CURIOUS POISON STORIES.

A story is going round the daily press, to the effect that a man once spit into a rattlesnake's mouth, and the snake died; he did the same thing to an adder, and it died also. Another adder would not open its month, so he spit on a stick, rubbed the spittle on the adder's nose, and it died. A non-poisonous black snake was treated in the same way, but it did not die; and the conclusion is drawn that human saliva is as poisonous for poisonous snakes as the poison of snakes is for man.

In order to realize the improbability of this story, we will state that the poison of snakes is not their saliva, but a special fluid secreted in a bag situated near the root of the poisonous fang, which is provided with a channel to conduct the poison from the bag to near the point, so that it may be injected into the wound.

Many poisons, dangerous if given by injection, are harmless in the stomach, where, by the digestive powers of the gastric and other juices, they are decomposed and made harmless. So the vaccine virus, which by inoculation produces the well known ulcer, is perfectly harmless when swallowed; and several other organic poisons, especially of the septic kind, of animal origin, are only dangerous when entering the system by a wound, and may with impunity be taken into the mouth and stomach. An excoriation or scratch on the lips or tongue, by which they may enter the circulation, is dangerous, as has been proved by many examples. Hence the danger of wounds during dissection by medical students, by which the decomposed animal matter of the subject enters the circulation, and kills the poor victim rapidly; while students with an unimpaired skin on their hands may dissect any subject with impunity. A case is on record of a young lady who kissed the dead body of her father. She had a little excoriation on her lip, which was touched by the moisture on the lips of the corpse; it soon inflamed with all the characteristics of a virulent dissection wound, and in a few days she was a corpse also. The poison had entered into the circulation of her blood.

Experiments in this line are of course highly objectionable; but as far as experience has shown, most poisons of this kind may with impunity be taken in the stomach. If the saliva of man or animals has any dangerous qualities, it is mostly only manifest when entering the circulation of the bitten individual, and especially when the saliva has been changed in its nature by the excitement of passions, such as great fear, anger, etc. Hence arises the often malignant appearance of bites by infuriated men or animals; while the introduction of such saliva into the stomach would undoubtedly, in most cases, not be attended with serious consequences. This shows the absurdity of the idea that the normal human saliva should be a poison in the mouth of any animal, whether possessing poison bags connected with its teeth or not.

The story reminds us of one which went round the papers some years ago, about a man who was bitten by a rattlesnake through his boot. Long after his death, every one who tried on that boot died of the consequence of a scratch in the foot, produced by a serpent's tooth projecting inside the boot; and the cause of the mischief was only discovered when many persons had been killed. The inventor of this story did not know that the rattlesnake poison is only active when freshly injected from the poison bag.

THE SOURCE OF VOLCANIC ACTION.

Volcanoes have long been considered as having their origin in the liquid interior of the globe. This view is still held by some of our best physicists and geologists, though others hold widely different views. While some believe that the internal heat is the cause of volcanoes, others hold that both heat and volcanic phenomena are due to the motion resulting from lateral pressure transformed into a sufficient degree of heat to produce volcanic action, and the question is receiving no little discussion in scientific circles at the present time. The distribution of volcanoes is confined very largely to the boundaries of continents bordering on oceans or seas, or on islands within these bodies of water. This fact leads to the conclusion that water has something to do with volcanic action. And it has been explained by supposing that, as the subsidence of the oceanic regions necessitates the elevation of the continental regions, the shore lines are subjected to a great strain from being the fulcrum point of leverage. This strain results in fracture which admits the water to the heated parts below, and this, by its sudden expansion, forces up the melted material to the surface. The unequal straining, of the submerged crust in subsidence, would cause fracture which, by admitting water, would account for oceanic volcanoes. Continental volcanoes may be due to the pressure of shrinkage which forces the molten matter through mountain fractures, because they are the places of least resistance.

Whether volcanoes originate in a molten nucleus or stratum beneath the crust, which would naturally be homogeneous throughout, or from isolated molten material like subterranean lakes or reservoirs, is largely demonstrated by a consideration of the material brought to the surface by volcanic energy. If this is uniform in its chemical properties, it would argue a common source; or a variety of sources, if the ejected matter varied in its composition. It is found, by inspecting the material thrown out from different craters or fissures, that it differs widely in composition; and even that the lavas of the same volcano vary at different periods. Phillips, and later Durocher, accounted for this diversity of composition on the supposition that the interior fluid mass separated into different strata, according to the density of its components, and that sometimes matter from one of these was ejected, sometimes from another, and again from a mixture of two or more at once. It may also be explained by supposing that each eruption was the result of local chemical action which melted the rock, and, by thus increasing the pressure, forced itto the surface. Hunt and others explain it on the probable supposition that the originally cooled crust is anhydrous, while the sedimentary deposits are all impregnated with water. When the internal heat invades the position of these, the presence of water would greatly facilitate fusion; and the injected matter would vary in composition according to the composition of the stratified deposit which was subjected to the degree of heat requisite for fusion. This Hunt, Babbage, and others consider a "ready explanation of all the phenomena of volcanoes and igneous rocks."

