

noon, and night. The third day the number of ants had greatly diminished, and on the fourth there were none. He at once concluded the ants had all been destroyed, but in the attics he found a few feeding on dead house flies, which led him to suppose that the remainder had become suspicious of the sweet cake. He accordingly distributed through the house pieces of bacon, which were afterwards found swarming with ants. This was repeated with the same result for several days, when, in like manner with the cake, the ants finally ceased to visit the bacon. Pieces of cheese were next tried, with the same results, but with an undoubted thinning in the multitude of ants. When the cheese proved no longer attractive, recollecting the feast on dead flies in the attic, dead grasshoppers were supplied from the garden. These again proved too much for the ants, and after a few days' trial neither grasshoppers nor anything else attracted them. They appear to have been thoroughly exterminated, nor has the house since been infested with them. Professor Leidy regards the action of the ants as indicating a ready disposition to become circumspet.

THE PYRENEAN PINE.

The foliage of this tree is very distinct, quite unlike that of any other conifer. The leaves are in twos, of a beautiful grass-green color, and from 6 inches to 7 inches in length. It can easily be distinguished from other pines on account of the deep yellow colored bark on its young shoots; the cones are about $2\frac{1}{2}$ inches long, rather egg-shaped, on short foot-stalks, sometimes in twos, but mostly solitary. It is found on the Pyrenean mountains, where it forms extensive forests. This tree is highly ornamental, especially when young, its fine, upright-growing, light green leaves, and the orange colored bark on the terminal shoots being its most striking and beautiful features during that stage; but when older, it assumes a coarser habit of growth; its branches become stout, wide-spreading, and straggling, and altogether its general appearance is far from attractive. This pine has never been very extensively planted, on account of its scarce use in the trades, and the difficulty in procuring seed true to name. The wood is of inferior quality. We copy the illustration from the *Garden*.

Presence of Indigo in the Human System.

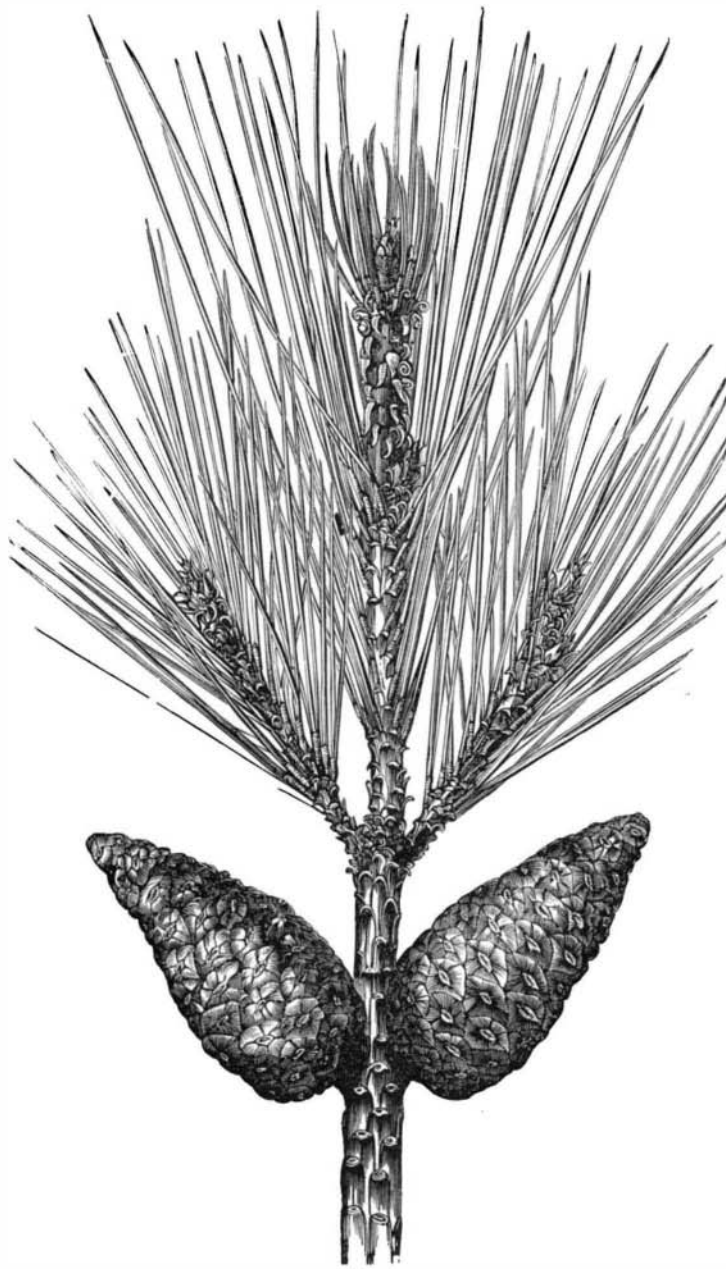
At a recent meeting of the Pathological Society, of London, Dr. Ord exhibited a specimen of a renal calculus containing indigo. He remarked that indigo, as well as a substance which yielded indigo blue under certain reagents, was sometimes met with in normal urine; but it had never before been met with in the form of a calculus. The specimen consisted of a black mass of the size of a half walnut, lodged in the pelvis of one of the kidneys. When heated on platinum foil it gave off a peculiar smoke, which had a sooty character; after incineration a small amount of a deposit of phosphate of lime was left behind. With the microscope, bluish-black masses and crystals could be seen; and after treatment with hydrochloric acid a black residue was obtained. On sublimation it yielded crystals in the form of six-sided tablets, just like indigo. After trituration with strong sulphuric acid, it gave a blue fluid, which finally had the spectroscopic characters of indigo, a single broad absorption band in the yellow and orange part of the spectrum. In regard to the formation of the substance, Dr. Ord stated that there had been nothing peculiar in the patient's food to produce it. Indol, which bears some relation to indigo, is formed by the action of the pancreatic juice and pepsines, and is present in the fæces. When indol is injected into the blood of a dog, indican appears in the urine. Now indican, richer in carbon and hydrogen than indigo, is decomposed by the action of acids into a mixture of indigo blue and glucine; and hence it is said that in this is to be found the reason of the presence of indigo in the urine of cholera, and in cases of obstruction of the passage of the fæces through the intestine. It is also found in pus, the greenish blue color of which is due to a substance allied to indigo. In the present case, pus contained in one of the kidneys may have been the source of the indican, which, being reabsorbed by the blood, was excreted by the other kidney, and precipitated as the colored indigo-blue by its contact with the acid urine. Whatever the explanation, it pointed to a direction in which the urine might be studied with profit. Dr. Thudicum remarked that the first urine of cholera contains a very large quantity of indican, so that the albumen in the urine is precipitated of a black color. But even if a substance was present only in a small amount, it was not, therefore, to be regarded of no importance, but the contrary.

