pipes, and the earth returned, the roots instinctively push for the trench as a point of relief, or where food can be more easily secured. We have seen gas pipes, after having lain for several years, perfectly covered with a network of roots proceeding from the neighboring trees. Now, if there is the slightest leak in the line of pipe, the gas moves in the direction of least resistance, and that is along the trench in which is placed the pipe; hence, the tender spongioles are presented with strange and poisonous food, the gas is absorbed, and the tree dies.

We can hardly suggest a remedy for this great evil. It may be well to compel gas companies to cover their pipes, in the vicinity of trees, with a thick coating of cement, or plank the walls of the trench, so as to prevent the tree roots from passing through. The loss of fine shade trees in cities and towns is almost irreparable, and every practical method should be adopted to prevent it.

EXPLOSIVE COMPOUNDS FOR ENGINEERING PURPOSES.

NO. V.

We resume the statements of facts in relation to the above subject contained in Mr. Nursey's paper. He speaks of the Nobel arrangement of the same substances, differently combined, under the title of "dynamite." We have heretofore published articles on dynamite, but Mr. Nursey appears to have given particular attention to the subject, and his report of experiments is very interesting. He says:

"To this new substance Mr. Nobel has given the very expressive name of 'dynamite.' It consists of fine gravel saturated with nitro-glycerin, in which condition it presents the appearance of coarse brown sugar. In July last, some interesting experiments were carried out with this substance at the Merstham Graystone Lime Works, near Red Hill, Surrey, at which the author was present. So important were these experiments as bearing on the subject of the paper, that the author will here give their details from notes taken by him at the time. The object of the experiments was to illustrate the perfectly safe and harmless character of dynamite under any other conditions except those of actual work, and to show its resistless energy when confined and fired according to the special mode proposed by Mr. Nobel.

A number of cartridges of various sizes were made up of dynamite wrapped in thin paper. To each of them was attached a fuse which burned at the rate of 18 inches per minute. On the end of the fuse, which was inserted in the cartridge, was fixed a copper cap primed with a powerful detonating compound, and to which is due the development of the explosive energy of the dynamite. A charge of half an ounce of dynamite was first exploded on an oak plank about 6 feet long, 9 inches wide, and 2 inches thick, and supported at each end. An exceedingly loud and sharp report ensued, and an examination of the plank showed that the charge had taken effect completely through the board, the under side being rent and splintered. A similar charge was then fired on a balk of fir timber placed flat on the ground. A deep indent was made in the timber, and one side was splintered off. To prove the harmlessness of the dynamite when fired by an ordinary light, Mr. Nobel cut a cartridge in two, and lighted one-half in his hand with an ordinary fuse. It burned quietly and quickly, but not rapidly out. The remaining half of the cartridge was then fired with a capped fuse, when a violent detonation resulted. The absence of all danger in case of collision or fire during transport or storage was then demonstrated in a most marked manner. A small deal box, containing about eight pounds of dynamite, was thrown down from the top of a cliff about 70 feet high, upon a hard bed of rock below. The concussion started the joints of the box, but the contents remained uninjured and unchanged. The test of fire was then applied to a box similar to the last, containing the same quantity of dynamite. A fire was kindled, upon which the box was placed, and after a few minutes the box quietly turned over on one side, a gentle puff of smoke and flame issued from it for a few seconds, and 8 pounds of one of the most violent of modern explosives were almost noiselessly dissolved into air. The charred and blackened box was removed from the embers, and on examination the joints were found to be sound and whole. The author examined this box of dynamite before it was nailed down and placed on the fire, as also the one which was thrown down the precipice after the occurence, and therefore writes from his own knowledge of the matter. Such tests ought to satisfy the most skeptical of the safety of the new blasting powder either in a railway collision, or accidental upset of a package, or a fire.

