openings to the air, and through which currents could be maintained by artificial means. Such a plan is still more to be recommended on hygienic grounds, since it has been shown, by Pettenkoffer, that infiltration of coal gas, through the soil, takes place even into houses not supplied with gas.

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(Illustrated articles are marked with an asterisk.)

MORBID MENTAL CONDITIONS.

There is an old saying that "every man has a bee in his bonnet," which, being translated, means that we are each, on some one topic, slightly insane. Somewhere in the marvelous organism of the brain there is a weak spot; some place in the connection between mind and body is at fault; and in the exercise of certain faculties, as a consequence, our actions are less governed according to the dictates of a sound reason. We are not prepared to vouch for the accuracy of such a theory, or to adduce scientific proof in its support; but in the daily life of every one, instances apparently substantiating the notion may be constantly encountered. Take, for example, the search for perpetual motion, which in some reaches a mania, or, indeed, the efforts made for solving any of the problems which Science demonstrates to be beyond peradventure insoluble. This is not confined to the ignorant, though perhaps such a class are in excess; for there are men, scores of them now living, some we have ourselves encountered, who, while well versed in philosophy, and who will follow the mathematical demonstration that a circle cannot be squared or a perpetual motion constructed, point by point admitting the truth of every step, will yet, after all, nevertheless find it impossible to divest themselves of the idea that, by some hook or crook, the wished-for result may be obtained. Or, conversely, they may see results reached which their reason and knowledge must teach them are impossible, either in principle or from the means employed, without the addition of hidden or extraneous circumstances, and yet they will grasp at the apparent proof, and even hold it out to the world as genuine, simply because it goes to confirm their secret and cherished ideas which their very reason prevents them openly avowing. Such cases, mere ignorance being eliminated from consideration, we may term the mildest form of the "bee in the bonnet," and starting from them, as it appears, may be traced a whole series of mental defects, reaching perhaps up to actual monomania.

We mention the above as a common and harmless instance of the triumph of will or desire over reason and judgment. As the beginning of a special category of human actions, which, did we believe in the doctrine used by some, that spiritual beings unseen govern men's every doing, we should say were directed by a demon of perversity. Passing through all intermediate grades, considered in their ascending order, in proportion to their hurtful effects upon society, the end seems to be found in morbid impulse, in that strange condition which Professor Hammond, in his recent able lecture on the subject, defines as a state "in which the affected individual is impelled consciously to commit an act which is contrary to his natural reason and to his normal inclinations." We would not have confounded the feelings which impel an educated man to seek the perpetual motion, and those, which perhaps all of us have felt, when on the verge of some high eminence, to cast ourselves down; but while they differ in point of time, one extending over years and the other over seconds, there appears, in certain cases, in both a morbid element which, in its result of overcoming reason, lends to them a similarity sufficient to class them as extremes of a like mental action.

At the present time, however, when the plea of insanity is so frequently interposed in courts of law to shield the criminal from the consequences of his guilt, too great care cannot be exercised in approaching or admitting the existence of a mental state which tends to destroy the responsibility of a person for his own actions. How fine a distinction may be drawn, showing the existence or non-existence of morbid impulse, Professor Hammond indicates by pointing out that, in the case of a person committing murder while delirious, who acts in accordance with reason, though it may be perverted at the time, and in that of another who, supposing himself to be imminent to a great danger, commits suicide to avoid it, neither acts from morbid impulse; but if a delirium acts so over the mind as to convince a man that some one is going to murder him, and hence he lies in wait for and kills that individual, that is true morbid impulse. The person suffering is perfectly aware of his wrongdoing, but cannot help performing the action. Dr. Hammond mentions repeated cases of such impulses impelling men to murder, and instances especially that of Jesse Pomeroy, the child who recently killed his playfellow in Boston. The boy, on being questioned, asked to be put where he could not do such things.

In other cases people have been impelled to throw vitriol on handsome dresses, and we are aware of an instance of a lady, for some time known in society, who could not resist the temptation of stealing small articles from shop counters.

