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
CLUB RATES { Over ten copies, same rate, each	2 50

VOLUME XXX, No. 16. [NEW SERIES.] *Twenty-ninth Year.*

NEW YORK, SATURDAY, APRIL 18, 1874.

Contents:

(Illustrated articles are marked with an asterisk.)

DECISION OF AN IMPORTANT PATENT LITIGATION.

For nearly twenty years the monopoly of making glycerin from fatty bodies by the action of highly heated water under pressure has been held by the owners of the Tilghman patent; and various parties, supposing the patent to be valid, have paid tribute to the monopoly. Its days are, however, numbered. The Supreme Court has decided against the patent, in two cases brought against R. A. Tilghman, and the complaints are dismissed. These cases have been carried on for a long time, and have been heretofore decided by the Circuit Court in favor of the patentees. They have involved the employment of much legal talent and the examination of many scientific witnesses. The Supreme Court now reverses the Circuit Court decisions, and requires the plaintiff to pay all the costs. These will necessarily be heavy.

The Supreme Court held that the scientific witnesses who were examined differed so widely in their testimony that they gave little aid to the Court in settling the question. The Court was therefore compelled to depend chiefly upon the comparison of the descriptive portions of the specifications, and came to the conclusion that the results and process claimed by the patentee could not be realized in the manner described in his specification, and that the defendant did not make use of any process covered by the original patent. Among other things it appeared, from the original specification of the inventor, that it was necessary for him, as a matter of safety, to use an apparatus capable of standing the enormous pressure of ten thousand pounds to the square inch, although he expresses the opinion that an actual working pressure of two thousand pounds to the square inch would answer.

The defendant only needed three hundred pounds to the inch to make his process successful.

In so simple a matter as the effects of hot water upon grease, it would seem as if scientific experts ought to be able to give intelligible information to the Court. But in this case they only succeeded in contradicting each other. This is, however, explained by the Court in its remarks as follows:

"Chemical and mechanical experts were examined as witnesses on both sides in about equal numbers. Those called by the complainant expressed the opinion that the patented process may be applied, by the means and in the mode of operation described in the specification, so as to accomplish useful results, and of a character to give commercial value to the new product. On the other hand, those examined by the respondent express opinions widely different, and most or all of them are of the opinion not only that the means and mode of operation described in the patent cannot be so applied that the invention will be practically useful, but several of them state that the attempt to apply it without the exercise of extraordinary precautions must be attended with danger to the operator.

"Most of the expert witnesses made experiments in applying the process, and in the course of their examination were required to state the results of the same as supporting their opinions: but experiments made, as most of these were, with small apparatus, admitting only a small charge of the fatty substance or mixture to be treated, are not entitled to much weight in determining such an issue, however satisfactory the analysis may have been to the chemist who conducted it, as the issue necessarily involves very difficult questions of mechanics as well as of chemistry.

"Taken as a whole, the evidence convinces the Court that the patentee never did succeed in introducing his invention into practical use, by the means and in the mode of operation described in the specification, to such an extent as would warrant the Court in finding that issue in his favor."

In another column we give a brief *resumé* of the findings of the Court.

THE AGASSIZ MEMORIAL.

No more fitting monument of the great naturalist so lately passed away can, we think, be reared than that which already exists in the Museum of Comparative Zöology at Cambridge. Begun by him and for years the cherished work of his life, the collection has grown steadily in extent and value until at the present time its renown is worldwide. It was founded by him, with that spirit of self abnegation which characterizes his life, not as an evidence of his own matchless skill and profound learning in the study of Nature, but as a means of education to others, and as a school to be open to all who might desire to possess themselves of the vast store of information enclosed within its walls.

Agassiz labored as a teacher, but not from books nor of the learning of others, but rather as one who, a preceptor in the truest sense of the term, points out to his pupils the means by which they may question Nature for themselves and obtain their knowledge from her infallible responses. There is a particular appropriateness therefore in the plan proposed that the teachers and the pupils of the country should contribute the funds for a suitable memorial in his honor; and the selection of the Museum above referred to as the object of the contributions, which will serve to establish it on a firm, enduring basis, is the most creditable and suitable that could be made. The money, which it is suggested shall be collected on the birthday of Agassiz, May 28, 1874, is to be set apart and known as the Teachers' and Pupils' Fund of the Agassiz Memorial, and remittances are to be made to the Treasurer, Mr. J. M. Barnard, room 4, No. 13 Exchange street, Boston. Every teacher or scholar who desires to add something, however small, and thus take part in the memorial, is invited to do so. We trust that, without doubt, the sum raised will be sufficient for the purpose intended. However great it may be, it certainly must fall far short of repaying the debt of gratitude which from the country to Agassiz is so justly due.