The next point was to test the power of the dynamite when under conditions of partial and also of perfect confinement. To this end, about 4 ounces of dynamite were placed upon a block of granite, measuring 3 feet by 2 feet 9 inches by 2 feet, the dynamite being only covered in with a lump of clay and a shovelful of gravel. A very loud report followed, and on examining the stone it was found to be traversed by rents and fissures, large masses being easily detached by a crowbar. The effect was certainly surprising, considering the comparatively loose and unconfined condition of the charge. In the next experiment, a cylindrical block of wrought iron, about 12½ inches high and 10½ inches in diameter, and having a one-inch hole bored through the center, was used. The bore hole was filled, but not rammed tightly—with dynamite, and fired. A report soon followed, remarkable for its penetrative loudness, and on examination one-half of the cylinder was found about 80 feet from the place where it originally stood, being then only stopped by a grass embankment. The other half was found some 50 feet in an opposite direction, lodged against a pile of broken rock, which stopped its further progress. The iron showed a clean split, which revealed an excellent quality of metal. The bore showed an extraordinary enlargement near the center, measuring nearly 1⅝ inches across, while the measurements at the top and bottom of the bore were in each case 1 inch, as before firing. It would appear that power developed increased as it approached the center of its length, becoming reduced again as it neared the further end of the hole, although of course the explosion was practically instantaneous. Both ends of the bore were open to the atmosphere, there being no plugging or tamping. The strain on the metal must have been enormous to have thus compressed it around the center of the bore, and to have rent such a mass and sent its halves yards away in opposite directions.

Dynamite is of course unfitted for use, either in heavy guns or small arms, its very power being against it in this respect, as forcibly illustrated in the experiment with the cylinder. But it can be utilized in shells with great advantage. A time fuse fitted with the detonating cap would effect its explosion at the proper moment, while if the shell broke up in the gun, no harm would result, as demonstrated by previous experiments. The danger attending the use of a shell was too great to allow of its adoption by Mr. Nobel, but he fairly met the point by filling a tin case with 4½ pounds of dynamite, and firing it behind a piece of curved ¾-inch wrought iron plate, 2 feet high and 3 feet long, measured round the curve. The plate was broken into four unequal parts, which were blown considerable distances away. The face of the plate upon which the powder had acted was completely pitted with small holes, due doubtless to the atoms of silica in the dynamite. This experiment satisfactorily demonstrated the great velocity which would be imparted to fragments of shells charged with this explosive.

The next experiment was directly illustrative of the present subject—that of blasting rock. Here a charge of 12 pounds of dynamite was inserted in a vertical bore hole 15 feet deep and 2 inches in diameter, tamped with sand. The explosion was indicated by a low subterranean thud, and a perceptible tremor of the surrounding land, even at a considerable distance from the blast. The rock showed a series of fissures which indicated that an enormous mass had been loosened, and was ready to be detached by the pick. Had the rock been of a harder and less friable nature, it would have offered a greater amount of resistance, and the whole mass would doubtless have been blown out. This was the case with some granite quarries at Stockholm, where an immense mass was detached by a charge of dynamite, and thrown down in huge blocks. On the present occasion, a further charge of 4½ pounds of dynamite was fired at the same depth as the last, with proportionate results. The method of charging in dry ground was next illustrated by filling a glass tube with a series of cartridges which were tamped with loose sand and fired. This experiment was repeated with water tamping to illustrate the mode of operation in wet ground. A striking effect was produced by firing a cartridge in a bucket of water. The detonation appeared to be stronger than under any other conditions; the bucket was shattered, and fragments were picked up several hundred feet from the spot where the charge was fired.

It will thus be seen that the most severe tests for safety failed to show that any danger was present in this material, while, on the other hand, there was no condition under which its violence was not developed when fired with a detonating fuse. So far, dynamite appears to be well calculated to supersede gunpowder for blasting purposes. The only point of doubt which has arisen in the author's mind, is whether any mechanical or chemical change might not occur in the course of time, which would render dynamite as dangerous as nitro-glycerin. The author recently made this objection to Mr. Nobel, who, however, stated that there was no fear of such an occurrence, inasmuch as he had kept dynamite in store for very lengthened periods, subject to high temperatures, and that it retained its original condition under some very trying tests. The stability of dynamite has been practically confirmed by extensive and daily use in various mines, and by the large quantities which are stored at the factories. Beyond this the most careful investigation has shown that there is not the slightest ground for apprehension on that score. Under continued exposure to the direct rays of the sun during the whole of last summer, not the slightest chemical changes could be detected, and the same was the case with some dynamite exposed for forty days to a heat varying between 150° and 200° Fah. All nitrated, or rather hyponitrated organic compounds, are liable to spontaneous decomposition—or what is understood by this hackneyed and ridiculous term—unless they are completely rid of free adhering nitric acid. The reason is that the free acid will produce a local decomposition, which sets hyponitric acid free, the latter producing a new local decomposition, and so on until sufficient heat is evolved to set fire to the compound. There is no difficulty whatever in ridding dynamite of free acid, but in the case of cotton, or any other fibrous substance, the utmost care is required, as free acid will sometimes adhere in spite of repeated washing.