On the other hand, Robert Mallet concludes "that the crushing of the earth's solid crust affords a supply of energy sufficient to account for terrestrial volcanicity," and has calculated that the crushing of 7,200 cubic miles of rock would cause heat enough to make all the volcanic mountains of the globe. These views have been vigorously opposed by Professor Hilgard, of the Michigan University, and Rev. O. Fisher, of England. They claim that Mallet's experiments of crushing 1½ inch cubes of rock, and producing a heat of 217° Fah., are not sufficient to prove that the crushing of solid rock could produce fusion. Hilgard claims that the friction of the crushed and powdered particles would be necessary in addition, and implies that the resistance of the rock would be "materially diminished by the downward increase of hypogeal temperature." Mr. Fisher claims that, if crushing rock will produce fusion, the cubes Mallet crushed in the air should have been fused. He also objects that a horizontal prism of rock, ten miles long and one in sectional area, if crushed, would have the heat uniformly distributed, and nowhere sufficient to cause fusion; and asks, if it fuses in certain parts, what determines the localization?

Mallet meets these objections by saying, first, that the pressure on rock 10 or 20 miles below the surface would be 2·14 or 4·28 times greater than at the surface. This would necessitate greater "work" to crush it, and hence cause greater heat. This, added to the 1,000° or 2,000° of heat 10 or 20 miles deep, would be sufficient, in his estimation, to fuse rock. In his experiments, he subjected the stone cubes to pressure on only two opposite sides, leaving the other four sides free; and if the six sides had all been pressed simultaneously, it would have required much greater force and produced much more heat. Again, in his experiments, the crushing force was so slow, comparatively, that much of the heat was carried off by the steel plates during the process. But in the earth's crust the pressure is on all sides, and the force acts so suddenly that there is little or no time for diffusion of the heat produced. As to the localization, he says, that if the rock be homogeneous, the greatest force of pressure would be excited at the surface which is in contact with some fixed rock, and here the melting would commence. He instances, in proof of this, rocks in the foundations of buildings and masonry, when subjected to too great pressure, which have thus been crushed or "spalled" off, and always at or near the joints. If not homogeneous, the crushing would commence at the weakest place; and in either case the crushing must be localized either at the end or ends of the prism, or at the place of weakness where it first yields. Again the temperature of each succeeding foot of rocks will be raised by the heat imparted from each preceding foot of rock that is crushed. Now since the pressure is 4·28 times greater twenty miles down than at the surface, this multiplied by 217° gives 928° of crushing temperature for the first foot, and the following feet would increase correspondingly in temperature.

Mallet illustrates his points by noting the fact that the resistance of air before a moving meteorite is sufficient to make the latter red and even white hot; and the greatest heat occurs in immediate contact with the moving body, where the air is subjected to the greatest pressure. Also in cutting a cast steel file in two by the rapid rotation of a soft sheet iron disk in contact with it, the greatest heat is developed at the working point, and here the file is softened and cut in two by means of the heat remaining in it, while the air carries off the heat from the disk in its revolutions. Cutting of railroad bars by a similar process is another illustration in point. The exaltation of temperature by the work of modifying the form of a body is also clearly seen on rapidly hammering tough iron, when after a minute or two it becomes red hot, then in a second or two it reaches nearly white heat. Mallet takes into the account the additional heat caused by friction of the crushed particles, as suggested by Professor Hilgard, but says he knows of no experiments that prove its amount, and that it cannot be determined in any other way. The other objections which Professor Hilgard raises, namely, that the increase of heat from the surface toward the center would soften the rocks more and more as their distance from the surface increased, and consequently cause the production of less heat from their displacement by lateral pressure and crushing force, is doubtless a very weighty and important one; but Mallet seems not to have given it an adequate answer.

Professor J D. Dana, probably the best geologist on this continent, does not accept the conclusions of Mallet, but holds that "igneous eruptions must for the most part have come from great fire seas, and had their origin in the earth's original liquidity." To substantiate this view, he instances the great dolerytic ejections of the triassico-jurassic era, which extended from Nova Scotia to South Carolina—a distance of 1,000 miles, and the far greater trachytic eruptions of later eras over the Pacific slope of North America. The matter thrown out from each of these very broad areas, being the same in character throughout, points unmistakeably to the conclusion that in each case it must have come from one great fire sea or the molten interior of the earth. At the time this matter was ejected, it must have come from a common source; but the connection of all its parts may not be retained till the present time, but may have become cut off by subsequent cooling.

