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A Case of Medical Jurisprudence.

It is seldom that we indulge in any comments upon judicial proceedings, but when the evidence upon which human life is to be sacrificed or spared is of a scientific character, it comes within our province to examine the testimony by the laws of investigation and deduction which should lead the scientific man to his conclusions, and see if all the accidental or attendant circumstances have been properly weighed before giving his professional dictum on the one side or the other.

An accusing conscience, the vigilance of the executors of the law, the speed of electricity, the precision of physiological formation, the daguerreotyping retina, and the rich fruits of chemical research all conspire in refusing to let the murderer go unpunished. The chief of these accusers, however, is found in the later triumphs of chemistry, yet the test, although generally positive, is at times so delicate as to be in great danger of abuse from morbid excitement and hasty conclusions. A prisoner is now confined in our city awaiting trial for the murder of his wife by arsenical poisoning, against whom there seems to be such strong circumstantial evidence, that every opposing circumstance of justifiable bearing ought to be adduced for the benefit of the accused. The supposed victim, who died nearly a year ago, has recently been exhumed; her body was found in a remarkable state of preservation, and a justly celebrated chemist (Dr. Doremus), after a most elaborate and praiseworthy examination, found traces of arsenic "sufficient to have produced death." This seems strong evidence, but is insufficiently strong to justify the conclusions of the Coroner that "the fact of the poisoning is beyond all doubt," and that it "reduces our inquiry to the simple question, who administered the arsenic by which the death of Mrs. Sophia Stephens was undoubtedly occasioned?" Neither judicial sentence ought to be given, nor public opinion formed from, such authority as this, for the conclusions are merely assumed. Let us look at some of the facts.

First. Where is the physiological evidence that arsenic was the cause of death? There appears to be none, and it is certainly singular that this has been overlooked. It is well known that arsenic when taken in poisonous doses violently irritates and inflames the stomach; and so corroding is it that, if the patient lived a few days, the entire mucous membrane lining the stomach and intestines appears to be discharged *en masse*, the cellular tissue and muscular fiber also giving mournful evidence of its toxic power. This occurs whether the dose is vomited or retained. In the case before us, the patient did live several days, and, according to the evidence, took laudanum with the suspicious-looking powders, which would be the more apt to retain a larger quantity, while at the same time it would not prevent the destructive action of the poison. Yet Dr. Wood, one of the witnesses, on whose testimony the charge of the Coroner is founded, says, "The liver, stomach and intestines presented a well-preserved appearance, with a natural color."

Second. Even though a small quantity of arsenic was found in the body, the inference need not necessarily be drawn that it was administered as a poison. It is getting to be pretty well known that physicians are constantly receiving calls for arsenic, to be taken internally for roughness of skin, dusky and dull complexion, and a quantity is taken in this manner which the uninitiated know nothing of. The powders and washes of the face, the pimple destroyers, &c., owe their reputation mainly to the action of the arsenic they contain. This substance is also discovered so extensively in the mineral and vegetable world that but few bodies are found where it

is really a foreign lodgment, and in spite of the opponents of Orfila, or even some of his own concessions, it is undoubtedly true that arsenic (at least in some persons) is found tenanted in bones and even the muscles of those who have never taken the separate preparation.

Third. Very few would agree that the quantity of arsenic found in the body examined was sufficient to have caused death. Dunglison gives the remedial dose in one-eighth or one-tenth of a grain, and some have carried it as high as one, two and three grains. According to Professor Beck, in thirteen cases of poisoning by arsenic, the smallest quantity was 60 grains and the largest 120. Smaller doses than these may undoubtedly destroy life, but the quantity discovered in this body would hardly produce that effect. In an "analysis of the heart, lungs, liver, kidneys, large and small intestines, spleen, pancreas, omentum, bladder and uterus, only 0.185 grains of arsenious acid or about one-fifth of a grain was found." These are the most important organs in the system, and would of course contain the majority of the poison, yet the quantity of the acid is but little above the ordinary remedial dose.

