuth and Schinkel also interested themselves in it, and Berlin very soon began to employ zinc columns, capitals, architraves, cornices, and similar pieces of architectural work. The road was now broken for zinc casting, and zinc founderies sprang up rapidly in Berlin and other large cities; the price of zinc, which had fallen to $1.50, soon rose to $4.50 and the production of zinc in Europe increased, as stated, from 200 tuns in 1808 to 60,000 tuns in 1858, and to 125,000 tuns at the present time.

This remarkable increase of production, not being followed by a decrease in price, shows that the employment of zinc for casting objects of general use has been kept up, and that its use has not been limited to architecture. As soon as it became known that zinc could be so readily employed for casting, it began to be used for chandeliers and the like, where it served a good purpose as substitute for the more expensive bronze. The introduction of this use of zinc is principally due to Spinn; Devaranne employed it for theater decorations, a use founded upon the power of polished zinc to reflect the light. Finally zinc was employed for making copies of large statues, which could thus be very cheaply produced. Geiss, at the very beginning, cultivated this use of zinc, but it first came into practical use when Hossauer introduced a process of depositing, upon the zinc structures, a layer of copper by galvanic action. When thus coated, they soon acquired the appearance of genuine bronze. This use of zinc is still quite general, as it enables persons of more moderate means to possess excellent works of art. They are made chiefly by Lippold and Geiss.

At present a great variety of articles are cast in zinc in Berlin; candlesticks and still smaller objects, chandeliers and gas brackets, statues and huge architectural pieces, whole monuments, and even pieces 30 or 40 feet high and weighing half a tun, are made of this metal. All this great variety can be made in the same establishment, for the operation is exactly the same with all. If we enter a zinc foundery, we see no huge contrivances; in the court yard we saw, perhaps, a copy of the colossal "Amazon," by Kiss, as large as the original, or perhaps a monument 20 feet high; we enter the works and find very small furnaces, small crucibles, and in fact only a small space for casting. The explanation of this is in the ease with which zinc is soldered. Everything, however artistic, is cast in small pieces weighing not over ten pounds each, and then soldered together. For all such things the patterns only are kept; and when a cast is ordered a sand mold is made, the pieces cast separately, and soldered together and the joints finished off. In consequence of the small arrangements and fittings required by such founderies, their number in Berlin alone is quite considerable, there being about fifty in all. The majority of them, however, combine zinc casting with bronze casting; these are the manufactories of lamps, gas fixtures, and cheap substitutes for bronze ornaments.

The zinc founderies, in the narrower sense, whose chief productions are architectural pieces and duplicates of plastic works of art, employ about 300 hands. Berlin, where this industry originated and where it is conducted with truly artistic taste, still takes the lead therein.

SIMPLE TESTS FOR MINERALS.

One of the first tests to which a mineralogist submits a specimen is a test of hardness. Hardness is expressed in two ways: By the degrees from one to ten, or by comparison with familiar substances, which are able to scratch it or which it is able to scratch; so we must begin with a

SCALE OF HARDNESS.

1. Talc, laminated light green variety, which is easily scratched by the nail.
2. Gypsum, crystallized. Not easily scratched by the nail; does not scratch a copper coin.
3. Calcite, transparent. Scratches and is scratched by a copper coin.
4. Fluor spar, crystallized. Not scratched by a copper coin; does not scratch glass.
5. Apatite, transparent. Scratches glass with difficulty; easily scratched by the knife.
6. Orthoclase, white, cleavable felspar. Scratches glass easily; not easily scratched by the knife.
7. Quartz, transparent. Not scratched by the knife.
8. Topaz. Harder than flint.
9. Sapphire. Harder than flint.
10. Diamond. Harder than flint.

With a knife, piece of glass and a copper coin, the hardness is soon determined, and a clue to its name and value obtained.