What to do with such people is a question which the community sooner or later must solve, and Dr. Hammond's answers, as the result of his experience, may be summarized as follows: A person aware of the influence of the disorder, and knowing that he cannot resist it, is bound to put himself under suitable physical restraint, so as to render it impossible to yield. If he does not, then, when shown to have committed acts thus impelled, it is the duty of society to prevent his being at liberty. Morbidly constituted persons who commit crime because it is pleasant for them should be dealt with according to law. The apparent absence of motive is apparent only. The fact that a murder has been committed in order that the perpetrator might secure his own execution is not a palliating circumstance; the desire to be hanged is the evidence of a morbid mind, not of an insane one. A morbid impulse to crime experienced by a really insane person demands continued sequestration; but the plea "I could not help it," when standing alone in an otherwise sane individual, should be absolutely disregarded.

CHEAP TRANSIT FOR OIL.

We have heretofore described the extensive ramifications of the pipes, used in the oil regions, for conveying the oleaginous products of the neighboring wells to the railway stations. Many miles of such pipes are now in use. A new and extensive work of this kind, which is rapidly progressing, is the oil pipe of the Pittsburgh Pipe Company, now being laid from the heart of the oil regions, at Millerstown, Butler county, Pa., to the Baltimore and Ohio Railroad, near Pittsburgh, Pa., a distance of about forty miles. The pipe has a diameter of three inches, and will have a delivering capacity of four thousand barrels a day. Relay stations will be placed every five miles. The pipe company expect to charge thirty cents a barrel for pipage, the present charge by railway being fifty-five cents. This will, doubtless, prove to be a profitable investment. The first cost of pipes is not great, and, if properly laid down, the expenses of working cannot be heavy.

The ordinary railways undoubtedly furnish the cheapest transportation for most products; but there are some substances, as, for example, water, gas and oil, that to a certain extent may be said to possess the power of self-transportation, whereby they can be moved cheaper than by railway or canal.

The facility with which liquids may be made to flow in pipes, between distant places, has often suggested the idea of using similar means for the transportation of grain and merchandize. Years ago it was proposed to convey grain from Chicago to New York in pipes, by air pressure, and the notion has been lately revived. The idea of transporting merchandize packed in rolling balls, within tubes, the balls to be driven by air pressure, was patented a generation ago in England, and re-patented here recently, as a new discovery. Wonderful things in the way of speed and cheapness of transportation were predicted in favor of these schemes. But the predictions were not based upon the mathematics of the subject. After all, whether the project relates to so ideal a thing as music, or so practical a matter as the carrying of goods, the performances of mankind are inexorably confined to the limits of exact numbers. We think that any intelligent person who will take the trouble to figure out the cost of pipes and air machinery, and the expenses incident to the working thereof, will soon become satisfied of the folly of expecting to compete with the ordinary railway over long distances in the transportation of general merchandize. The pneumatic system is a good motor for short lines in cities. But it stands no chance with the common railway, economically considered, on long lines through the open country.

Oil, water, and gas are exceptional commodities. These, when placed in pipes, will flow of themselves; and if the apparatus is properly arranged, of the right size, almost any extent of distance can be easily overcome. Thus, the city of New York is supplied with water which flows through an underground tube from Croton Lake, Westchester county, a distance of some forty miles, while the street piping, by which the water is locally distributed, has a total length of some two hundred miles. In view of the cheapness and facility with which liquids may be transported in pipes, it would seem as if this method might be employed with great advantage to convey oil, from its fountains in Western Pennsylvania to Philadelphia and New York. The present cost of transporting oil by rail from Venango and Butler counties to New York is $1.20 per barrel. The pipe system would, probably, effect a considerable reduction over this cost, and yield a handsome profit to the projectors.

POWER REQUIRED TO DRIVE COTTON MACHINERY.

The New England Cotton Manufacturers' Association have recently performed a good act in publishing a little "Manual of Power," prepared for them by the well known engineer, Mr. Samuel Webber, of Manchester, N. H. Mr. Webber presents an extended tabular statement of the power absorbed in driving mill machinery in a large number of mills, as determined by the dynamometer. Some of the machinery was new when tested, some very old, some in good and some in very bad condition. Special tests were made to determine the effect of weather changes, of different kinds of oils and various methods of lubrication, of altering the method of banding, etc. The information given is derived from the experience of the author, extending over several years, and is of great value to engineers and manufacturers. We have only space for a general *résumé* of results.

Cotton openers, delivering cotton loose on the floor, with single beaters revolving from 532 to 820 revolutions per minute, and single fans at 700 to 1,600 revolutions, required, including countershaft, from two to over six horse power: with two beaters and two fans, four and a half to six horse power. The cotton delivered ranged from 3,000 to 10,900 lbs. per day.

