The English Patent Laws.

The engineering journals and nearly all classes of industrial newspapers of London are seriously advocating a change in the English patent laws whereby the cost of patents shall be so reduced as to enable British workmen to secure to themselves their inventions. Under the present law, which seems to have been enacted for the sole benefit of the capitalist and manufacturer, the rights of the inventor are disregarded. The employer patents for his own benefit his workman's invention, and some of the newspapers find fault with Her Majesty's Parliament for the lack of interest which the members manifest on the subject in not bringing up the new patent bill for discussion.

The *Chemical Review*, lamenting over the inertness of Parliament on the proposed amendment bill, says the subject is attracting no attention within that body, and adds:

"As a nation we forget the old proverb: 'For want of a nail the shoe was lost, for want of a shoe the horse was lost, for want of a horse the rider was lost, and overtaken by the enemy.' A good patent law, which shall enable even the poor man to protect his right to his own ideas, is the nail. May we not then say, 'For want of a good patent law invention was lost, for want of invention our industrial pre-eminence was lost, and for want of industrial pre-eminence the nation was lost, being overtaken by its enemies, or, as they are called in the dialect of the day, its competitors'?

"It is sad, and at the same time almost farcical, to see what 'trifles light as air' engross public attention in preference to what is, in fact, the very key not merely to our prosperity, but to our very existence. The interests of invention ignored, and crowded meetings assembled to protest against the monument to the late so-called Prince Imperial! Surely John Bull must for ever abandon his old claim to practical common sense, and be content to rank for the rest of his days as a maudlin, moon-struck, hysterical sentimentalist!"

ENGINEERING INVENTIONS.

Mr. Marshall Wood, of Alderson, W. Va., has patented an improved railway switch which is adapted to be opened and closed by the passing engine, and it dispenses with the frog usually placed at the crossing of the rails of the switch and main track.

Mr. Eugene H. Angamar, of New Orleans, La., has patented improved apparatus for removing snow and ice from railroads and streets by heat; and the invention consists in a double furnace mounted on wheels, the wheels being incased within the fire boxes of the furnace, so that when used the whole apparatus will become highly heated, and the snow and ice melted by radiation of heat and contact with the heated surfaces.

Mr. John G. Curtis, of Ludlow, Pa., has patented a sectional boiler. The object of this invention is to provide a simple and inexpensive boiler, designed especially for burning wet tan, sawdust, etc. It is so constructed that the tubes may contract and expand without straining the joints, and so that any of the tubes may be removed for repairs and replaced without disturbing the others.

Mr. Junius Poitevent, of Ocean Springs, Miss., has patented an improved traction engine, so constructed that it may be used at will with full power for traction purposes, or as a stationary engine. The engine is especially adapted for plowing.

The Mexican Calendar Stone.

A Mexican archæologist, Señor Alfredo Chavero, has written a book to prove that the famous Aztec "calendar stone" was never intended or used as a calendar. His study of Aztec hieroglyphs leads him to the conclusion that the stone was an altar of the Mexican sun god, and the characters, hitherto supposed to be signs of the zodiac, are records of Aztec cosmogony and theogony. When they are fully interpreted, he says, we shall know positively what progress the Aztecs had made in science and religion.

Platinum and Iridium in Maine.

The list of metals now found in native condition in Maine comprises copper, silver, gold, antimony, bismuth, platinum, and iridium. The last two have recently been found in the Rangeley Lake region, associated with gold, by Mr. R. B. King, of Portland. In reporting upon some of the specimens furnished by Mr. King, the State Chemist, Mr. F. L. Bartlett, says:

"My analysis proved the compound to be gold, platinum, and iridium, and possibly osmium and some others of the rarer metals, although no tests were made for anything but gold, platinum, and iridium, the quantity not being large enough to operate on in testing for other metals, which at best occur only in minute quantities, yet usually associated with the platinum ores."

Mr. King also submitted for analysis some peculiar black sand, suspected to contain tin. It proved to be menaccanite or titaniferous iron, containing over twenty-five per cent of titanium. The finding of so many rare elements together, adds Mr. Bartlett, is interesting, and calls for further exploration. Platinum is a rare and valuable metal, and it appears to be quite abundant in the sands from Rangeley; it is not at all improbable that it may yet be worked to advantage in this region.

