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ACCURATE WORKMANSHIP.

It has been truly said that no work of human hands is perfect, and that though we may strive to our utmost to secure entire accuracy in workmanship, it will be forever beyond our reach. On the other hand it has often been asserted that the works of Nature are perfect, that they are far superior in every respect to human handiwork, and upon this assumption many a moral homily has been based.

That this proposition has been so generally accepted, affords a forcible instance of the readiness of mankind to accept as truth whatever is presented to them as a generalization. Formulate an idea and lay it down as a proposition, and nine out of ten will accept it as true, because five of the nine will lack the power to detect its falsity, and the remaining four will have too much indisposition to the mental labor involved in logical reasoning, to test whether the proposition be correct or otherwise. About four tenths of the human race are mentally lazy, five tenths are so credulous as to accept anything as a principle which is clothed in the garb of a generalization, and certainly not more than one tenth think for themselves.

Only in one sense are the works of nature more perfect than the works of man. In their adaptation of complicated means to ends, they are for the most part unquestionably above any human production. Yet even on this point there is much illogical inference. We once heard a Professor of Anatomy, in lecturing on the hand, speak of its complicated structure and its marvellous machinery, as one of the greatest evidences of a beneficent design pervading creation. Five minutes later he spoke of the carpal bones and their investing ligaments as being peculiarly liable, on account of their structure, to obstinate and deep seated inflammation when injured; but he did not adduce this as an evidence of a beneficent design. Yet surely there is as much reason to believe that all the effects of a peculiar construction are designed as that one of them is.

But turning our attention to the mechanics of nature, we find that, so far as perfection in form is concerned, human work may stand well in a comparison. It has been said that the types of all the forms employed in the arts are found in Nature; but if we admit this, we shall find on examination that these types are in the majority of instances extremely imperfect. Nowhere in Nature is found a perfect sphere, a perfect cube, a perfect square or prism. We look in vain for perfect cylinders, for absolutely straight stems of trees, for filaments perfectly uniform in size throughout. No individual of any species exactly resembles any other, and even the elementary parts of animal and vegetable structures differ from each other. The anatomist might dissect a thousand subjects without finding two femoral bones that would not differ in some way; and even in the same body the corresponding parts on opposite sides are often found to be somewhat different. So much for the uniformity and mechanical accuracy of natural things. If man's mechanical productions are not perfect, they excel in the particulars named.

There are many practical difficulties in securing accuracy in construction, but we shall find that they may be placed in two categories. The first category includes our own imperfections. These are nature's imperfections. Our vision is so limited that, in very fine work, we must supplement it by the magnifying glass and the microscope. The command of mind over muscle is so far from absolute that, even when the former has been trained to command and the latter to obey through long years of practice, the control of the one and the obedience of the other are still defective. Eye and ear and touch, all tell us falsehoods and never more than approximate to truth.

The second category is found in the lack of rigidity in the materials which we use. Even the diamond, the hardest substance known to man, is elastic and changes its size with every variation of temperature. Nothing we can touch is precisely alike under any two different sets of circumstances. Some things change by absorbing or losing moisture. Others when once changed never resume their original form. So mobile is matter, that a toy cart drawn by a baby hand over a stone floor will generate vibrations the waves of which flow along through the granite, through the legs of the most solid workbench, and set the particles of the material in hand dancing to an entirely new step. All matter throughout the universe, though some of it may seem to the superficial eye to be at rest, is in constant agitation. While the large masses are whirling through space with inconceivable velocity, the smaller masses—molecules—are each moving through what may be—for all we know—even wider orbits in proportion to their size, than those of the sun, moon and stars. The slightest external change is followed by a change in their movements. A man goes on board an ocean steamer with a shingle nail in his pocket, and instantly the compass needle in the binnacle feels the fact, and varies somewhat in its indications. Change, change, is written upon each and every atom of the universe. Nothing shall be constant, nothing shall be uniform. The combined intelligence of mankind cannot command a force strong enough to chain one infinitesimal atom. Endless variety—nothing stable—this is a fiat from which we vainly strive to escape, and to which we cannot find one solitary exception.

HIGH AND LOW STEAM.

An error prevails somewhat extensively among steam users who have not studied the theoretical principles of steam generation, which we propose briefly to correct. It is erroneously supposed that high steam contains much more heat than low steam, and that on this account it will be more efficient in heating buildings and driving engines. We would say to those who entertain this notion that a pound of steam at any pressure contains practically a constant number of heat units. In other words, a pound of steam at either low or high pressure will raise the temperature of a given quantity of water the same number of degrees. This has been thoroughly proved by experiment, the variations from the law being too small for notice in common practice.

It is only the sensible heat of steam which is measured by the thermometer, (the temperature), that increases under pressure, and this increases only as the latent heat diminishes so that the sum of the two is always a constant.

These being facts, it is certainly folly to incur the greater danger of high steam for heating buildings. The low steam will, pound for pound, both in evaporation and consumption, heat just as many cubic feet of air space as high steam.

But although the theoretical working power of steam is measured by the heat it contains, in practice there is a gain in using high steam for propelling engines. Steam generated under pressure is capable of expanding more than low steam, and as this expansive power can be made to perform work, there is a practical economy in using as high pressures as safety will admit; not that the steam contains the power to do more work, but that we can utilize a larger portion—a small proportion at best—of its working capacity. It follows that it takes no more fuel to produce a pound of high steam than a pound of low steam. There is, however, with high temperatures resulting from increased pressure, a greater loss through radiation, to make up for which more fuel will be consumed.