THE GENESIS OF THE HORSE.

The specialized structure of the small group of animals, of which the horse is the chief member, used to form one of the strongest supports to the theory of specific creation. No other mammals depart more characteristically from the average type, and none seemed to show more positive proofs of design in the adaptation of the modified parts to suit the purposes of man.

Curiously, the same order of animals is now among the best supporters of the theory of evolution. When Cuvier found, in the tertiary beds of the Paris basin, the horse-like yet characteristically distinct remains of the *palæotheria* (one of which was figured in the SCIENTIFIC AMERICAN of April 4), they seemed to him to offer to the evolutionists of that day a problem of the toughest sort. By what process could the single-toed horse be evolved from these many-toed predecessors, in the short time that had elapsed since those comparatively recent beds were deposited, and where were the connecting links?

With the progress of geological discovery, other fossil forms, more or less closely allied to the horse, came to light in various parts of the world, and with each addition the line of descent seemed to be more clearly marked. When Darwin wrote his "Origin of Species," enough was known to justify, to his mind, the hypothesis that the peculiar legs and feet of those animals had been produced by a long course of variations from the less specialized forms of former periods; and he expressed the belief that, though they had not been, and might never be, discovered, the intermediate forms had made a continuous series. By his opponents this confident belief, in what no one had ever seen, was taken as evidence only of his abandonment to theory. He had created a system, they said, without substantial basis in fact, then argued the existence of improbable facts, because the theory called for them. "Show us one of those hypothetical connecting links," they replied, "and then your doctrine will have something to stand on."

As in many other instances, so in this, increasing knowledge has proved Darwin right, and his critics wrong. One by one the predicted connecting links have been discovered, to the number of thirty or more, and the horse's pedigree is now practically complete for several geologic periods.

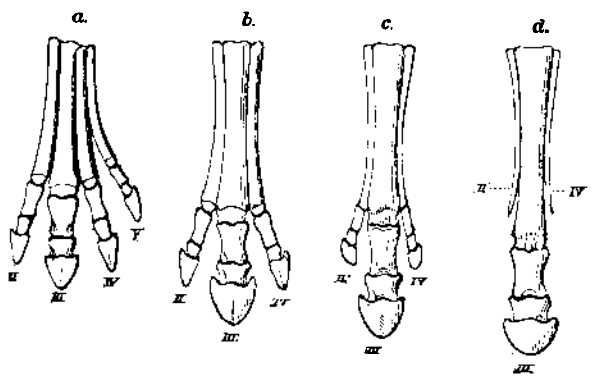
In his annual address before the London Geological Society, in 1870, Huxley reviewed the case as it stood at that time, making out a tolerably complete lineage, connecting the horses of today with the fossil horses of the quarternary period, the *hipparion* of the later tertiary, and the *anchitherium* of the middle tertiary, or miocene period. The process by which the last named had been converted into the modern horse was one of more and more complete deviation from the average form of hoofed mammals. The *anchitherium*, for example, had three serviceable toes on the fore foot. In the *hipparion*, the lateral toes did not touch the ground. In the horse, these supplementary hooflets have disappeared, and nothing remains but splints of bone to hint at the vanished digits. Corresponding changes went on in other parts of the skeleton. Though the specialization was less marked in the *anchitherium* than in the *hipparion* or the horse, yet, as compared with other mammals, it was still great. In view of these facts, the speaker asked whether it was not probable that, if we were to pursue the investigation to the eocene period, we should find some quadruped related to the *anchitherium*, as *hipparion* is related to *equus*, and consequently departing less from the average form.

The intimation has been justified by the discoveries of later years, especially in our own country, where the line of descent appears to be more direct and the record more complete than has been found in the Old World. It reaches clearly to the eocene period; and the remains already known supply—as pointed out by Professor Marsh in the current number of *Silliman's Journal*—every important intermediate form.

"The natural line of descent would seem to be through the following genera: *Orohippus* of the eocene, *miohippus* and *anchitherium* of the miocene; *anchippus, hipparion, protohippus*, and *pliohippus* of the pliocene, and *equus* of the quarternary and recent."