RECENT experiments by Professor McNab on the rate of the ascent of fluids in plants, ascertained by the employment of spectroscopic examination of the diffusion of lithium citrate, gave a maximum result of 24 inches per hour

THE OIL BEARING SANDS OF PENNSYLVANIA.

The question as to the precise spot in which a well may be sunk with a sure prospect of "striking oil" is one of great importance to petroleum miners, and yet one which the most experienced and best informed oil men fail to answer with certainty; and, in fact, one that must await the completion of the present geological survey of Pennsylvania for its correct solution. Pending this result, however, Mr. Ashburner, one of the assistants of the survey, has, in a paper read before the Engineers' Club, of Philadelphia, given us some valuable information as to the rock formations and the relative positions of all the oil horizons of Western Pennsylvania, together with an estimate of the daily production of each horizon. That portion of the State in which petroleum has been found lies entirely west of a line drawn across the State, from its boundary at the southeastern corner of Greene County, to that at the northeastern corner of McKean County. The oil regions may be divided, for convenience of description, into three districts, the southwestern, the western, and the northern.

The southwestern district may be said to include that part of the State south of the Ohio river and west of the Monongahela river; the western, known among the producers as the "lower country," lies in the water basin of the Alleghany river, between Pittsburg on the south and the Phila-



THE PYRENEAN PINE.

delphia and Erie Railroad on the north; and the third, or northern district, lies entirely north of the Philadelphia and Erie Railroad, in the counties of Warren and McKean, and extends ten miles into the State of New York.

The strata of Western Pennsylvania lie comparatively horizontal, and their average dip from Bradford, near the State line, to Pittsburg, is about eighteen feet to the mile. Three thousand feet of the stratified rocks of the Carboniferous and Devonian ages in Pennsylvania have been found to contain petroleum. The highest stratum in which oil is found occurs in the coal measures, 165 feet below the Pittsburg coal seam, in Greene County; while the lowest occurs about 3,200 feet below the geological position of the Pittsburg coal seam in McKean County. If we should drill a well in Greene County 3,200 feet deep, starting on the Pittsburg coal, we would pass through the horizon of all the sands and sandstones in which the petroleum of the State has been found. The rocks are subject to very marked and rapid changes in their thicknesses, in comparatively short distances. What the changes in thickness may prove to be between McKean and Greene counties is not yet known; nor is it easy to say whether the total thickness of the stratified rocks between the Pittsburg coal and the "Sartwell" (or lowest) horizon will be found of a variable quantity, or much greater or much less than the above estimate at localities between the two counties.