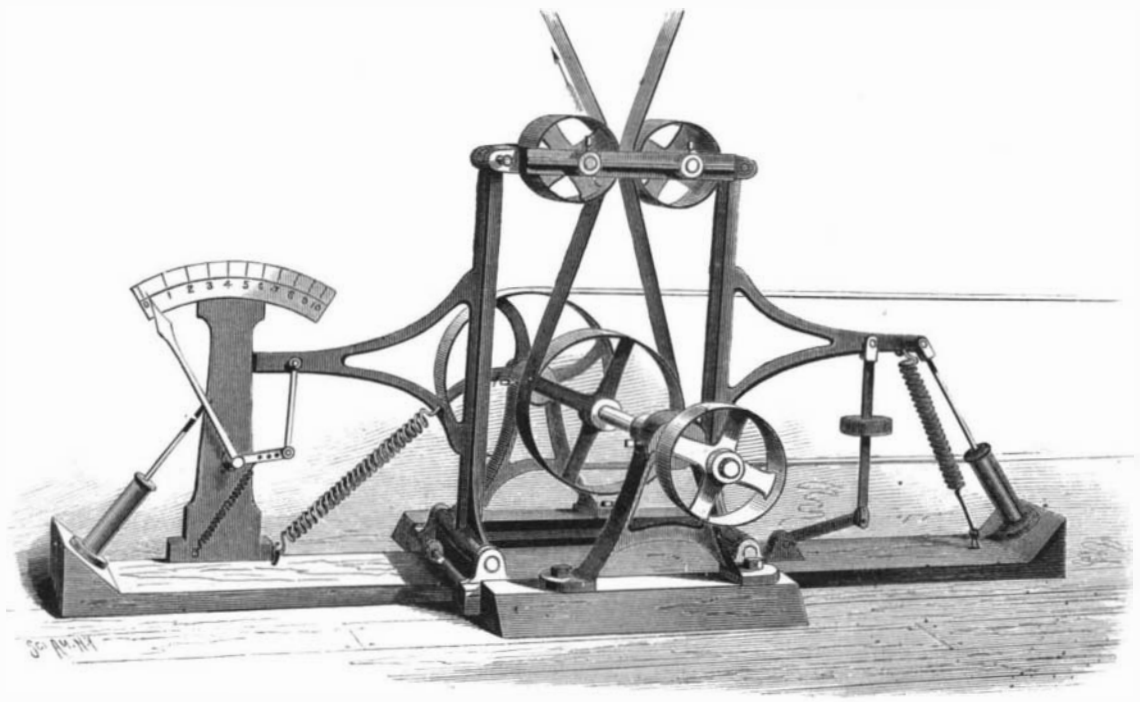


Fig. 1.—MAXIM'S DYNAMOMETER.