Cotton pickers, delivering cotton in the lap, at the rate of from 1,000 to 5,000 lbs. per day, required from 3 to 13½ horse power, averaging about 2½ horse power per 1,000 lbs.

Cotton cards absorbed from 2 to 9 horse power, carding from 30 to 76 lbs. per day, averaging about one twentieth horse power per pound for finishers, a third more for breakers, and one fifth for very fine work.

Railway heads required from 1½ to 2½ horse power, a usual figure being about a horse power for 9 inch rolls at 10 yards per minute, and half a horse power for 1½ inch rolls at 300 revolutions per minute.

Drawing frames indicated a resistance of from ½ to 1¾ horse power at speeds varying from 200 to 400 revolutions, 3 to 5 rolls, 2 to 4 doublings.

Roving frames ranged from 28 to 276 spindles per horse power, at speeds of from 475 to 1,350 revolutions. A fair performance would seem to give about 150 spindles per horse power, at 1,200 revolutions.

Throstle spinning required a horse power for from 65 to 165 spindles, the latter at 2,685 revolutions of the flier, the former at 5,000. Ring spinning absorbed very nearly similar power.

Mule spinning gave 200 to 280 spindles per horse power, speeds of spindles ranging from 3,000 to 5,000 revolutions.

Cotton looms required usually about one sixth or one eighth horse power, at 120 picks per minute. Looms making 156 picks per minute, on Nos. 15, 16, and 20 warp and weft, ran 5·1 per horse power. Others, at nearly the same speed, on finer goods, ran 9 and 10 per horse power.

Cotton spoolers, at 100 revolutions, required 0·2 to 0·3 of a horse power, twisters about three fourths of a horse power, and warpers 0·11 to 0·17; dressers 2 horse power, and slashers 1½ horse power.

A circular saw, 18 inches in diameter, sawing 3 inch hard plank, gave 1·27 horse power; and a saw, 9 inches in diameter, cutting 1 inch pine board, 1·6, their speeds being 1,300 and 4,000 respectively.

A small lathe, turning ⅜ inch iron, took 0·09 of a horse power, and a larger lathe, turning 1 inch iron, 0·21. An upright drill, boring a ¾ inch hole, absorbed 0·16. A crank planer, cutting with a two inch stroke, required 0·23, and a planer with a five feet table took, when making 4 feet length of cut, 0·25. Three polishing wheels, of 12 inches diameter and 1½ inches face, absorbed 1·15. A grindstone, 6 feet in diameter and 12 inches face, grinding axes, took 3 horse power, while another, 6½ feet diameter, grinding axes, in wooden boxes, absorbed 11; and a stone, 3 feet 10 inches in diameter and 11 inches face, required 7·8.

Wool cards absorbed 0·9 to 1·27 horse power, at 96 to 130 revolutions; jacks, at 2,457 revolutions, 0·65 to 0·78; and looms, making 65 to 95 picks, took 0·4 to 0·6.

Coefficients of friction on shafting ranged from 0·0336 to 0·759, a good average result being about 0·05.

Reviewing the whole series of results, we deduce the following as fair approximate rules for estimating power:

Cotton openers, one horse power per thousand pounds cotton delivered.

Cotton pickers, three horse power per thousand pounds cotton delivered.

Cotton cards, one twentieth horse power per pound cotton delivered per day.

Cotton cards, best practice, one fortieth horse power per revolution per minute.

Railway heads, breakers, one horse power per each ten yards per minute.

Railway heads, finishers, 0·001 horse power per revolution per minute.

Drawing frames, 0·002 horse power per revolution per minute.

Spindles, 0·008 horse power per spindle per 1,000 revolutions.

The very great irregularity of the results given in the pamphlet indicates how vast are the losses experienced in every mill where machinery, badly made, out of repair, or badly lubricated, is allowed to run. We have little doubt that there are many mills in the United States where a knowledge of these facts may lead to a reduction of running expenses within their walls, which will go far toward compensating the proprietors for their losses incurred in these dull times outside their mills.

A SWITCH ACCIDENT.