The petroleum in the southwestern district comes from the highest rocks. The "oil-sand group" of this district is about 800 feet thick, and is composed of three sandstone members, separated by intervals containing coal seams, slates, and shales. The first, or upper, oil sandstone, 260 feet thick, shows considerable variation, and is often replaced by shale; in such cases the shale contains no oil. The second, or Mahoning, sandstone is quite constant in thickness, 135 feet being the average. It is the principal repository of the petroleum of the southwestern district. The third, or lower, sandstone is made up of three members, separated by about thirty or forty feet of shale and coal. The thickness of the whole is about 400 feet. The upper member is regarded as the oil bearing rock; the lower is the representative of the coal conglomerate or millstone grit. Some of the features of this district are very different from those of the other two. Small crevices in the oil sands are of frequent occurrence; and it is a striking fact that the oil is said never to have been found except where a crevice has been so struck. By some this feature has been considered a necessary one to the original production of the oil. Professor Stevenson, however, states that the oil in nowise owes its origin to a disturbance of the strata, but that the only effect of the latter has been to provide reservoirs for the oil in the rock already oil bearing. Between the bottom of the coal conglomerate (the lowest member of the lowest oil-producing sandstone of the district under consideration) and the "first oil sand" (the highest producing sandstone of the western district) there is an interval of from 650 to 700 feet of shales and sandstones, forming the barren oil measures, or mountain sand group. These rocks are perfectly destitute of any economical strata, containing no coal, iron, or oil.

The petroleum producing sands of the western district are found intermediate between the high rocks of the southwestern district and the low rocks of the northern. The total thickness of the group is 315 feet, and consists of three strata separated by two intervals of 105 feet and 110 feet respectively. The first sand produces a heavy lubricating oil, of from 30° to 35° gravity; the second, an oil of about 40°; and the third, the usual light oil, of from 45° to 50° gravity. The latter sand is the most productive, and yields most of the oil of commerce. The well records along the "green oil belt," in Venango County, show great uniformity in the arrangement of the sand rocks, being sharply defined, massive, and lying at regular intervals. Going southeast from this belt, they gradually split into several members, becoming finer and finer in their composition, and shade off into shales. Going to the northwest, the third sand terminates quite abruptly; the second sand overlaps it and continues a mile or two farther; the first sand overlaps the second, and extends in some places a long distance beyond. Most of the wells producing from the first and second sands are located along these overlapping edges of the sand rocks. Wherever the lowest sand is adapted to the production of oil, the main deposit is found in it, and not in the sands above. The first and second sands do not produce oil along the center of the belt. In some wells oil has been obtained from all three of the sands; but in such cases the wells are not on the axis, but near the edge of the third sand; and but a short distance farther from the center no third sand can be found. These facts are suggestive, and seem to point to the conclusion that the oil sands are merely reservoirs which have acted as sponges in absorbing the oil that has ascended from a much greater depth. In such a case the oil would not be a product of the rock in which it is found.

The petroleum of the northern district comes from the lowest rocks. Between the "third oil sand" of the western district and the Warren sand of the northern district there is an interval of about 600 feet of shale, which is entirely barren. The Warren oil sand is very irregular in character, and the oil is found at horizons varying from 600 to 800 feet below the Venango third sand. In quality it very much resembles the "third sand oil." By many of the producers it is known as "slush oil," on account of the poor quality of the sand, and the rapid diminution of the product of the wells, which yield largely when first struck. The productive horizon of the Bradford oil belt in McKean County and Cattaraugus County, N. Y., occurs probably 300 feet, more or less, below the Warren horizon. The sand in this belt is of a finer and closer texture, and is more constant in character over a wide area than that of any other producing belt in Pennsylvania. This belt is the surest and safest territory in which to operate. The oil is of about the same gravity as that of the "third sand oil," but somewhat different in character. On account of these differences in the sand and oil, the Bradford wells are never pumped continuously, but "by heads," or at regular intervals. This is found necessary to keep the sand open or porous. A great deal of the oil obtained from the Bradford belt, along the State line, is found several hundred feet above the regular producing sand. The lowest oil of the northern district, and in fact in Pennsylvania, comes from the "Sartwell oil sand," but recently discovered in Liberty Township, McKean County.