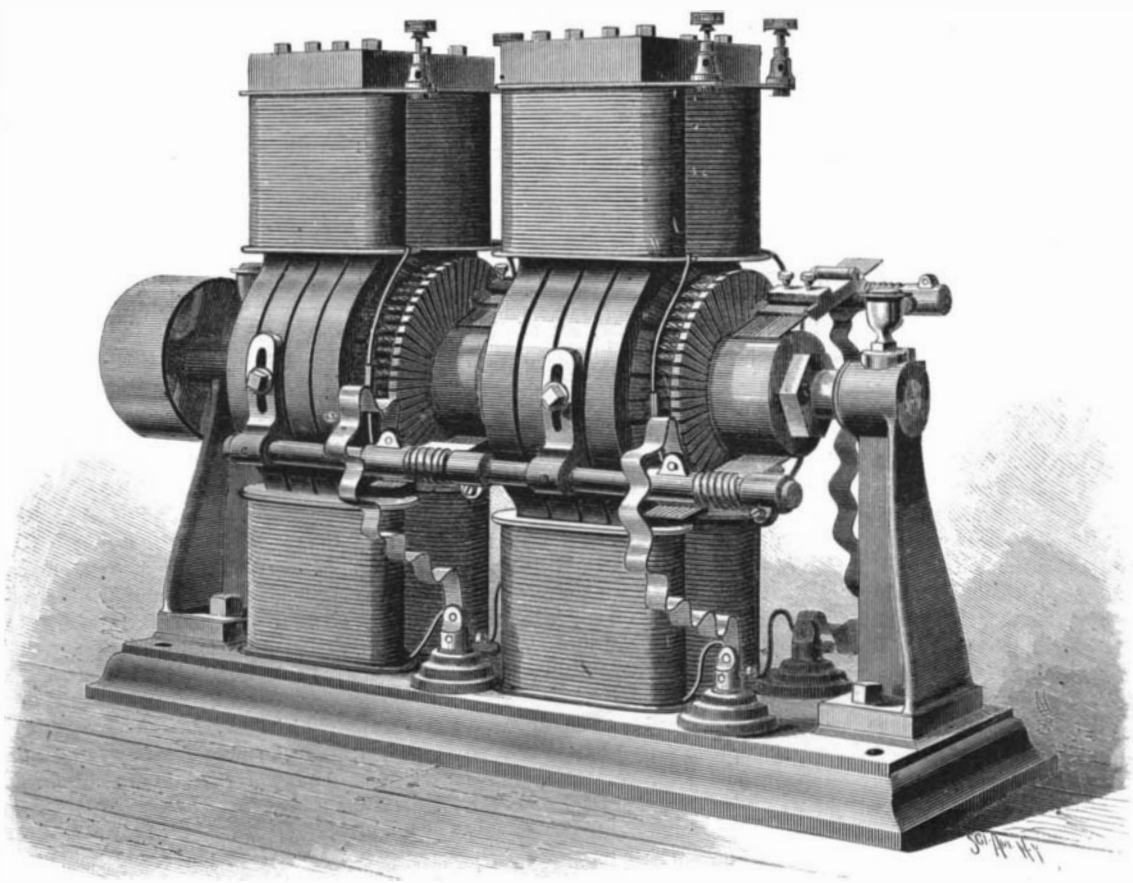


Fig. 2.—MAXIM'S DYNAMO-ELECTRIC MACHINE.

SOME NEW ELECTRICAL MACHINERY.

We give engravings of electric light machinery lately perfected by H. S. Maxim, M.E., of this city.

Fig. 1 represents a double current machine, so constructed that it furnishes two separate currents entirely independent of each other, that may be used to produce two large electric lights, or may be coupled for quantity in one very large light, or may be coupled for tension in one strong current of great electromotive force. It is, therefore, not only well calculated for the electric light, but makes an admirable machine for scientific and experimental purposes. The Maxim machines of this kind are called dynamo-magneto-electrical, as they convert dynamic energy through the agency of magnets into electrical energy. In the construction of these machines great care is required to so arrange and proportion the parts that the greatest possible amount of the energy consumed appears in the electrical current. Not only must the current be accurately measured, but the power employed to produce it must also be measured.

Mr. Maxim has constructed a peculiar dynamometer, shown in Fig. 2, to measure the power consumed in these machines. It is driven from above by a large pulley, not shown. The two small pulleys that hold the belt together are mounted on a vibrating frame, pivoted at the bottom and operating freely. The belt for driving the machine is run from either pulley of the countershaft. When no load is on, the pull on both sides of the belt is the same, and there is no tendency to move the framework in either direction; but whenever anything offers resistance to the rotation of the countershaft, one side of the belt is pulled, while the other is correspondingly slackened. This, of course, draws the pulleys in the direction of the taut side, and just in proportion to the difference in the stress between the taut and slack sides of the belt. The greater the resistance to the rotation of the countershaft, the greater will be the deflection of the framework carrying the small pulleys. A weight and spring are provided for pulling against the belt. Dash pots at each end prevent a too rapid motion of the parts. The pointer is so connected with the frame that it moves through a considerable distance, so that a small fraction of a horse power may be noted.

In experimenting with the electric light in connection with this delicate dynamometer the following phenomena have been noticed: When two carbons, carefully filed to the shape ordinarily assumed in the process of consumption, were placed in a lamp and the machine started, the recorded power would go up to four (horse power). If they were drawn apart in the attempt to diminish this power, the light would go out; but when they became considerably heated, the power required would drop down in some cases to 1·75, only to remain for a few moments, when a slight evolution of gases would diminish the resistance in the voltaic arc, and the pointer would go up to 2·50, while a hissing sound would be produced and a considerable augmentation of the flame of the arc.

At times, when the light was perfectly steady and the play of the voltaic arc was confined to the points of the carbons, with no hissing and very little flame, the power required was the lowest. An iron wire touched to the positive carbon for only a moment would keep the pointer up to 4 for fully half a minute. It was found that pure carbons caused but little variation, while metallic vapors in the flame required the most power. Every fluctuation of the flame or change in the pitch of the note emitted was accompanied by a corresponding fluctuation in the power required to operate the

machine. When one machine, weighing 450 lb., driven from the dynamometer, was connected with another exactly like it, the current of electricity from the first machine would drive the second backwards, and the power recorded was 0·25 of a horse power. Any friction on the second machine showed instantly on the dynamometer, while to stop it completely sent the needle up to 7·50. Some points in this dynamometer resemble Edison's; but, we are informed, Mr. Maxim had his in operation some months before Mr. Edison made his.