The development in size, from the earliest form to the latest, was something remarkable. The *orohippus* was about the size of a fox. The miocene forms were as large as a sheep. *Hipparion* and *pliohippus* equalled the ass in hight; while some of the quarternary equine forms rivaled the modern dray horse. Accompanying this change in size, the species of the successive genera exhibit an increasing concentration of the limb bones, and a progressive elongation of the head and neck, with corresponding modifications of skull. The changes in the limbs were steadily toward their simplification by the enlargement of their axial element and the reduction of their lateral ones. As a part of this process, the number of toes was reduced, until the third toe alone remained effective.

The nature of these changes is shown in the accompanying diagram, showing the forefeet of the typical genera of the series.



The *orohippus* had all four digits on the fore foot well developed, with three toes on the hind foot. In the *miohippus* of the next period, the fifth toe has disappeared, or is only represented by a rudiment. The *hipparion*, as already noticed, has three toes, but the outer ones have ceased to be of use. In *equus*, the last of the series, the lateral hoofs are gone, and the digits—except in rare cases, as pointed out by Darwin in his great work on "Animals and Plants under Domestication"—are represented by rudimentary splint bones.

The changes in the head and neck, though less fundamental, steadily approximated the character of the modern horse. It is an interesting fact, adds Professor Marsh, that the peculiarly equine features acquired by *orohippus* are retained persistently throughout the entire series of succeeding forms.

But how came the *orohippus* with its specialized characteristics? As Huxley looked for a less specialized form than *anchitherium* in the eocene, so Professor Marsh infers an earlier ancestor of the *orohippus*, perhaps in the lower eocene, with four toes on the hind foot and five in front, and to this a still earlier ancestor, possibly in the cretaceous period, with five toes on each foot, the typical number in mammals.

Since it is impossible to say with certainty through which of the three-toed genera, that lived together during the pliocene period, the succession came, Professor Marsh makes the interesting suggestion that possibly the later species, which appear generally identical, may be descendants of more distinct pliocene types, as the persistent tendency of all the earlier forms was in the same direction.

THE SUPPRESSED MEMBER AGAIN.

Not long since we noticed some of the manual evils resulting from the customary repression of the left hand, and advocated, on physical grounds, its culture equally with that of the right hand. It seems that there are not less cogent mental reasons for developing the two sides of the body impartially.

It is coming to be well known that mental development is the result of properly directed physical training: that the brain grows in size and power by the varied exercise of the senses and the will in mechanical employments quite as rapidly as by purely intellectual efforts in study or otherwise. It is equally well known to physiologists that most men are one-sided in their heads as in their bodies. The two halves of the brain are rarely developed symmetrically, as may be readily seen in the "conforms" or head measures accumulated by hat makers supplying individual customers. To some extent, the difference in the contour of the two sides of the head may be due to unequal pressure on the nurse's arm, or to the habit of lying chiefly on one side while sleeping, thus causing a permanent displacement of the walls of the skull; but the main reason appears to be our one-sided habit in education.

In his fourth lecture before the Lowell Institute, Boston, of which we print a résumé on another page, Dr. Brown-Séquard observe[illegible] the study of the facts relating to the brain has led him to believe that "each half of the brain—paradoxical as it may seem—is a whole brain," each lobe being normally competent to perform all the functions of both, not so vigorously, of course, as the two acting together, yet with apparent completeness. Unfortunately, however, the most of us are single brained as we are single handed, and for the same reason. We fail to do what is really needed to give us two working brains. "There is no question, concludes this skillful observer, "that it is our habit of making use of only one side of the body that consigns to one half of the brain—the right side—the faculty of expressing ideas by speech. If we developed both sides of our body equally, not only would there be the benefit that we could write or work with the left hand as well as with the right, but we should have two brains instead of one, and would not be deprived of the power of speech through disease of one side of the brain."

HOW A GREAT DISCOVERY WAS MADE.