THE MEETING OF THE PUBLIC HEALTH ASSOCIATION

A meeting of the American Public Health Association was recently held in Baltimore, Md. Several interesting papers were read. The abstracts below given are selected from the most interesting of the papers read.

VENTILATING BY MACHINERY.

Mr. Carl Pfeiffer said, in substance, that, through the difference of from 30° to 40° between outer and inner air, a sufficient ventilation in an apartment may be obtained in winter, but not in spring, summer, or fall. In these seasons it will be necessary to resort to mechanical means, which the best authorities consider generally to be nearer perfect than any other ventilating system. Mr. Pfeiffer thought that owners of tenement houses should be forced to supply proper ventilating machinery which should be located out of the reach of the tenants.

A NEW ARGUMENT FOR TEETOTALLERS.

Dr. Hitchcock suggests a new raid on the liquor dealers, for causes which will add a novel argument to those already urged by total abstinence advocates. The vital statistics of the United States, he says, show a mortality of from 7 to 16 per cent traceable to the use of alcoholic drinks. In New York, $56 a year for each inhabitant is spent for such beverages, by which life is shortened 28 per cent. Each State should ascertain, by a commission, how much loss it suffers from the traffic in liquor, and should assess that loss on the dealers equitably according to their sales.

THE FINANCIAL EQUIVALENT OF DISEASE.

A remarkable paper on this subject was read by Dr. Benjamin Lee. The object was to determine the loss sustained by the city of Philadelphia in dollars and cents through the epidemic which occurred there in the winter of 1871-2. Dr. Lee calculates the loss by diminution of travel and traffic on the railways, and loss to hotels, to merchants, and to business generally. He also computes the loss due to sickness and diminished production and by death. He sums up his calculations as follows: Expenses incurred in care of sick, $203,879; loss by sickness (time), $1,072,065; loss by disability (time and expenses), $10,000,000; loss by death (based on estimate of value of a life to society), $5,013,000; burial expenses, $74,420; total, $16,363,364. As the epidemic was due to neglect of sanitary precautions and might have been prevented by judicious sanitary legislation, the above represents in cash the money equivalent of the disease, which was wholly lost to the community.

A NEW USE OF NEW YORK GARBAGE.

Mr. Jackson S. Schultz suggested a new use of the garbage of New York. His plan was to buy one or more of the islands in Long Island Sound, erect sheds, and colonize 60,000 hogs, which should be fed with the garbage by the paupers and criminals of the city, under the control of officials wholly independent of political supervision or influence.

THE HORSE DISEASE.

The *anthrax epizoötic* was the subject of a valuable paper by Mr. Law of Cornell University.

The most universally acknowledged causes of the malady in animals are: Plethora, or a state of the blood highly charged with organic elements; an impervious soil or subsoil: a very rich surface soil; inundations; a period of heat and dryness calculated to foster the decomposition of organic matters to a great depth in the ground, and great contrast between the day and night temperatures; and in one case all coincided to produce one of the most malignant types of the disease. It may be added that, while this affection is communicable to all animals by inoculation, it can scarcely be said to spread in any other way, and is therefore to be looked upon as essentially an enzoötic disease. We must go to such places as the inundated margins and deltas of large rivers, dried-up lakes and marshes, or the rich and pestilential Russian steppes, to find any approximation to the disastrous outbreaks in man and beast which blacken the history of past ages.

It only remains to be noted what was done to check the disorder. One hundred of the best steers were turned on a higher pasture with a gravelly subsoil. The remainder were of necessity left in the higher of the two meadows formerly occupied, but were fenced out from the swamp and lower meadow where the clay approached to the surface. All of both herds were fed with hay and watered with a solution of carbonic acid and bichromate of potassa. The fifty sick bullocks took small doses of nitro-muriatic acid and bichromate of potassa by the mouth, and a solution of sulphate of quinia, iodide of potassium, and bisulphite of soda hypodermically, each repeated twice daily. The result was that of fifty animals seriously ill only two died, and the rest made a prompt and perfect recovery.

F. A. A. says, to amateurs wishing to mark patterns for scroll saw work: Take the bracket or other piece of work which you desire to copy, and spread over it a sheet of paper, securing it from slipping. Rub gently over it a piece of saddler's black leather. All the outlines will be marked accurately, and it takes but a minute to copy any piece. The saving in money for patterns, which cost from 10 to 20 cents in the stores, is therefore considerable, and it is often impossible to get a pattern of some particular thing which strikes your fancy."