Fig. 3 shows a new electrical lamp designed for use in stores, factories, etc. It is nicely incased in ornamental bronze work. One novel feature of this lamp consists of telescopic side rods, which facilitate the dropping of the bottom to remove or replace the glass globe and carbons.

The United States Electric Lighting Company, 120 Broadway, New York, are the owners and manufacturers of Mr. Maxim's inventions.

THE SPOTTED TRITON.

BY C FEW SEISS.

The spotted triton (*Diemyctylus viridescens*, Rafinesque) is of an olive green or brown color above and yellow beneath. On each side of the body is a row of three or more vermilion spots, each encircled by a black ring. These spots vary greatly in number and distribution. Thus, in specimen No. 1, there are two spots on the head, two on one side of the body, and five on the other; in No. 2, there are four on the head, and three on one, and four on the other side of the body; in No. 3, two on the head, and four on the right side and two on the left; No. 4, which is much darker in color, has seven spots on each side, three of the spots being double on one side, and one spot on the occiput; No. 5 has two small spots on the occiput and three on each side of the body. The throat, abdomen, legs, and tail are generally studded with black dots. The hind legs are twice the size in bulk of the front. The latter has four digits and the former five, the first and fifth being rudimentary. The tail is compressed laterally, of natatory form. The length of our largest specimen is 3¾ inches; of the medium, 3 6/16 to 3 11/16 inches.

The spotted triton is an aquatic species, but it must be remembered that it has lungs and is an air-breathing animal, and consequently is obliged to come frequently to the surface of the water for fresh air. The immature tritons or larvæ are gill bearers like other urodelans; they are of a dirty brown color, and the vermilion spots are wanting.

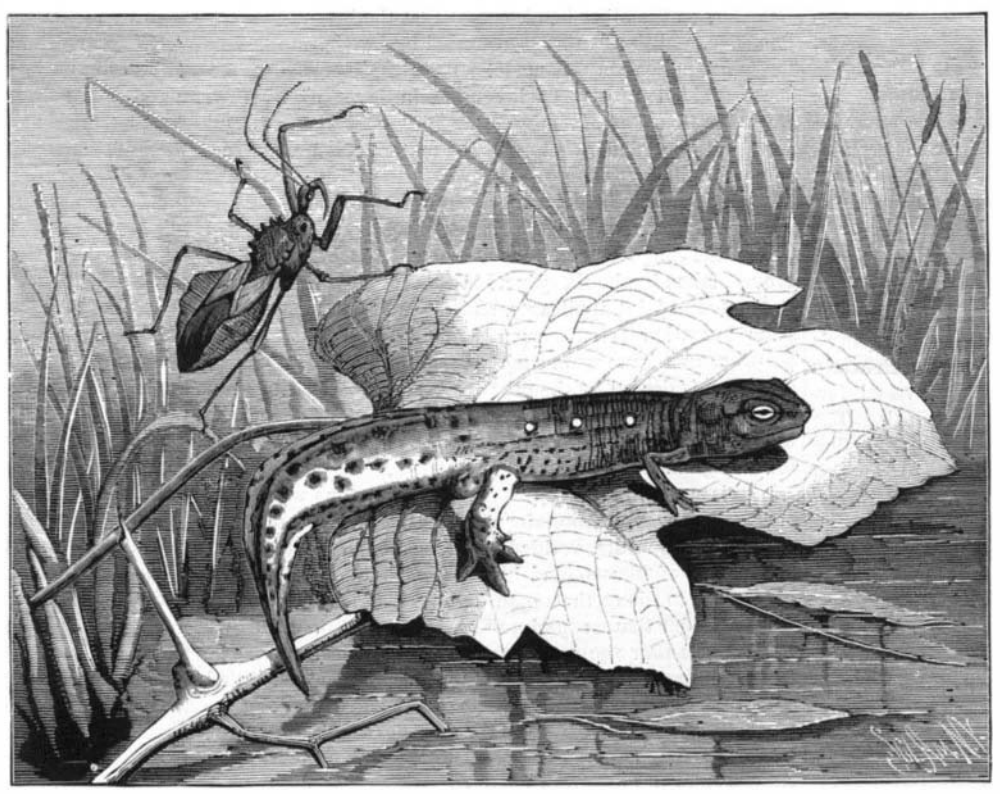
The food of this triton consists of insects and worms. The stomach of one which I lately dissected contained two mosquito larvæ. Our aquarium specimens have seemed to thrive on small bits of raw meat. In the aquarium they are sometimes attacked with a fungoid disease, which is common to many water animals in captivity. They become greatly emaciated, and at length are unable to eat, and subsequently perish.