M. Claude Collas, a celebrated French chemist, communicates to *Les Mondes* an interesting paper on how discoveries are made. To M. Collas is due the honor of first recognizing nitro-benzol, or, as it is better known, essence of mirbane, a yellowish oil derived from coal tar, having a very sweet taste and an odor strongly resembling that of bitter almonds, which latter peculiarity has led to its extended use in perfumery. In telling the story of how he found this substance, he says that, during the year 1848, he was engaged in researches with a view of utilizing industrially the quantities of light oil which, having no employment and hence very small value, filled up the cisterns in gas houses. It was at that time worth about one cent a pound. After vainly endeavoring to solve the problem for some time, M. Collas was about to relinquish the task, when it occurred to him to treat the oil in the same manner as gun cotton, that is, with a mixture of monohydrated nitric acid and sulphuric acid. "After the operation, the acids being separated by water," he says, "I was astonished to find at the bottom of my vessel a yellow button. The oil, at first lighter than the water, had become heavier, and hence sunk. I touched it with my finger and rubbed it on my hand, when the strong characteristic odor at once became forcibly apparent. I had found an essence which, at the cheapest, could replace a substance in great demand, and which was worth, instead of five centimes (one cent), fifty francs (ten dollars), a pound."

This discovery of mirbane was, however, only the prelude of the greater one, subsequently made, of the magnificent colors which could be derived from the aniline obtained by its deoxidation by means of nascent hydrogen evolved from iron filings and acetic acid. In 1856 Perkin obtained from aniline the beautiful violet color known as mauve, and since then the dyes thus derived have been produced to such an extent that their value to industry is almost beyond calculation. The little button of mirbane, however, in the modest laboratory of a Parisian apothecary, was the germ from which the whole grand series sprang.

There seems to be a kind of fatality about great discoveries which brings them forth in its own time. Men stumble across valuable ideas, and learn important truths too soon, which lie dead during their life time, only to be appreciated by the world after their death. The history of arts and sciences abounds in examples. Faraday, in 1825, found benzol in the tarry residues of gas works, but that illustrious chemist obtained neither fame nor profit for his discovery, which would doubtless have remained buried in the archives of the British Royal Institution until the attention of the scientific and industrial world was drawn to the chemical properties of the substance, almost forty years later. Again, it often happens that discoveries escape those who are, by accident, placed in the very position to seize upon them. M. Collas cites, as evidence of this, the case of a French chemist who, in 1846, made a yellow dye for silk by the action of nitric acid on coal oil. The peculiar odor of the mirbane, which he must have produced, escaped him, and he failed to recognize the new substance which he had obtained.

THE ORIGINATION OF SCREW PROPULSION.

In our columns of correspondence this week is an interesting letter from Mr. C. H. Delamater, proprietor of the well known Delamater Iron Works in this city, relative to the subject of the first practical application of the screw propeller to marine propulsion. Mr. Delamater considers that the practical establishment of the art is due to Captain John Ericsson, and tacitly takes exception to the reference in our recent biographical notice of Sir Francis Pettit Smith, in which we ascribed a large share of the honor, of introducing the propeller, to that inventor. The subject is a very interesting one, and the issue raised renders a slight historical retrospect necessary to the formation of an intelligent opinion.

It is certain that, for many years previous to the date of either Smith's or Ericsson's patents (1836), experiments had been made proving that vessels could be propelled through the water by means of a screw. But the inventors were either deficient in persistency of effort, or they found that, as is very often the case, the times were not ripe for the introduction of so radical an innovation. It is, therefore, a fact that, when Smith and Ericsson took up the subject, no vessel of the kind was in actual employment; and so far as past experiments extended, the simple fact of their abandonment, or rather non-continuation, held out a prospect for future inventors far from encouraging.

As our correspondent states, Ericsson's patent was obtained about a month and a half subsequently to that of Smith, but while the first trial of Smith's boat was made in May, 1836, immediately on the granting of protection, Ericsson's experiment did not take place until April 30, 1837. The Ogden, built by Ericsson in the latter year, was undoubtedly successful, but Smith's first vessel was equally so, for she made a voyage of 400 miles, and averaged a speed of 8 knots per hour. Hence, while both ships proved the value of the invention, Smith's was undoubtedly first in so doing, in point of time.