A very unfortunate switch accident recently took place on the Shore Line Railway, near New Haven, Conn. The switchman shifted the switch just before the last truck of the last car of the train had passed. This threw the truck from the rail, and the truck bumped along over the sleepers for a short distance to a trestle work bridge, when the rear car fell off the trestle, drawing with it the next car ahead, then the next, and the next, and then the baggage car. The coupling then broke, leaving the tender and the locomotive on the track. The superintendent of the road, Mr. William Wilcox, was in the baggage car and jumped out, but only to be crushed and killed by that car. His was the only life lost, though many passengers were more or less injured. The train was moving quite slowly, or the loss of life might have been serious, as the trestle was some fifteen feet high. The coroner's jury found that the switch was in perfect order, both before and after the accident; and there appears to be no other way to account for the catastrophe than as stated, though the switchman avers that he did not move the switch too soon, as alleged. The switch was of the caboose style, the switchman being obliged to enter a round house and close the door, in order to shift the switch, the switch being connected with the door. The object of this arrangement is to compel the switchman to remain at his post so long as the main track is open. A window is so placed in the house that the range of view of the switchman is confined almost entirely to the switch points, thus compelling him, as it were, to pay attention to his duty, that is, observe the switch.

This device has been in use for several years on the Connecticut railways, and has hitherto been an effective and valuable auxiliary in the prevention of switch accidents. It is, perhaps, as good a contrivance of the kind as can be provided. But what the public require is an easy plan of shifting cars from one track to another, without subjecting passengers to the risk of injury if a switchman is sleepy or careless. One plan of this kind was mentioned last week in the SCIENTIFIC AMERICAN, whereby switches are done away with altogether.

It is pleasing to be able to state that the Shore Line Railway is a comparatively well appointed institution, in respect to the ordinary means of safety. The rails are of steel. To prevent a repetition of the telescoping horror which occurred on this road a few years ago, the cars have been provided with the Miller platform and its strong couplings. Had the cars at the time of this last accident been coupled with the old style of couplings, it is probable that the coupling of the first car that left the track would have snapped, and the other cars would not have been thrown down. The strong safety couplings appear to have been productive of evil in this case But experience shows that, in the ordinary run of accidents, in nine cases out of ten, this device may be relied upon to prevent injury.

Superintendent Wilcox was one of the most careful, experienced, and able railway officials in this country, highly esteemed in every walk of life. His loss is deeply deplored.

THE MANUFACTURE OF GEM STONES.

What boxwood is to the wood engraver—the means without which his finest art would be impossible—that chalcedony is to the engraver of gems. Hard without brittleness, susceptible of a fine and endurable polish, tinted by Nature with beautiful and at times strongly contrasted hues, or capable of taking on such colors at the hand of man, it has been from the earliest period of art not only the favorite medium but the only possible medium of the gem engraver's most striking effects.

In its simplest state, chalcedony is an unattractive white stone, nearly transparent, and chiefly useful for making spear heads and arrow tips, or their more modern representatives, gun flints. Sometimes it has a striped or banded appearance, due to alternations of more or less translucent layers, ranging in color from whey white to the white of skim milk, still not very serviceable for gems or jewelry. When stained by metallic oxides, however, chiefly those of iron, it rises to the dignity of gem stone, as sard, cornelian, chrysoprase, etc., when uniformly tinted brown, yellow, red, or green: as agate, onyx, sardonyx, etc., when the colors lie in bands or strata, or are separated by layers of white. The natural formation of these flowers of the mineral world is recorded in their substance. Though commonly found in lavas and other igneous rocks, or in the *débris* remaining from their disintegration, gem stones are substantially an aqueous product, and require the agency of fire simply to develope their fine colors, a step in their production more the work of Art than of Nature.