At the pairing season the male embraces the female in a peculiar manner; not with his arms or forelegs, as might be supposed, but with his stronger posterior extremities he clasps her firmly immediately back of her forelegs. The female fastens her roundish jelly-like masses of eggs, which somewhat resemble frog spawn, to water plants, where they remain until hatched.

I agree with Dr. Hallowell and others in considering the yellow-bellied salamander, *D. miniatus*, Rafinesque (*Salamandra symmetrica* of Harlan), as merely a terrestrial variety of the present species.

The insect above the triton in my drawing is the *Prionotus novenarius*. I can find no English name for it, but as I have from childhood called it the *Devil's camel*, it may be well, even if it is not a pleasing name, to retain it. It is of a dark ash color and pubescent; its long cylindrical head is armed with a strong curved beak or rostrum; its thorax is arched, compressed laterally, and deeply serrated, and its abdomen is flattened above and turned up at the sides. With its forelegs, which are raptorial, it catches caterpillars and other insects, and inserting its beak sucks all the juices from the caterpillar's body before it will drop it. It inserts its beak into the different segments of its prey to make sure no good is lost. Three or four different kinds of caterpillars I have seen it devour; it is, therefore, beneficial, and should be protected.

The devil's camel is most numerous about Philadelphia during the month of September. I have a note of one that was captured as late as the 5th of November, 1879. The young are wingless, and have the abdomen turned upward and forward. I have never felt the evil effects of his rostrum, but Dr. Horn says, when it is caught by one not expert, it inserts its rostrum into the hand, causing a feeling of acute pain which may last for some hours, but gradually passes away, leaving a feeling of numbness in the part bitten.



THE SPOTTED TRITON.

A Large Importation of Percheron Horses.

Ninety-seven horses of the Percheron breed, the largest lot ever brought to this country, recently passed through New York on their way to Wayne, Du Page County, Illinois, where their owner, Mr. M. W. Dunham, has a large stock farm. About one-fourth of them were colts, the rest were full-grown stallions, ranging in weight from 1,400 to 2,000

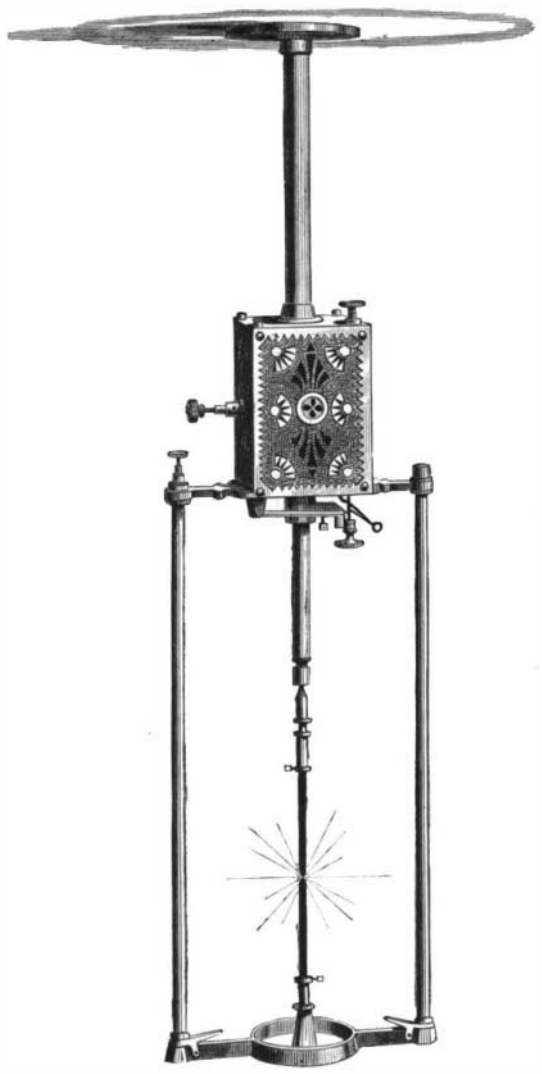


Fig. 3.—MAXIM'S ELECTRIC LAMP.

pounds. They cost in Perche, France, from $800 to $2,000 each, and were conveyed to the sea coast in a special train, the first ever run on a French railroad. To a reporter of the *Tribune* Mr. Dunham said:

"In 1873 it cost me $500 for every horse I brought across the ocean. Now, however, when I bring them in large numbers it costs only a little more than half as much for each. It will cost me $100 a car for my special train to Wayne. I put six of the horses in a car. I insure them when I start, and I have to pay four or five per cent on the insurance. You see there are large risks in this business. When I sell these stallions, however, I will get from $1,500 to $3,000 each for them."