In 1838 Smith's successful operation of his plan before the Lords of the Admiralty resulted in the building of the Archimedes, and the making of a long voyage around England and to various points of Europe. In 1840 and 1841 the Rattler was built for the navy, and in the same years merchant vessels were constructed at Newcastle, Londonderry, and Hull. These ships were fitted with double-threaded screws set in the dead wood. Ericsson's vessels, however, had the blade screw, similar to that now employed. It will be seen that the course of the two inventors was very nearly parallel up to 1839, when Ericsson built the Stockton and started her across the Atlantic. The successful completion of that voyage resulted in the purchase of the vessel by the Delaware and Raritan Canal Company, and her subsequent use as a steam tug in the Delaware and Schuylkill rivers. While Smith was comparatively successful at the outset in gaining the support of the British authorities, Ericsson was not so. In face, however, of heavy odds, he was the first, as our correspondent states, to place a boat in actual commercial use in England, equally the first similarly to introduce screw propulsion in America, and also in France. Bourne, in his "History of Screw Propulsion," in summing up the respective merits of Smith and Ericsson, leans to the side of the former in ascribing the weight of praise. Ericsson, he says, had the advantage of being a skilled mechanical engineer, while Smith was merely an amateur; but in almost the following sentence he renders the effect of this assertion nugatory, by stating that Smith accepted expedients known to engineers as his starting point, and hence submitted to the use of gearing in bringing up the speed of his screw, while Ericsson "threw the dogmas of the engineers to the winds and coupled the engine immediately to the propeller." Smith, however, showed great genius and resolute perseverance, and, so far as simple priority of time is considered, it is true that he maintained the lead; but the credit for this, in our belief, falls far short of that due to Ericsson for his extended practical applications of the system. Both courses of the two inventors were remarkable for successful issues. It may even, says Bourne, be probable that the exertions of either would have sufficed to introduce the screw into practical operation, but their simultaneous prosecution of the same object was not nevertheless a waste of power. The progress of each, therefore, was stimulated by that of the other, and their united force acted more powerfully upon the public, and procured for the screw a readier and wider introduction than could otherwise have been expected. Neither invented the screw, but both revived it.

While, however, opinions may be and probably will be divided as to the question above discussed, so far as Ericsson and Smith are concerned, a careful search through various authorities reveals the fact that to neither is justly due the credit of first practically demonstrating the ability of screw-propelled vessels to make sea voyages, a merit which Mr. Delamater seems to claim for Ericsson. That honor is due to Robert L. Stevens, of Hoboken, one, says Mr. Scott Russell, to whom "America owes the greatest share of her present highly improved steam navigation. Mr. Stevens' father, Colonel John Stevens, was associated with Livingstone in his experiments, previous to the connection of the latter with Fulton, and had persevered in his experiments during Livingstone's absence in France.

Fulton's boat, however, was first ready, and obtained an exclusive privilege from the State of New York. Being excluded from the Hudson and all waters of the State, Stevens conceived the bold idea of taking his steamboat by sea to the Delaware. He did so, and thus not only demonstrated the possibility of screw propulsion, but he used a bladed screw in the open sea. The engines and screw used are still in existence. To Stevens, then, is due the credit of being first in the field to prove the practicability of the system; to Smith that of first, after a long period of years, reviving it and re-demonstrating its value; while to Ericsson, finally, is due not merely also its revivification, but in addition the first practical application of screw propulsion to the necessities and requirements of commerce in three great countries.

ARTESIAN WELLS.

A recent question which appeared in our column of answers to queries, regarding the greatest depth attained in the boring of artesian wells, has elicited some interesting letters from our correspondents. We find it necessary from the information given by one writer to revise the statement that the well in Louisville, Ky., 2,086 feet in depth, is the deepest in the country, as the bore sunk for Belcher's sugar refinery in St. Louis has penetrated 2,200 feet, while that excavated for the insane asylum in the same city has reached the enormous depth of 3,843 feet, or in that locality, 3,000 feet below the level of the sea. This would give a water pressure at the bottom of 1,293 pounds to the square inch. Another correspondent, however, tells us of a bore in the old world which is deeper than the one last mentioned by several hundred feet. It is situated in the village of Sperenburg, some twenty miles from Berlin. The government, it seems, in order to obtain a supply of rock salt, began the sinking of a shaft 16 feet in diameter. At a depth of 280 feet salt was reached, but excavations were continued, the diameter being reduced to 13 inches for 4,194 feet, at which point work was discontinued, the bit still remaining in the salt deposit, which thus exhibits the prodigious thickness of 3,907 feet.

The supply of water from an artesian well is practically inexhaustible. At Aire, in Artois, France, a well, bored over a century ago, has since then flowed steadily, the water rising 11 feet above the surface at the rate of 250 gallons per minute; and at Lillers, in the same country, one well has yielded a continuous steam since the year 1126. This fact, coupled with that of the large amount of water delivered, renders the artesian well of the greatest value for the irrigation of desert plains. Up to the present time, some seventy-five shafts have been sunk in the Desert of Sahara, yielding an aggregate of 600,000 gallons per hour. The effect of this supply is said to be plainly apparent upon the once barren soil of the desert. Two new villages have been built and 150,000 palm trees have been planted in more than 1,000 new gardens. Water, it is stated, is reached at a very slight depth, in some cases hardly 200 feet.