The minerals which, like quartz, are not scratched by the knife are seldom of value as ores. Their principal uses in the arts are as ornaments, or in cutting and polishing: for example, diamonds, agates, beryls, garnets, topaz, tourmaline and corundum. The most remarkable exception to this is capiterite, an oxide of tin, with a hardness 6 to 7, infusible and insoluble, but which gives the blowpipe reaction for tin.

Ores of metals are usually heavy; and with a small pair of accurate balances, the specific gravity is easily taken. Suspend the mineral freely by a horse hair, from one end of the beam or scale pan, and weigh: next allow it to hang freely in a tumbler of water and weigh again; divide its weight in air by its loss of weight in water, and the result is its specific gravity.

The acid test is also easily applied. Effervescence indicates a carbonate, and is frequently some form of limestone. Iron ores usually dissolve in warm acid, especially if pulverized. So too most other ores of any commercial value are dissolved more or less rapidly by acids and heat.

GOLD AND PYRITES.

Gold and platinum occur in the metallic state and are dissolved only by *aqua regia*. Gold does not occur in large masses nor is it often crystallized. All these serve to distinguish it from iron pyrites, or fool's gold, of which so many specimens are sent to us for analysis. When pyrites are heated on charcoal before the blowpipe, they give off the well known sulphurous acid fumes and form a magnetic globule. Gold fuses. The specific gravity of gold is 15 to 19, that of pyrites 4·5 to 5; pure gold is scratched by a copper coin, pyrites are not easily scratched by the knife. Copper pyrites, chalcopyrites, are of a darker or brass yellow color, not so hard as iron pyrites, and dissolve in acid with a green or blue color.

TESTS FOR SOME METALS.

When gold is dissolved in *aqua regia*, the solution should give a purple color with protochloride of tin solution. Gold is also precipitated by sulphate of iron as a brown powder.

Silver dissolved in nitric acid gives a white precipitate with hydrochloric acid, which precipitate is soluble in ammonia. Mixed with carbonate of soda and heated on charcoal before the blowpipe, compounds of silver give white, brilliant metallic globules.

Lead also gives a white precipitate with hydrochloric acid, but it dissolves in boiling water. With bichromate of potash or iodide of potassium, a beautiful yellow precipitate is formed. Its compounds are very readily reduced on charcoal. Galena often contains silver, which can only be separated from the lead by an assayer.

Very dilute solutions of iron yield dense blue precipitates with yellow prussiate of potash. Since the acids sometimes contain iron, they should be tested first, and the solution greatly diluted. Ores of iron give characteristic black, brown or red streaks on unglazed porcelain.

Lime gives a precipitate with oxalate of ammonia. Barium is precipitated with lime by sulphuric acid.

Zinc and tin are not very difficult to reduce with a blowpipe, and the coatings formed give characteristic shades of green when moistened with nitrate of cobalt.

If our friends, who think they have discovered a rich ore of some sort, will take the trouble to apply the above simple tests, they will frequently ascertain for themselves that it is not all gold that glitters.

SCIENTIFIC AND PRACTICAL INFORMATION.

EFFECTS OF OPIUM.

In China, very few physicians employ opium for therapeutic purposes, though the drug plays an important part through its effects upon the customs and hygiene of the nation. In smoking opium, the taste at first is not unpleasant; but as is the case with tobacco, a person must become habituated to its use. The drug is prepared in a semi-fluid state and has a sweet oily flavor somewhat resembling rich cream. Smoking the substance for the first time, not over 130 to 150 grains per day can be used, as it is apt to cause violent vertigo, nausea, and headache. The first puffs render the smoker loquacious, then he becomes stupidly happy, and finally paleness and quick contractions of the face ensue. The sensations and dreams differ according to the temperament and nervous organization of the user. A deep sleep is generally produced lasting from two to three hours, during which time the pulse is low and very feeble. The physical effects are loss of appetite, extreme emaciation, and, frequently, idiocy.

THALLIUM FROM VESUVIUS.

