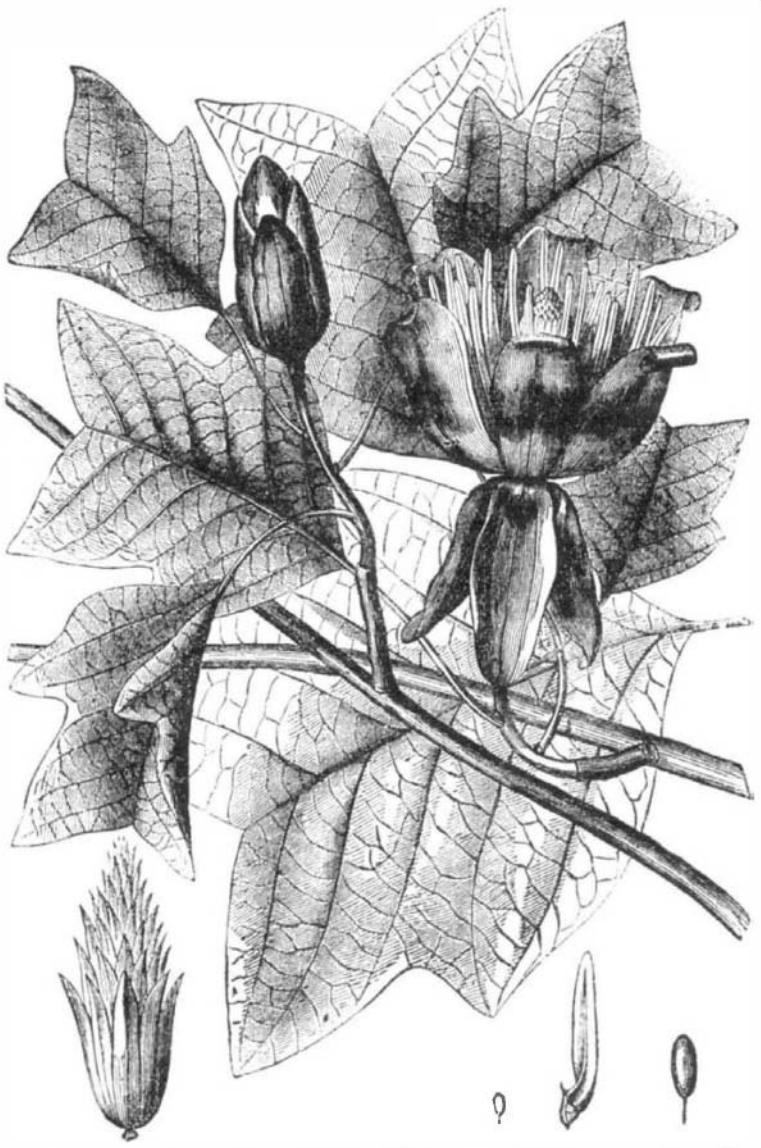
THE TULIP TREE.

This noble tree deserves a place on every lawn, as it seldom fails to develope itself into a stately specimen in any good, deep, well drained soil. In habit of growth, it closely resembles the common maple, but its conspicuous orange-tinted blossoms and scaly fruits at once suggest its near affinity to magnoliads, to which it belongs. The flowers are not unlike those of a tulip, and hence the name by which it is most generally known. The broadly expanded leaves, instead of being palmate as in the plane, are irregularly four-lobed, and somewhat resemble a saddle in conformation; and it is sometimes called in the vernacular the saddle tree, from this peculiarity. Our illustration gives an excellent idea of the flowers, foliage, and fruit. The flowers are profusely borne during the summer months; and although not strikingly ornamental on the tree on account of their being somewhat hidden amid the ample foliage, when cut and arranged in a vase with the foliage that naturally belongs to them, they have a distinct and striking appearance. This tree is from 100 to 150 feet in hight, but in Europe it rarely exceeds 70 or 80 feet. In the old arboretum at Chiswick, Eng., there used to be two specimens of this fine tree, one having much larger and brighter colored flowers than the other; and, doubtless, other varieties of it exist where plants are raised from seeds. All through the summer the foliage is of a fresh, pale green; and, in the autumn, it dies off a brilliant golden yellow. Striking effects might, therefore, be obtained by grouping it with *quercus coccinea* or the purple-leaved beech. In addition to its ornamental properties, its distinct and noble port commending it at once to the notice of intending planters, it is valuable as a timber tree, the wood being firm in texture and capable of taking a fine polish.



FOLIAGE, BLOSSOM, AND FRUIT OF THE TULIP TREE.

The Diving Bell.