Sweden consumes at present nearly as much dynamite per month as Great Britain does in a year, which only proves the want of organization which has hitherto stopped its progress in this country. In Norway, the consumption of dynamite is not very large (from about 33,000 to 40,000 pounds per year, the author is informed) but it is steadily increasing. In California, dynamite is in great favor, and is transported by rail without any restriction. In the Eastern States of the American Union, the miners still continue to use nitro-glycerin, chiefly because dynamite has not been manufactured and sold there. In England, comparatively little dynamite has been used until recently. This is owing to the difficulties of transport, and to the fact that Mr. Nobel has hitherto directed his attention to its manufacture and sale upon the Continent. There is but one depot for the whole of Great Britain, and that is situated at Carnarvon. As, however, dynamite is not carried by rail, a great many orders are not executed.

The author has referred to several catastrophes which have been caused by nitro-glycerin, but he can only find that a very few have resulted from dynamite. Since the latter material has been introduced, no accident has occurred either from its manufacture, conveyance, or storage. When the nitro-glycerin factory exploded at Stockholm last year, the dynamite stored close by was found scattered about, but not exploded. Two accidents have happened from the use of dynamite in mines. The first was caused by the tamping having been incautiously removed after a miss fire—an operation which ought not to be allowed in any case. The second was due to the folly of lighting the fuse of a charged cartridge and holding it by the hand until it exploded. These are the only accidents the author can discover. Accidents like these, through carelessness, must and will occur in mines, however safe the explosive may be to handle.

The Amoeba---A Most Remarkable Creature.

The amœba is one of those singular forms of animal life which seemingly occupy the extreme boundary between animal and vegetable life. In an article attempting to set forth the distinguishing points between animal and vegetable life, the *London Quarterly Review* gives the following description of this most remarkable of living creatures:

"But perhaps the clearest instance of the uselessness of attempting to make the possession of a stomach a distinctive feature of animal nature is shown by the history of a group of creatures, of which the well-known and common amœba may be taken as a type. In these there can be no question of definition, for in no sense whatever can they be said to possess a permanent stomach.

"The amœba has a just claim to the title of animal, for its affinities with the foraminifera are clear; and no one would deny that these creatures, with their exquisitely beautiful shells, are animals. Nor is this position shaken by the fact that the life history of the amœba can at present hardly be said to be fully made out. Yet the amœba has no stomach, possesses indeed no organs at all, unless we consider its so-called nucleus as one; and there are closely allied forms in which even this is absent. Conceive of a minute drop of transparent jelly, so small as to be invisible without the help of a microscope, a drop of jelly sprinkled and studded with a dust of opaque granules, sometimes hiding in its midst a more solid rounded body or kernel called the nucleus, and perhaps with the outer rind a little different from the internal mass. Conceive further of this amœba as of no constant shape, but like the Empusa shifting, as we look upon it, from one form into another At one moment it is like a star with straggling unequal limbs, at another club-shaped; now it is a rounded square, soon it will be the image of an hour-glass. None of these changes can be referred to currents in the water in which it lives, or to any other forces acting directly upon it from without. It seems to have within it some inner spring, an inborn power of flowing, whereby this part of it or that moves in this or that direction. And not only do its parts thus shift and change in form, but through their changes the whole body moves from place to place. As we begin to watch it, for instance, at the moment when it is in what may be called its rounded phase, a little protuberance may be seen starting out on one side. Speedily the little knob swells, lengthens, flows into a long process. The process thickens, faint streams of granules indicating in which way the currents of the unseen molecules are setting. The substance of the body surges into the process; and as the latter widens and grows thick the former shrinks and grows small. At last the whole body has flowed into the process; where the body was there is now nothing, and, where the process reached to, the whole body now is. The creature has moved, has flowed from one spot into another. Here, then, we have movement without muscles, locomotion without any special organs of locomotion. We have also feeling without nerves or organs of sense, for if a process such as we have described, while flowing out, meet with any obnoxious body, it will shrink back and stop in its work. And the whole body, terrified by some potent shock, will often gather itself up into a ball. As it moves without muscles, so also does it eat without a stomach. Meeting in its sluggish travels with some delicious morsel (and diatoms are its frequent food), it pours itself over its meal, and coalescing at all points around it, thus swallows its food by fluxion. To use a homely illustration it is much as if a piece of living mobile dough were to creep around an apple and to knead itself together into a continuous envelope in order to form an apple dumpling. Watching the food thus enveloped by the gelatinous substance of the amœba we see it grow fainter and fainter as its nutritious constituents become dissolved by the corrosive action of the same transparent but chemically active jelly; and when all the goodness has been got out of the meal the body of the eater flows away from the indigestible remains just in the same way that it flowed around the original morsel.