The success attending the efforts of the French engineers in Africa has led to the excavation of numerous wells in the dry alkali plains along the line of the Union Pacific Railroad. There is a desolate and arid section, extending along the Bitter Creek valley for a length of about 120 miles, and varying in width from 20 to 50 miles. Since the building of the road, water trains have been running over the whole distance, supplies being obtained from the Green and other rivers. The cost of running these trains was about $80,000 a year. It became therefore absolutely necessary to produce some other means for getting water for the locomotives, and to the miners working in the coal mines along the route. The only relief available was in boring artesian wells, and a correspondent of the *Tribune* says that, last year, six were begun. The subsequent success has been all that could be desired. The first well is at Separation, 724 miles from Omaha, and the last one is at Rock Springs, 832 miles. Another is in progress at Red Desert. The well at Rock Springs is 1,145 feet deep. There are layers of clay mixed with sandy loam, clear sand, and water-worn pebbles (in which the supply of water is usually found), layers of sandstone of varying degrees of density, and beds of sulphate of alumina and iron chemically combined, resembling the peculiar bluish clay of some of the surface soil. The Rock Springs well rises 26 feet above the surface, discharging at the latter 960 gallons per hour. The water in the various wells, it is said, sometimes holds in solution as much as 280 grains of mineral salts to the gallon, and hence produces undesirable effects on steam boilers. It is believed, however, that for agricultural purposes these salts could, with plenty of water, be washed out, when the result would be a remarkably productive soil, which would be as valuable as guano. A flowing well furnishing 1,000 gallons per hour will water a section of 640 acres.

An artesian well, we learn, is also in progress at Denver; it is already down 800 feet, and water has risen nearly to the surface. The government has appropriated $10,000 to sink one at Fort D. A. Russell, and it is now nearly 900 feet deep. A well 1,000 feet deep costs about $10,000; and out on the plains, this outlay would make a most productive farm and might be made the nucleus of a stock range of thousands of acres.

SCIENTIFIC AND PRACTICAL INFORMATION.

SOUTH AFRICAN DIAMONDS.

A note on the diamonds of South Africa was communicated to the geological section of the British Association, during its recent meeting at Bradford, by Professor Tennant. He said that the first diamond arrived in England from South Africa in 1867. It weighed 21 carats. Last year there was one of 110 carats, and this year one has been brought over which in its present rough state is larger than the Koh-I Noor itself, and which when cut down will probably be not much smaller than that celebrated gem. He gave a history of the Koh-I-Noor, showing how it has been reduced from its original weight of 787 carats to 102 carats, its present weight. It is a great mistake, said the speaker, to suppose that, because the diamond is the hardest substance known, it is not easily fractured. He showed by means of a diagram the fractures that had been made in the Koh-I-Noor, and remarked that the diamond is in fact one of the most brittle stones we know of.

ACTION OF LIGHT ON THE ELECTRIC RESISTANCE OF SELENIUM.

M. Sale, in experimenting on the electric conducting power of selenium, which varies with the degree of light to which it is exposed, as described on page 193 of our volume XXVIII, says that, after careful experiments, he concludes that the effect of the light is not produced by the chemical rays, since the maximum of diminution is observed in the maximum point of the red rays. Neither is the change in the resistance due to an augmentation in the temperature. While the effect also of the light is sensibly instantaneous, the return of the selenium to its normal resistance after the light is cut off is not so rapid. Finally it appears that there exists in the red rays, which are the most intense in heating properties, a power which, without modifying the temperature, changes the molecular conditions of the particles.

A NEW SIGN OF DEATH.

At the moment of death, there become disengaged from venous blood certain gases which are normally confined therein, and which form a pneumatosis or swelling of the veins. This action in the veins of the retina, says M. Bonchut, is easily appreciable by the ophthamoscope, and constitutes an immediate and certain sign of death. The pneumatosis is indicated by the interruption of the column of blood, and is comparable to that observed in an interrupted column of a colored alcohol thermometer.

T. W. Y. says: I recently witnessed the application of a known medical fact in an unusual way, namely: the vaccination of a dog to prevent distemper. The pus was inserted in the ear, when the pup was only a few days old, and the effect was about the same as when the operation is performed upon a child.