The first Percheron stallions ever brought to this country were imported by Mr. William Harris, of Moorestown, N. J., in 1839. Mr. Charles Fullington, of Ohio, imported the next lot in 1851. In 1856 one of the stallions imported by Mr. Fullington was sent to Illinois, where for twelve years he was the only one of the kind in that State. In 1868 Mr. Dunham imported two Percheron stallions, and in 1872 went regularly into the business. Since then he has brought over between three and four hundred of them.

Drying a Specific Gravity Bottle or Flask.

It not unfrequently occurs that a clean, *dry* sp. gr. bottle or flask is wanted for use, and in hurried drying sometimes gets cracked. The following little device has been found useful: Wash the bottle or flask with distilled water and drain it for a moment or two. Then wash with a little strong alcohol and drain the bottle a second time. The alcohol need not be wasted, as it is but slightly diluted with the residual water from the first washing. When the bottle is again drained it remains wet with the diluted alcohol. Pour in a little dry ether and wash the bottle out with this. Again drain, and the warmth of the hand or very little extra heat will then completely dry the bottle or flask. The alcohol must of course be *strong*, and the ether *dry*, or the device fails.—*J. Shea, M.D.*

Evolution of Species in Butterflies.

As well known, many butterflies have two or even three broods in a year; one brood appears in spring, their larvæ having fed during the preceding autumn and passed the winter in the pupa state, while the others appear later in the year, having passed rapidly through all their transformations and thus never having been exposed to the cold of winter. In most cases the insects produced under these opposite conditions present little or no perceptible difference: but in others there is a constant variation, and sometimes this is so great that the two forms have been described as distinct species. In order to learn something of the origin and nature of the latter curious phenomenon, Dr. Weismann, of Freiburg, has, for many years, carried on a variety of experiments, breeding the species in large numbers, and subjecting the pupæ to artificial heat or cold for the purpose of hastening or retarding the transformation. The result of these experiments is, that by subjecting the summer brood to severe artificial cold in the pupa state, it may be made to produce insects, the great majority of which are of the winter form; but, on the other hand, no change of conditions that have yet been tried have any effect in changing the winter to the summer form. Taking this result in connection with the fact that in high latitudes, where there is but one brood a year, it is always the winter form, Dr. Weismann was led to the hypothesis that this winter form was the original type of the species, and that the summer form has been produced gradually, since the glacial epoch, by the summer becoming longer, and thus admitting of the production of the second or summer brood. This explains why the production of the winter form from summer larvæ is easy, it being a reversion to the ancestral type; while the production of the summer form from autumnal larvæ is impossible, because that form is the result of gradual development, and processes of development which have taken thousands of years to bring about cannot be artificially reproduced in a single season. Dr. Weismann lays great stress on the varied effects of temperature in modifying allied species or the two sexes of the same species, from which he argues that the essential cause of all these changes is to be found in the peculiarities of physical constitution, which causes different species, varieties, or sexes to respond differently to the same change of temperature; and he thinks that many sexual differences can be traced to this cause alone, without calling in the aid of sexual selection. The general result arrived at by the laborious investigation of these phenomena is that "a species is only caused to change through the influence of changing external conditions of life, this change being in a fixed direction which entirely depends on the physical nature of the varying organism, and is different in different species, or even in the two sexes of the same species; and, he adds: "According to my view, transmutation by purely internal causes is not to be entertained. If we could absolutely suspend the changes of the external conditions of life, existing species would remain stationary. The action of external exciting causes, in the widest sense of the word, is alone able to produce modifications; and even the never-failing individual variations, together with the inherited dissimilarity of constitution, appear to me to depend upon unlike external influences, the inherited constitution itself being dissimilar because the individuals have been at all times exposed to somewhat varying external influences." Almost exactly similar conclusions to these have been arrived at by Mr. Alfred R. Wallace, from a study of the geographical distribution and specific variation of animal forms.

To RELIEVE CASKS FROM MUSTINESS.—Burn a little sulphur in the empty casks, bung, and let them stand for a day.