M. Toselli states that he has been making experiments with his submarine vessel, or "marine mole," as he calls it (of which we gave a description on page 19 of our last volume). He is struck with the correspondence, of many of the phenomena, to those observed in ballooning; and considers that it is at the bottom of the sea that the problem of aerial navigation will be solved. In a liquid mass which is still, the machine moves quite well in obedience to the screw propeller, which is driven by the hand. But if the vessel meets a current, it is vain to think of contending with it. Another difficulty, as in balloons, is orientation. Once a balloon has got to some distance from the earth, it becomes impossible to tell the direction in which it is going. The needle is useless. And, similarly, in the "marine mole," when it is only 0·39 of an inch under the surface, and nothing is seen in motion but the fish, the compass is found of no use. To go to a certain point, an artificial meridian has to be arranged outside. M. Toselli remarks, too, on the great distinctness with which sounds are heard. At a depth of 110 feet, the screw of a steamer, passing about 660 yards off, sounded in the (hermetically closed) mole as if directly overhead. The contrivance of M. Toselli, affording, as it does, a novel opportunity of observation, may furnish some instructive data in physics.

The Remarkable Mineral Treasures discovered in Massachusetts --- Rich Mines of Gold, Silver, Copper, and Lead.

Since the gold excitement a quarter of a century ago, says the Boston *Advertiser*, when the "forty-niners" flocked to the Pacific coast, there has been no discovery of the precious metals so important and yet exciting so little general interest, as the developments made during the past three months in the little town of Newbury, in Essex county, Mass. Four months ago the existence of any such ores was known to but two persons, and they were by no means aware of the magnitude of their discovery. When the matter got into the local papers, one gentleman of this city thought it worth while to investigate it, and the result has been, in brief, preparation for mining on an extensive scale, with prospects of returns far more remunerative than were ever known before.

The discovery dates back only to 1868, when a Byfield man, named Rogers, said to be a rather dissolute character, in his wanderings over Highfield Pasture first noticed the ore. Something in the weight of the stones which he picked up, and occasional gleams as the sun glanced on small, smooth surfaces, induced the belief that there was metal in their composition; and if metal, then something of value. With this idea he collected a number of the best specimens, and some time after took them to Mr. Albert Adams, a quiet bachelor farmer residing in Newbury. Mr. Adams became greatly interested in the matter, believing that a great discovery had been made. He began to study mineralogy and geology. Becoming convinced that metal was present in quantity, he was soon confident that it was silver and lead. He pursued his investigations very quietly; and finally concluded to secure by purchase the land on which the specimens were found. For this purpose advances were made to an old farmer named Jaquish, who had long owned the pasture, and the lot, measuring twelve acres, was transferred to him for $350 early in April of last year. He then began digging. The surface finds, or float ore, were naturally more or less oxydized by the action of the elements, but at a depth of six feet he struck the true vein. Several tuns were then taken to his barn and further examination made.

Dr. E. S. Kelley, of Boston, and Professor R. H. Richards, of the Institute of Technology, subsequently examined the premises and minerals. From their report it seems that the rocks in the vicinity are gneiss nodes, and quite hard. The strike or line of outcrop is about N. 70° to 80° E. the dip about 30° to the N. W. As he found it, the line of the vein was about N. 72° E. by the compass. Four specimens were assayed. The first, coarse grained galena, assayed for silver, yielded $56.37; and the second, fine grained galena, $75.23 per tun. The third, a comparatively pure piece of gray copper, containing also some quartz and galena, assayed for silver, copper, and incidentally for gold, yielded, of silver, $1,270 per tun; gold, $129 per tun; and about 27 per cent of copper. The fourth specimen, weighing about three pounds, tried for lead, was found to be nearly pure and hammered quite readily. The lead was fifty-two per cent of the whole matter.

After this a large extent of the adjoining property was secured, and in September last systematic mining operations were begun by the sinking of a shaft ten feet square. As the shaft increased in depth, the vein—which is what is known as a fissure vein, that is, metal between two walls of granite, where in all probability it was thrown by volcanic action—broadened from three feet at the surface to seven feet at present working, twenty-five feet down. As the men descend, the vein grows richer and purer, the proportion of silver and gold increasing, while that of lead remains about the same. The south wall has not yet been reached. The men are therefore working on the pure metal, the north wall being perfectly perpendicular. In consequence of this fact, which is totally without a parallel in mining history, there is but the smallest possible expense incurred in removing the ore—about one dollar per tun. About ten tuns are taken out, being hoisted up in baskets, every twenty-four hours. To work this quantity, only four men are required by day, and a relieving gang of equal number by night. This ore, which is piled in a storehouse, as at present mined yielded $90 per tun of silver, $70 of lead, and $11 of gold; a total of $171. The cost of smelting and separation is $20 per tun, so the profit is about $150 per tun. Near this first shaft, on the forty acre lot, they have sunk the second shaft, begun in last October. This is of about the same size as the first and is down almost as deep, the vein working about four feet in width and the ore being of similar purity. This vein, like that first found, broadens as it is dug out. Four men work in this shaft at night and four during the day. Shaft houses have been erected over the mines, and a large storehouse and a boarding house for the men built near by. Housing the shafts will enable the men to continue work during the winter.