"We have in this creature, then, eating without a stomach, moving without muscles and without limbs, feeling without nerves, and, we may add, breathing without lungs, and nutrition without blood. The amœba is a being of no constant outline, of no fixed shape, which changes its form according to its moods and its needs, and turns its outside into its inside whenever it pleases, which is without organs, without tissues, without unlike parts, a mere speck of living matter all alike all over. And yet in the midst of this simplicity it enjoys all the fundamental powers and fulfills all the essential duties of an animal body, and is, moreover, bound by chains of close joined links with those complicated forms of animal life which are provided with special mechanisms for the most trifling of their wants.

"The dormant capabilities of this organless being are indirectly and interestingly shown by the shells which, in allied forms, are built up by the agency of similar homogeneous living matter, and which are in many cases 'structures of extraordinary complexity and most singular beauty.' Professor Huxley in his lectures most justly says:

"'That this particle of jelly is capable of combining physical forces in such a manner as to give rise to those exquisite and almost mathematically arranged structures—being itself structureless and without permanent distinction or separation of parts—is, to my mind, a fact of the profoundest significance.'"

AGE OF TREES AND SIZE OF TIMBER.

W. W. Spicer contributes to "Hardwicke's Science Gossip" an interesting article on the above subject. He says:

"The life of a plant is determined by its inner structure, by the laws of its growth, by its power of resisting external injuries, and by other circumstances, many of which are a mystery, and no doubt will ever remain so. But, bounded though it is within limits as narrow and precise as those which hedge round the life of man or the lower animals, there are cases on record of certain members of the vegetable kingdom whose existence has been prolonged for very extraordinary periods.

"The most celebrated of all old trees (and perhaps the most curious, from its belonging to the endogenous division, which does not generally boast of long-lived members) is the the Great Dragon tree, of Orotova, in Teneriffe. This monstrous specimen, which came to an untimely end in a hurricane a few months ago, was well known and carefully looked after at the conquest of the island by De Bethencourt in the year 1402. It appears to have been of the same size and appearance then as now—namely, from 70 to 80 feet high, with a hollow trunk of about 20 feet in diameter—whence, judging from the slowness of growth in this family of plants, and the little change that has taken place in four centuries and a half, it is inferred that the tree could not have been less than 5,000 years old at the time of its death. Another giant among the pigmies of modern days is the Baobab (Adansonia), an African tree, specimens of which, growing on the banks of the Senegal river, 60 to 80 feet high, and 30 feet in diameter, were estimated by Adanson to be over 5,000 years old. The Portuguese, on their voyages of discovery, were in the habit of carving their names, etc., on conspicuous trees, as a memorial of their having been the first to visit the spot. Adanson arrived at the age of the trees by comparing the depth of the indentations with the number of 'rings' in the portion of wood overgrowing them. The names themselves bore a date which showed them to have been cut three centuries prior to his visit. It has been suggested that possibly in a tropical climate these rings may not be so good a test of age as in our more temperate clime, where they are really annual. Nevertheless, allowing that the Baobab forms two rings in each year, in lieu of one, it is still deserving of 'honorable mention.' Yews have a great reputation as long-livers. The care usually taken of them in church-yards and similar places, no doubt tends greatly to their preservation. Thus a yew in the church-yard of Brabourne, in Kent, has, it is believed, reached the enormous age of 3,000 years; another at Fortingal, in Scotland, is quoted at 2,600 years, and others at Crowhurst, in Surrey, and at Fountains Abbey, are put down at 1,400 years. The yew has some near relatives in the cypress, the Taxodium, and the Wellingtonia. Of the first there is a specimen at Grenada, which was a celebrated tree before the Moors were expelled from Spain by Ferdinand and Isabella, toward the end of the fifteenth century. A *Taxodium distichum* at Oaxaca, in Mexico, which in 1829 measured 120 feet in hight by 117 in circumference, is supposed to number forty centuries. It sheltered Hernan Cortez and his little band of adventurers under its wide-spreading boughs about the year 1520. Among the gigantic Wellingtonias (or Washingtonias, as our thin-skinned cousins across the Atlantic will persist in calling them, in spite of priority of title)—among these mammoth trees of California, which reach a hight of 300 or 400 feet, individuals have been observed which must have witnessed 3,000 summers.