At high temperatures, especially under pressure, silica, the basis of all these stones, is dissolved to a limited extent by water, and thrown down in a more or less crystaline form when the temperature falls or the pressure is lowered. Illustrations of this process may be seen on a grand scale in the hot springs of the Yellowstone country and elsewhere in the Great West, where immense masses of siliceous sand and rock, sometimes chalcedonic, have been brought up from the heated depths by the flowing or spouting water, and deposited around the orifices of the springs. When water similarly impregnated with silica finds passage through rocks containing cavities, bubble holes, and the like, a portion of the mineral is deposited in the cavities, gradually filling them from circumference to center, the variable rate of deposit showing in concentric rings or bands of more or less opacity. Frequently the supply of silica-bearing water appears to have been prematurely cut off, leaving a crystal-lined druse or geode; and occasionally the cavity remains filled with water hermetically enclosed, forced in possibly under pressure and unable to escape when, by some geologic change, the pressure has been removed. In case the siliceous water is also charged with iron, nickel or other metal, the stone may be more or less impregnated with the foreign material according to the degree of its crystallization, the more amorphous layers naturally taking the most and consequently developing the deepest color when subjected by Nature or Art to the action of heat, sunlight, or other agent of chemical change. Or after the deposition of the stone, the enclosing rock may be washed by chalybeate or other mineral waters supplying the coloring matter necessary to convert the unattractive gray chalcedony into the highly prized sard, cornelian, onyx, or other gem stone. It is in these latter processes that Art steps in to complete or improve upon the work of Nature, either by developing the latent color of naturally impregnated stones or, going further back, by supplying the coloring material also. Probably the majority of gem stones, thus owe part if not all their beauty of color to Art, as well as their beauty of engraving and finish.

The simplest process is the development or hightening of dull or latent color by the action of heat. The celebrated cornelians of India, for example, are largely produced from dull brown stones, by a native process of roasting in a matrix of camel's or cow's dung, which prevents the stones from being too highly or too rapidly heated. A temperature sufficient to char wood is enough, the effect being like that observed in the burning of bricks: the brown oxide of iron is changed to red oxide, and the color of the stone is correspondingly improved. At Oberstein, the great manufacturing place of gem stones in Germany, carefully regulated ovens are employed for the same purpose. Similarly treated lumps of unimpregnated chalcedony are converted into white cornelian, the texture of the translucent stone being sufficiently disturbed by the heat to make it opaque. The snow-white bands of onyx, to which we owe the art of the cameo engraver, are almost always artificially produced in this way, the heat which improves the color of the darker layers, serving to develope the white ones at the same time.

But Art, as we have said, goes a step further back, and introduces as well as developes the colors of these stones, sometimes producing effects which Nature is unable to rival. In all cases the staining process involves, first, the introduction of a substance capable of producing color on precipitation, by heat or chemical action, second, the precipitation of the color. As the stone is too finely grained to absorb any colored solution, the coloring liquid must itself be colorless To convert gray chalcedony into cornelian, the stone is soaked in a solution of pernitrate of iron, roughly made by dissolving old nails in dilute nitric acid; then the colorless pernitrate is changed into red peroxide of iron by roasting, the resulting color being faint or dark according to the amount of the solution absorbed. The more translucent the stone, the longer the period of steeping required; and when layers of unequal translucency exist, unequally colored bands result, giving sardonyx or cornelian onyx instead of simple sard or carnelian. Black onyx, that is, black stones crossed by bands of pure white, are always artificial. The coloring matter is carbon introduced in a colorless solution and blackened by fire or sulphuric acid. By the oriental and most ancient method, the stones are first boiled in honey or oil, sometimes for weeks, then heated to a temperature which chars the vegetable matter in the pores of the stone, producing black or brown according to the amount absorbed. This method produces the finest and most permanent black; but as the heating is liable to check or crack the stones and so destroy them, the western practice is to darken the carbon by the action of sulphuric acid. Inasmuch as the oriental black resists the action of nitric acid, while that produced by sulphuric acid is readily "drawn" thereby—that is, reduced to the iron mold tint of natural sardonyx—it has heretofore been regarded as a natural color. Billing has discovered, however, that it is merely a question of time in soaking, a sufficiently protracted bath in nitric acid drawing the oriental as well as the western black color. He has found also that any stone made pale by nitric acid, if properly heated, will recover its color by the charring of the carbon remaining in its pores, and that the color so produced will resist nitric acid as well as the best oriental black, which in fact it is.

The yellowish brown, orange, and lemon tints of sards are artificially producible by methods the same in principle as those already described, the last being developed by the action of hydrochloric acid on nearly transparent stones slightly impregnated by Nature with oxide of iron, the other two by the protracted soaking of the stone in the neutral solution of pernitrate of iron, afterwards exposing them to the action of sunlight.

The pale green of chrysoprase is imparted to translucent chalcedony by a bath in the saturated solution of nitrate of nickel, the best effect being produced with the unpurified metal, which always contains a trace of cobalt. The stone must remain a long time in the bath—three or four weeks or more—as it is nearly crystaline and the process is comparatively slow.