Mining experience has demonstrated that a fissure vein is always without bottom. This vein is estimated by geologists to extend in its general direction, 20° east of north, about six or seven miles in length. Bearing this fact in mind, the wealth to be reasonably expected from this "find" can only be estimated by comparison. The Comstock lode in Nevada, hitherto supposed to be the richest silver mine in the world, yields only $45 per tun on the average, while the Newburyport yields just double that. The Mariposa mines, which were sold a few years ago to a company for $10,000,000, yield only $15 per tun of silver. The Belcher mines in Colorado, which yield about $40 per tun, divided $900,000 among the stockholders as the profits of work during the month of August, 1874; and these mines had not the additional profits accruing from the product of lead.

Chalk in Artificial Fuels.

We have remarked paragraphs in sundry home and foreign scientific journals relative to the utilization of chalk, such as is found in natural beds, as a source of heat. Various descriptions of improved fuel have appeared, in which the above material has been mixed with bituminous coal and various earthy substances, and the compound thus produced is stated to have increased calorific properties. How this result can be directly ascribed to any active effect of the chalk, we fail clearly to comprehend.

Chalk is a body already the result of a combination of carbonic acid and lime. By heating at a high temperature, the material may be decomposed; and it absorbs an amount of heat equivalent to that produced at the moment of combination. Carbonic acid and lime result, and these themselves are also burnt bodies, neither of which can individually produce heat. If the carbonic acid, after contact with an incandescent combustible, is transformed into carbonic oxide, it is simply through the absorption of exactly the quantity of heat which would be produced by the transformation of carbonic oxide, in turn, into carbonic acid. So that, theoretically and according to all present chemical ideas, it is impossible to conceive that lime, no matter in what form it be utilized, can be a source of heat.

It remains therefore to account for the advantageous results which are claimed to have been secured by the admixture. In domestic heating, the types of apparatus commonly employed are the grate and the stove. A grate fire utilizes about one tenth of the heat developed by the combustible, that is, about this fraction goes to warm the room, while the remaining nine tenths flies up the chimney. It is radiant heat that warms our apartments. Now if, by mixing chalk or limestone with the fuel, the combustion is retarded, the chalk, by absorbing a portion of the heat which otherwise would be lost, serves to increase the radiating surface, it thus probably augments the quantity of heat utilized.

In stoves an analogous state of affairs exists, and it is not impossible to conceive that such, in the instances noted, may be advantageous. But for the production of steam, wherein active combustion is required, it is certain that the addition of such foreign matter to the fuel can exercise no useful effect.

Talent and Tact.

Talent, it has been said, knows what to do, tact knows how to do it; talent is wealth, tact is ready money; talent has many compliments from the bench, tact touches the fees of the client; talent makes the world wonder that it gets on no faster, while tact excites astonishment that it gets on so fast. Tact makes no false step; it takes all hints, and, by keeping its eye on the weathercock, is able to take advantage of every wind. This promptness in seizing an opportunity, and diligence in following it up, is scarcely less valuable than industry. Instances might be given indefinitely of the results that have followed the immediate utilizing of an accidental discovery in mathematical demonstration, in chemical analysis, in mechanical invention, and in manufacturing operation.

Correspondence.

Remarkable Optical Phenomena.

To the Editor of the Scientific American:

Last evening, a curious optical phenomenon was visible at this place at sundown. For three days the weather has been very sharp (thermometer 10° to 12° below zero); and yesterday afternoon, flaky clouds lay in the west. Just at sunset, the full disk of the sun, considerably magnified, was seen behind a thin veil of cloud, but shorn of its rays, lusterless, and resembling the full moon, which it did not much exceed in brightness. The full disk was so clearly seen in all its parts that it was a matter of surprise that it was not brighter. This surprise was increased on observing, about twenty degrees to the right and a little above, a dazzling brilliancy, as if the sun were struggling to burst through a rift in the the clouds. It was hard to believe that the real sun was the lack-luster orb that was slowly passing down through the distant hemlocks, and not the one of which the radiance was making the whole west a blaze of light. The phenomenon lasted for some ten or fifteen minutes, and until the disk of the sun had completely passed out of sight. The luster then slowly faded away. The explanation that I give is that two clouds of snow crystals lay in such positions that the one cuts off the light from the sun, the other reflected it to our eyes.

To-night, another optical phenomenon has attracted my attention. The frame of a picture in my room has the appearance of being bent, when seen across the room, the lamp being on one side. This is beyond our power of explanation at present. At the point where the light strikes upon the frame, which is a gilt one, it seems bent or broken.

Troy, Pa. O. B. J.