We do not think it necessary that we should enter more fully upon this subject. We have thrown out a few thoughts, which may lead to such investigations and results as shall be useful not only for the cause of justice herein mentioned, but also for future reference in like cases.

Northern Lights—High Tides.

On the evening of the 27th ult. there appeared one of the most beautiful and remarkable aurora borealis ever witnessed in this latitude. Shortly after 7 o'clock, P. M., the northern sky was spanned with arches of pale green quivering light, traversed with numerous rays of the most brilliant red and purple colors, extending far over the heavens. The motions of these luminous rays were exceedingly rapid and graceful, well meriting the name of "merry dancers," applied to them by the natives of northern Europe. We have not witnessed such a splendid aurora since the month of January, 1838. During the week referred to, the northern lights appeared with different degrees of brilliancy every night, and in conjunction with these, the tides rose several feet higher on two successive days than had been the case for fifteen years. This took place several days after full moon, and at a period when very high tides are unusual. What could have been the cause of these wonderful natural phenomena? In the polar regions the aurora borealis is very common during the long dreary season when no light of the sun appears. In these countries of perpetual frost and snow, the brilliant red and orange colors of the aurora impart a cheerful warm glow to the chilling scenes of an Arctic winter.

Owing to the frequency of the northern lights near the poles of the earth, several eminent men of science believe they are caused by the polarization of light conjoined with magnetic influences. Dr. Dalton considered the aurora borealis as a magnetic phenomenon, and that its beams are governed by the earth's magnetism. Various experiments with light and magnetism give support to this theory. An arc of light produced between the poles of a powerful battery is deflected by a good magnet. If an electric spark from a machine is passed through a long glass cylinder nearly exhausted of air, a mimic representation of the northern lights takes place. Magnetic storms sometimes occur, and the needle has been observed to follow the shifting crown of an aurora. That part of the sky where the beams of light unite, is that to which the magnet is directed when suspended.

Sir William Snow Harris, an able writer on electricity, confidently classes the northern lights among meteors depending on ordinary electrical action, such as the flashing of electricity through rarified air at variable heights

above the surface of the earth. He says: "By far the greater number of appearances occasionally observed in these latitudes and referred to the phenomena of the aurora borealis, may be traced to the presence of dense masses of electrical clouds yielding up electricity into the atmosphere above them. Both glow and brush discharges of electricity, infinitely varied and of vast extent, are produced in this way, and are often observed to proceed from behind masses of clouds in long shooting streamers, attended by a beautiful glow of diffuse light varying from green to deep purple, violet, and red."

Those who have visited the distant north speak in glowing terms of the brilliant aurora borealis which they had seen. The aurora there begins with bright pillars rushing back and forth with great velocity until they finally cover the whole sky. The streamers then meet in the zenith, spreading over and above the earth like a vast tent of glittering gold and crimson. Luminous corruscations also occur, accompanied with a rustling, crackling noise, similar to the sounds caused by electrical excitation in turning a large plate detached from the conductors of an electrical machine.

We have no intelligence in respect to any disturbances of the magnetic needle during the days of the 27th and 28th ult. If such took place, they would certainly afford not only strong proof of magnetic action in the production of the northern lights, also in affecting the tides of the sea. This light has the appearance of luminous transparent vapor, and is usually followed by wind, rain, and unsettled matter. Luminous clouds of such a character were observed in the northwest sky in this locality on the evening of the 2d inst., and they were followed by a severe storm of rain and wind.

The Preservation of Stone.

Every one is of course aware of the part which the skeleton plays in the animal economy; it supports the softer parts of the fabric, and is, in fact, the framework upon which the rest of the body is built. In some animals, as man, this is internal, while in others—the shellfish—it is external. Remove from either type of life the skeleton, and observe what a seemingly unshapen mass it is, and how much more susceptible of decay. We use the above simply as an illustration, our real business being with inorganic nature, in the shape of rocks and stones, such as are fashioned into ornaments or blocks, and with which houses, palaces, city halls, and churches are built. These stones may be divided into two broad divisions, namely, those which have a siliceous skeleton, and these which have an aluminous or calcareous one, and be it further observed that this skeleton is not regular, and external or internal, but diffusive and permeating. It has been remarked that all those stones which have a silicious framework, such as granite, are firm, weatherproof and enduring, while those of the opposite character are not very tenacious, are easily worn by the weather, either crumbling gradually away, or shaling off, according to their nature, and last but a short time. Many illustrations might be found, but two will suffice.