Professor Palmieri has made many spectroscopic analyses of the sublimations of the fumeroles, or small holes on the crust of the volcano of Vesuvius through which vapors escape, and finds the metal thallium in most of them.

Thallium is the new metal discovered in 1861 by Dr. Crookes. In weight and appearance, it resembles lead. When burned in oxygen it yields a splendid green flame, and its chlorate, it is supposed, might be used in fireworks to advantage. Thallium is found in various mineral waters; its sulphate is very soluble in water.

IMPORTANT AFRICAN DISCOVERY.

A dispatch to the New York *Herald*, from the exploring expedition of Sir Samuel Baker in Africa, announces the discovery that the great lakes Tanganyika and Albert Nyanza are connected together, and communicate with the Nile, forming an inland sea seven hundred miles in length. Further, that vessels launched on the Nile above Murchison's Falls will be able to sail thence into and through the great lakes. This is a very important discovery, as it brings an immense and fertile portion of interior Africa into easy communication with the civilized world.

OZONE BY SLOW OXIDATION.

If a small quantity of petroleum benzine be placed in a large vessel and exposed to direct sunlight for a few days in summer, the vessel being frequently opened and shaken, the air in the vessel will contain ozone. The same change will take place in diffused daylight, or even in the dark and at a low temperature, but a much longer time is required. The slow evaporation seems to be the chief cause of this. This has been observed by Fudakowski, who published a full description of the oxidizing action of this active benzine in the "Proceedings of the Berlin Chemical Society."

HOW A SURGICAL DISCOVERY WAS ACCIDENTALLY MADE.

The *Aertzliche Hausfreund* is responsible for the following account of the cruel misdeeds of a brutal woman leading to the discovery of an important method of performing painless surgical operations.

A wicked stepmother placed a net upon the head of her eleven year old stepdaughter, and compelled her to wear it for two weeks continuously. On the 5th of March, 1872, the girl, suffering with headache, was brought to the clinic of Professor Dr. Dittel. Dr. Dittel made a careful examination of the head and found a deep furrow plowed into the head, at the bottom of which was the elastic cord of the net, covered with little caruncles. The poor girl died of inflammation of the cerebral membrane, and upon dissection it was found that not only the pericranium but also even the skull bones were cut through as if with a sharp saw. This proved what power is exerted by elastic cords, and since then Dr. Dittel has employed them for cutting off tissues and removing swellings and tumors. By this gentle means, the patient does not lose a drop of blood, suffers scarcely any pain, has no fever, and soon gets well. This method seems to have a great future in store for it. Many patients are so horrified by the sight of the dreadful knife that the date of their recovery is postponed by it, even if they do not faint quite away.

PROGRESS OF INSTANTANEOUS PHOTOGRAPHY.

During the recent naval review in honor of the Shah of Persia, at Portsmouth, Eng. a number of photographs were taken by means of dry plates, prepared by the use of the salts of uranium, after the process of Colonel Stuart Wortley. The steam vessels in motion, views of the ships with the men in the act of clambering into the rigging, yachts in full sail, all were produced in faultless perfection by the instantaneous exposure of the plates.

LA NATURE is the title of a new French illustrated scientific weekly, published in Paris. It is edited by M. Gaston Tissandier, a well known *littérateur* and *savant*, and enters a field, similar to that of the English periodical of like name, of popular science and the diffusion of recent and interesting industrial information. The journal is handsome in appearance, and in this wise rather above the standard of French newspapers; the two numbers received are well edted and entertaining.

NEW METHOD OF PROTECTING THE PLATES OF IRON SHIPS FROM CORROSION.—To prevent the corrosive action of bilge water upon the iron plates of iron ships, James Young has suggested and tried the use of lime, to neutralize the acid of the water. Actual experiment, continued for several months, shows that a small quantity of lime in the bilge water wholly prevents the corrosion of the iron plates.