"Two other American trees, both Brazilian, have been noticed for their size and probably long lease of life. The first is the Bertholetia, which supplies the 'Brazil nut' of commerce, specimens of which, growing on the banks of the Amazon, have been noticed with more than 1,000 distinct rings. The other is the Hymenæa, in connection with which I transcribe the following passage from 'Lindley's Vegetable Kingdom.' The size of the timber is sometimes prodigious. The locust trees of the west have long been celebrated for their gigantic stature, and other species are the colossi of South American forests. Martius represents a scene in Brazil, where some trees of this kind occurred of such enormous dimensions that fifteen Indians with outstretched arms could only just embrace one of them. At the bottom they were 84 feet in circumference, and 60 feet where the boles became cylindrical. By counting the concentric rings of such parts as were accessible, he arrived at the conclusion that they were of the age of Homer, and 332 years old in the days of Pythagoras; one estimate indeed reduced their antiquity to 2,052 years, while another carried it up to 4,104; from which he argues that the trees cannot but date far beyond the time of our Saviour.

"My remaining examples are European. Among them is a chestnut tree growing on Mount Etna, and generally known as *Castagna di cento cavalli*, on account of the immense space which it overshadows. It is 180 feet in circumference, and cannot be less than one thousand years old. A scarcely less celebrated tree is growing at Tortworth, in Gloucestershire. It was a tree 'of mark' in the days of King John. The great lime tree of Neustadt on the Kocher, in Würtemburg, which as early as 1220 caused the town to be known as *Neustadt an der grossen Linde*, is believed to be not less than 800 years old. Its stem is 38 feet in circumference. At Worms, where there has been lately such a gathering of crowned and ducal heads to do honor to the memory of the great Reformer Luther, is an elm well known in Germany as the Lutherbaum, which measures 116 feet in hight, with a stem 35 feet in circumference, and has attained an age of not less than 700 years.

"A less venerable member of the vegetable kingdom, though still one that can look back through a tolerable vista of years, is a Judas tree (*Cercis siliquastrum*), in the Botanic Garden at Montpelier; it was planted in 1598, and consequently numbers 270 years. Its trunk a short time ago measured 12 feet round. In 'Science Gossip' of last year, p. 163, was given a short account of a rose, which covers one end of the principal church at Hildesheim, in Hanover. This remarkable climber was well known as 'a monument of the past' as early as 1054. Tradition assigns its origin to the year 814, under Louis the Pious, son and successor of Charlemagne.

"Another tree with a legendary history is a 'Gospel Oak' in my own neighborhood in Hampshire, standing in Avington Park. If we are to believe the stories told of it, and common there in every one's mouth, this 'old, old tree' was spared, at the earnest intercession of certain monks residing at Winchester, solely on account of its great age, when a brother of William the Conqueror leveled the whole of the surrounding forest of Hampage, about A. D. 1076. For some sixteen centuries, therefore, it has defied the storms of winter; but the latter have conquered at last. Ten years ago the old veteran made a final struggle to show some signs of life; and now it stands a hollow trunk, with two or three bare and withered arms, and only prevented from falling by a stout band of iron, with which it is encircled. A mere infant by the side of the Avington tree is the Great Oak of Pleischwitz, near Breslau, whose age is reckoned by Göppert at 700 years. It was blown down in 1857; its fall being due to a hollow within its huge stem, which could accommodate with ease twenty-five or thirty persons standing upright.