The "Tombs" in this city is as good now as the day it was put up; while from the nature of the material and from the fact that there are seams and imperfections in the sandstone employed in St. George's Church (Dr. Tyng's), and in other buildings in this city, which will admit dampness and so disintegrate the stone, it becomes an important question, how to prevent this destruction of edifices constructed of friable materials. We are happy to say Mr. F. Ransome, of Ipswich, England, has done something towards a practical solution to this question. When a stone has no silicious skeleton to give it endurance against the winter's blast, he, with a philanthropy that actually feels for stones, gives them an artificial one in the following manner. The outside of the building is first saturated with a

solution of chloride of calcium, and then several coats of soluble silicate of soda are laid on the outside of the building with a brush. Between these two substances a chemical action is set up in the very pores of the stone itself; the result being chloride of sodium (common salt) and silicate of lime. The common salt washes out with the rain, but the silicate of lime remains in the stone, hardening as it grows older and protecting the building against the destructive action of the weather. Wood may also be rendered fire and weatherproof by this process, which is one that every builder should be acquainted with.

Machine for Printing Names on Newspaper Wrappers.

The *Artizan*, at Cincinnati, publishes an advertisement of F. A. McDowell, of that city, offering \$10,000 for a "machine which will print addresses on newspapers and similar documents after they have been enveloped." An invention for this purpose has taxed the mind of many an ingenious inventor within the past few years, and many crude efforts have been projected to accomplish the result.

On the 7th of September last, a patent was secured through our Agency to James Lord, of Pawtucket, Mass., for an ingenious machine for this purpose. The claims and a notice of this invention appeared in No. 2 of this volume, SCIENTIFIC AMERICAN. Engravings of it are in course of preparation, and will soon appear in our columns. We also received a call, a few days ago, from Rev. J. Spencer, editor of the *Christian Guardian*, at Toronto, C. W. He claims that he has a machine which will print from 30 to 60 names per minute either on wrappers or the folded papers themselves, and so well satisfied is he that it will work that he is prepared to take orders for them. A machine of this character, to be useful, must of course be labor-saving; but it is hardly probable that it would be of much service except for journals of large circulation. Inventors, in order to think understandingly upon this subject, should make themselves familiar with the details of newspaper-wrapper writing in some large concern, else their ideas are liable to be very crude and ill-digested. They will also do well to examine what has been already done in this line of invention.

More Steam Fire Engines.

We learn from the Philadelphia *Ledger*, that there are now three steam fire engines in use in that city, and three more are being built. One of these, for the Hibernia Company, will be capable of throwing a stream, through a 1½ inch nozzle, to a distance of 251 feet. We are right glad to hear of the success of the steam fire engine, as there is thus presented a way of escape from the disgraceful system at present in vogue in this city. Many of our firemen, no doubt, are excellent men, but they are too often attended by vagabond runners, thieves, and villains, who destroy more property than they save.

A NEW RULE—The Commissioner of Patents has revived the old practice of requiring all applicants for patents to sign their drawings. Judge Mason attempted the same thing; finding, however, that it served no useful purpose, but on the contrary, operated badly, he abandoned it, much to the satisfaction of all parties connected with the office. We hope Commissioner Holt will do likewise.

We understand, from good authority, that Commissioner Holt will not resign his present position; we rejoice to hear this good news.

RESIGNATION.—We regret very much to announce the resignation of Thos. H. Dodge, Esq., late a Chief Examiner in the Patent Office, and Chairman of the Board of Appeals. Mr. Dodge has been a most valuable and efficient officer, and has had the full confidence of the Commissioner, Mr. Holt. He returns to the practice of his profession—the law; and we have no doubt he will soon find his time fully occupied in the various important patent cases, which, from time to time, come before the United States Courts.