It may be asked: If these things be so, why, in testing the evaporative power of boilers, is it recommended to evaporate under atmospheric pressure? Why will not one pressure do as well as another, provided the proper allowance for radiation is made? We answer that it will make no difference at what pressure we make the test, provided we can keep the pressure uniform. There is usually more or less difficulty in maintaininga constant high pressure, while, with free discharge of steam, there is none in maintaining the atmospheric pressure. It is only for convenience sake that atmospheric pressure is considered by some as more desirable.

In conclusion, we would say that the heat which passes from boilers in the steam generated is the true measure of their working capacity. The heat which passes out in water mechanically suspended does no work. It is only then when the true proportion of the mechanically suspended water is determined that the working capacity of boilers is properly tested.

THE LATE JAMES FISK, JR.

The man whose name heads this paragraph achieved, in a very short time, a prominence in the railway and financial world that has given an interest to the circumstances of his death which his personal merits and character would never have elicited from the public. Our columns are no place for condoning the faults of the deceased by expatiating on his amiability and generosity, nor for homiletics on the scandalous and flagitious vices of which he and, we regret to say, his popularity were very largely composed. Cowardly and wanton assassination has cut him off in the midst of all his notoriety, wealth and pleasures; and New York, amidst the many black deeds that have been committed within her borders, has no greater stain upon her reputation than the murder which has just been committed.

It is difficult to account for the continued existence, in our midst, of so large a number of persons ready to commit the darkest and most violent crimes upon little or no provocation. The absurd and cowardly habit of carrying concealed weapons has much to answer for in this particular, and the great quantity of intoxicating liquors consumed by a large portion of our population is the chief cause for their production and use on the slightest pretext. But the bravado of the murderer obtains its principal stimulus from the fact that the law is full of uncertainties, that political influence and money have a protective power even under the shadow of the gallows, that, against the most adverse circumstances, a long delay is sure to be accorded to the guilty, and that thus the world may cease to take an interest in the matter, as we have often seen occur in our rapidly changing and effervescent state of public opinion. We are justified in these statements by the events which followed the crime of Foster, who murdered Mr. Putnam on the latter's alighting from a street car. The popular indignation against the dastardly perpetrator of this outrage was very great, and inquest, trial, and condemnation followed its committal with a promptitude which is an integral part of the majesty of the law, and the chief means of prevention of crime. But before the day of execution arrived, the culprit was reprieved by one of the hole-and-corner legal processes which discredit the whole American nation and people; and before long the murderer, the object of as righteous an indignation as ever animated the public mind, will probably be let loose to prey once more on society. It is by such precedents as that of Foster that crimes like that of Stokes are created and encouraged; and it may require the commission of a few dozen more outrageous villanies to get the popular sentiment on this subject into a condition more permanent and beneficial than a mere temporary frenzy.

It is quite time that some trustworthy system of administration of the laws was introduced into our social affairs. At present, with a vehement outburst of indignation at the time of the crime, followed by utter indifference to the sequel, and with political intrigue, corrupt judges, and monetary influence as complications, the process of the law is less certain and less logical than are the freaks of a gambler's fortune. If the wicked act which we now deplore does something to awaken the people, these lines will not have been written, and James Fisk, Jr., will not have died, entirely in vain.

TEACH THE CHILDREN TO DRAW.

Teach a child first to read; not merely to speak words in the order in which they occur, but to read understandingly, slowly, and carefully for ideas. Next teach him how to use numbers in arithmetical calculations, and show him that in all the business of life, in all its study, in all its science, the statement of facts in figures is the most important element. Then teach him to draw. You may stop your teaching right there, if you will, and rest confident that, if the boy thus taught has any disposition to mental acquisition, he will find a way to make it. Not that further good teaching will not greatly assist his progress, but that the acquirements named form a solid foundation upon which he *may* and, if his tastes are for learning, *will* build a noble superstructure.

The fundamental value of the two first elements of education named are generally appreciated by educators in this country; the third is only beginning to be appreciated. In the Boston public schools, drawing is now to be made a part of the course of study. The teachers are, we are told, to be taught how to teach drawing, at least such of them as have not the requisite knowledge. This accomplishment should be a part of every teacher's legal qualifications for employment in a public school, not merely because it enables him to give lessons in drawing, but because in the present age the power to draw rapidly and well is a means for the expression of ideas scarcely inferior to language; nay, without which it is impossible to convey certain ideas at all, in the absence of the objects delineated by the skilled pencil of the draftsman.

We cannot carry with us in our pockets geological and mineralogical cabinets, collections of shells and plants, museums of machinery and galleries of art. The power to represent such things as we cannot have at hand in talking about them has become essential to every one who aspires to anything like eminence in science or the arts. Even in walks of life not intimately connected with science and art, (daily becoming fewer) the power to draw is one that often saves time and money.

We speak, of course, more particularly of free hand drawing. Mechanical or geometrical drawing, as it is called, pertains to certain branches of business which will engage only a few out of the many youths now in American schools. A knowledge of it and skill in it can easily be acquired after the other, and will be attained by those who find it necessary to their callings.