A blue color is more easily produced, but it is not permanent. The dye is Prussian blue, precipitated in the pores of the stone by the action of ferrocyanide of potassium on the peroxide of iron, introduced as for the production of red. A better effect is secured by soaking the stone in the ferrocyanide solution first, then treating it to a bath in the peroxide solution.

SCIENTIFIC AND PRACTICAL INFORMATION.

BLEACHING IVORY AND BONES.

The curators of the Anatomical Museum of the *Jardin des Plantes* in Paris have found that spirits of turpentine is very efficacious in removing the disagreeable odor and fatty emanations of bones or ivory, while it leaves them beautifully bleached. The articles should be exposed in the fluid for three or four days in the sun, or a little longer if in the shade. They should rest upon strips of zinc, so as to be a fraction of an inch above the bottom of the glass vessel employed. The turpentine acts as an oxidizing agent, and the product of the combustion is an acid liquor which sinks to the bottom, and strongly attacks the bones if they be allowed to touch it. The action of the turpentine is not confined to bones and ivory, but extends to wood of various varieties, especially beech, maple, elm, and cork.

SOFTENING VIOLIN NOTES.

M. Laborde states, in *Les Mondes*, that the disagreeable rasping tone peculiar to some violins may be avoided by placing a small strip of wax on the upper portion of the bridge. The notes are immediately rendered sweet and soft, and can be suited to the ear by regulating the size of the piece of wax.

RABIES IN ANTS.

Corrosive sublimate, it is said, has the most remarkable effect upon ants, especially the variety of insect which we lately described as living upon fungi found on leaves of trees. The powder, strewed in dry weather across their path, seems to drive every ant which touches it crazy. The insect runs wildly about and fiercely attacks its fellows. The news soon travels to the rest, and the fighting members of the community, huge fellows some three quarters of an inch in length, make their appearance with a determined air, as if the obstacle would be speedily overcome by their efforts. As soon, however, as they have touched the sublimate, says the narrator in the *Naturalist in Nicaragua*, all the stateliness leaves them; they rush about; their legs are seized hold of by some of the smaller ants already affected by the poison, and they themselves begin to bite, and in a short time become the centers of balls of rabid ants. As these insects are one of the scourges of tropical America, destroying vegetation in immense quantities, it is probable that this extraordinary remedy may be of considerable service to agriculturists.

A REMARKABLE HAILSTORM.

A hailstorm of extraordinary nature recently took place in the northern portion of New Jersey. The hailstones, it is stated, in some instances, measured as much as five inches in circumference, and resembled common rock candy, being of oval form bristling with cubical crystals. The ice was very hard and difficult to break, but when broken presented the appearance of the section of an onion, in its concentric rings. The damage done to buildings and crops was excessive, windows being smashed by scores, roofs torn, and fruit trees completely denuded.

FOSSILS OF THE DEPARTED.

A German inventor, Dr. Von Steinfels, seems to have hit a happy medium for disposing of the dead, which is at least free from the objections urged against burial, while it does no violence to the feelings which naturally shrink from destroying by fire the corpse of a beloved friend. It is proposed to place the body in a sarcophagus made of stone, and to pack around the corpse artificial stone or cement in a plastic state. The latter being allowed to harden, the remains become like a fossil embedded in the solid rock, and, if need be, the deceased finds his grave and his monument in one and the same mass.

COCOA NUT TREPANNING.

There is a well known trick performed by the clowns in pantomimes, to the mystification of the juvenile portion of the audience, which consists in shooting a hole in a man's head, and then artistically plugging up the orifice with a carrot, thus completely curing the apparently assassinated individual. While this is, of course, very ridiculous, it is not more so than a somewhat similar operation practiced by the inhabitants of Uvea, an island in the Loyalty group. These queer people have a notion that when a person gets a headache his skull is cracked, or that the bone is pressing down on the brain. Consequently they proceed to cure the trouble by cutting open the scalp, and scraping a hole in the cranium with a bit of glass, and then stopping the aperture with a piece of cocoanut shell rubbed smooth Sometimes the surgeon scrapes too far and injures the *pia mater*, when the patient is killed; but ordinarily the boring proceeds to the *dura mater*, leaving a hole in the skull. It seems that few adults are without perforated heads, and that the cocoanut patch is common.