"Dr. A. B. Reichenbach, in his "Vollständige Naturgeschichte,' says: 'We know of limes in Lithuania with 815 annual rings, and a circumference of 82 feet; of oaks in the Polish forests in which one can count 710 perfect rings, and whose stems measured 49 feet round. There are elms whose age is known to be above 350 years, ivy 440, maples 516, larch 570, oranges 640, planes 720, cedars 800, walnut 900, limes 1,000, pines 1,200, oaks 1,400, olives 2,000.' From these numerous examples of extreme old age one may almost conclude that (provided the seed from which they spring be sound, the soil and climate favorable, and the means of nourishment abundant) the existence of many plants may be extended to an indefinite period, should they be fortunate enough to escape accidents from without."

Welding Copper.

Mr. Philip Rust, Bavarian Inspector of Salt Works, writes to *Dingler's Polytechnic Journal* as follows: "The great obstacle heretofore experienced in welding copper has been that the oxide formed is not fusible. Now, if any fusible compound of this oxide could be found, it would render such a weld possible. We find in mineralogy two copper salts of phosphoric acid—viz., libethenite and pseudo-malachite, each of which melts readily before the blow-pipe. It was therefore natural to suppose that a salt which contained free phosphoric acid, or which would yield the same at a red heat, would make the weld easy by removing the oxide as a fusible slag. The first trial was made with microcosmic salt (phosphate of soda and ammonia), and succeeded perfectly. As this salt was dear, it was found advisable to use a mixture of one part phosphate of soda and two parts boracic acid, which answered the same purpose as the original compound, with the exception that the slag formed was not quite as fusible as before. This welding powder should be strewn on the surface of the copper at a red heat; the pieces should then be heated up to a full cherry red or yellow heat, and brought immediately under the hammer, when they may be as readily welded as iron itself. For instance, it is possible to weld together a small rod of copper which has been broken; the ends should be beveled, laid on one another, seized by a pair of tongs, and placed together with the latter in the fire and heated; the welding powder should then be strewn on the ends, which, after a further heating, may be welded so soundly as to bend and stretch as if they had never been broken."

Mr. Rust states that as long as 1854, he welded strips of copper plate together and drew them into a rod; he also made a chain, the links of which had been made of pretty thick wire and welded. It is necessary to carefully observe two things in the course of the operation: 1st. The greatest care must be taken that no charcoal or other solid carbon comes into contact with the points to be welded, as, otherwise, phosphide of copper would be formed, which would cover the surface of the copper and effectually prevent a weld. In this case it is only by careful treatment in an oxidizing fire and plentiful application of the welding powder that the copper can again be welded. It is, therefore, advisable to heat the copper in in flame, as for instance a gas flame. 2d. As copper is a much softer metal than iron, it is much softer at the required heat than the latter at its welding heat, and the parts welded cannot offer any great resistance to the blows of the hammer. They must, therefore, be so shaped as to be enabled to resist such blows as well as may be, and it is also well to use a wooden hammer, which does not exercise so great a force on account of its lightness.

On the Inflaming Point of Vapors.

Various fluids occurring in the trade volatilize, as is well known, at ordinary temperatures, forming explosive mixtures with atmospheric air; others give off vapors at a somewhat higher, but still comparatively low temperature.

W. R. Hutton, of Glasgow, has recently determined the degree of heat at which the vapors of a number of liquids catch fire from a burning candle, when it is approached to the surface of the fluid at a distance of 1·5 in. or 0·5 inch. The results of these experiments are recorded in the subjoined table:

	Specific weight.	Inflaming point in degrees of Fah. — At a distance of 1·5 in.	Inflaming point in degrees of Fah. — At a distance of 0·5 in.
Sulphuric ether	0·747	below 53°	—
Bisulphide of carbon	1·270	" 53°	—
Petroleum benzine	0·706	" [illegible]6°	—
Benzole from coal tar, 90 per cent.	0·861	" 74°	71°
Crude paraffine oil	0·849	" 74°	72°
Crude naphtha	0·884	" 78°	74°
Whisky	0·940	"	85°
Wood naphtha	0·840	" 87·8°	81°
Crude paraffine oil	0·891	" 89°	84·2°
Crude naphtha	0·881	" [illegible]	86°
Dutch gin	0·930	"	90°
Wood spirit	0·827	" 96·8°	84·2°
Illuminating naphtha	0·859	" 100°	91°
Wine spirit	0·817	" 104°	73°
Whisky, 15 overproof	0·893	" 109°	83°
" 11 overproof	0·905	" 110°	84·2°
Kerosene	0·801	" 118°	110°
Light oil from coal tar	0·920	" 119°	109°
Spirit from resin	0·922	" 122°	105·8°
Turpentine	0·875	" 130°	119°
Sherry wine	0·993	"	130°
Port wine	1·003	"	130°
Refined paraffine oil	0·809	" 134°	123°
" "	0·814	" 138·2°	127°
Fusel oil	0·850	" 140°	129·2°
Oil from resin	0·987	above 212°	
Heavy tar oil	0·950	" 212°	—

From this table it may be seen at a glance that the specific weight has, on the average, no influence on the temperature at which the generation of vapors takes place. The cause of this property may be inferred from the fact that the fluids in question consist of mixtures of various compounds, of which the lighter generally escape first. This is the case with the two kinds of crude naphtha and the illuminating naphtha, from which the benzole had been separated by distillation. The crude naphtha of the specific gravity of nearly 0·89, contained considerable portions of tarry substances and napthaline, but it nevertheless took fire at a lower degree of heat than refined naphtha, the specific weight of which did not exceed 0·86. That a liquid which contains but a small amount of a very volatile fluid, may be very dangerous, is seen, for instance, in the experiment with the light oil from coal tar. This oil inflames by the light of a candle at 119° Fah. when approached to it within a distance of one and a half inches. When compared with the great inflammability of bisulphide of carbon or benzole, the tar oil may be considered as of little danger, but it is just as dangerous when it is taken into consideration that the great inflammability of bisulphide of carbon is well known, while the tar oil is looked upon as being comparatively harmless. In the preceding case, the liquid portion, which generated inflammable gases at 119° Fah., did not amount to two per cent of the whole, and after their separation, vapors were not given off below 179·5° Fah.

Buffaloes versus Telegraph Poles.

The *Telegrapher* is responsible for the following good story: "The buffaloes found in the telegraph poles of the overland line a new source of delight on the treeless prairie—the novelty of having something to scratch against. But it was expensive scratching for the telegraph company; and there, indeed, was the rub, for the bisons shook down miles of wire daily. A bright idea struck somebody to send to St. Louis and Chicago for all the brad-awls that could be purchased, and these were driven into the poles, with a view to wound the animals and check their rubbing propensity. Never was a greater mistake. The buffaloes were delighted. For the first time they came to the scratch sure of a sensation in their thick hides that thrilled them from horn to tail. They would go fifteen miles to find a brad-awl. They fought huge battles around the poles containing them, and the victor would proudly climb the mountainous heap of rump and hump of the fallen, and scratch himself into bliss, until the brad-awl broke or pole came down. There has been no demand for brad-awls from the Kansas region since the first invoice."

Action of Water on Lead.

Professor Parkes, F.R.S., calls attention to the fact that it has always been seen that the action or non-action of water on lead could not be entirely accounted for by the usual statements on the subject, and lately Dr. Frankland has made a curious observation, which may throw light on the matter. He found that water, which acted on lead, lost this power after passing a filter of animal charcoal. He discovered this to be owing to a minute quantity of phosphate of lime passing into the water from the charcoal; on comparing two natural waters, that of the river Kent, which acts violently on lead, and that of the river Vyrnwy, which, though very soft, has no action on lead, he found that the latter water contained an appreciable amount of phosphate of lime, while none could be detected in the Kent water. This observation, to which we have before alluded, may explain the discrepancy of evidence in respect of the action of soft water on lead.

GROWTH OF FUNGI IN CHLORIDE OF MAGNESIUM.—Mr. Slack recently noticed a quantity of flocculent matter in a strong solution of chloride of magnesium, which had been kept a long time in a dark cupboard. On examination it proved to be a gelatinous mass, in which innumerable fungoid threads were discernible. This may be added to the numerous cases of fungi growing in chemical solutions that might have been supposed unfavorable to their existence.