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ENGLISH AND AMERICAN SCIENTIFIC, MECHANICAL, AND ENGINEERING JOURNALISM.

To those who have access to the files of English and American periodicals devoted to the above-named subjects, a very striking difference between those published abroad and at home, is apparent. Whether the average English reader peruses the contents of such papers as *The Engineer*, *Engineering*, *The Artizan*, etc., or not, it is certain he tolerates in them much that, persistently published in an American journal, would limit its circulation to a very few readers.

England has done much to render science popular with the masses, but this work has been done through books and lectures rather than through her periodical literature devoted to technical subjects. *All the Year Round*, *Macmillan's Magazine*, *Chambers' Journal*, and others devoted to general literature, have done vastly more for the enlightenment of the general English public, on matters of science, than all the technical journals put together. The short but interesting (because easily comprehended) articles on scientific subjects, which the periodicals last enumerated have printed, have been many of them models of their kind. They were written with the full appreciation of the fact that to the general reader technical language is an unknown tongue, and that to attempt reaching their understanding through its use, is the height of absurdity.

What, for instance, could the general reader make of the page after page of mathematical formulæ with which, in a foreign cotemporary, Prof. Rankine sought to dignify the "gay velocipede?" There is not an American journal in existence that would have risked its popularity by the publication of the series of articles referred to.

Similarly, we find in many of the English publications like the one alluded to, prolonged serial discussions so technical in character, and so burdened with mathematics of the most abstruse kind, that we venture to say that not one in ten thousand Englishmen, not to speak of American readers, could read them understandingly in a year's time.

We have no means of knowing what the exact circulation of any of these papers must be, but from our stand-point of view it cannot be large. They seem, however, to be able to hold their heads above water, probably because their advertising columns are so liberally patronized, and because their regular price of subscription is much higher than American readers are willing to pay for the amount of reading matter they furnish.

If there is any one thing our English cousins know thoroughly, it is the value of advertising. Even papers of admittedly limited circulation are enabled to obtain a mass of advertising that makes a struggling Yankee newspaper publisher sigh that he was not born on British soil.

The tone of the discussions in most of the journals under consideration, is unexceptionable, except that to a Yankee reader it is wearisome on account of its length; and it puzzles an American to understand how many of the items can possess even a local interest to any.

If we should gravely inform our readers that the Messrs. Monotone had just successfully cast a bell for a rural church, or that Mrs. Fatpurse had bestowed upon the same edifice a stained glass window, or that the trustees of the village of Schaghticoke had just built a new schoolhouse, or supplied their town with water from a convenient

spring; and if we should fill a column week after week with such puerile items, we should soon expect to hear from our correspondents that they did not care to pay for such garbage. Yet this is only (perhaps a somewhat extravagant) sample of what many English journals designed for general circulation treat their readers to in every issue.

A profuseness in letter-writing is also a marked feature of English papers. Everything is fish which comes to their net in this line, provided it is, or can be made grammatically correct. Personal explanations, long preambles, and verbiage are allowed to burden a very small modicum of fact. A correspondent writing a recipe for the relief of corns, and feeling it necessary to relate his sufferings with divers unlucky purchases in the way of boots, would be sure to be permitted to tell his dismal "yarn" without restriction, at least in many English publications we could name.

It would seem that quantity, and not quality, is the aim of the average English correspondent, and that to fill space with printed matter is the ultimatum of publishers of technical periodicals. There are, however, some honorable exceptions to be made in this respect.

A few periodicals in America have imitated the English model, but have never achieved extensive popularity. American readers prefer their mental food cut in thin slices. A single point made and well wrought out in a short article suits them better than exhaustive essays; and facts, rather than theories, are sought by them. Few have leisure to peruse very long essays; and if they have, they prefer them published in book form rather than serially.

SOLUBLE GLASS.

A great many uses have been ascribed to this substance, some of which are obviously absurd. Others which seem rational, have been failures in the hands of most people who have tried them, and we are frequently called upon to explain the causes of failure. This is in all cases difficult. The causes are in many cases obscure, even when ample opportunity is afforded for examination; and as we seldom or never have opportunity to make a thorough examination, we are generally unable to reply definitely and intelligently to such queries.

Our own experiments with this material have not been of the most satisfactory character. In general, we have found that after it has been applied for a longer or shorter period it becomes crumbly, and cleaves off from the surface of wood or iron. We are informed by a thorough chemist that such has uniformly been his experience, and that he thinks soluble glass becomes crystalline in structure when exposed to the action of the atmosphere.

A gentleman has just left our office who purchased some of this material from a dealer in this city, with a view to use it as a protective coating to iron. He says it would not long adhere to the metal. He applied to the manufacturers for directions in correcting his supposed errors in its use, but could get no information by which he could secure any improvement in his results, and consequently he voted "water glass" a humbug.

A clue to these failures is perhaps found in a lecture recently delivered by T. S. Barff, F. C. S., in the hall of the Society of Arts in London. It seems from the observations of Mr. Barff, that soluble glass (silicate of soda or potash) is frequently too alkaline for satisfactory use in painting. The best way to make these silicates is to fuse the component materials together in a reverberatory furnace. When cold they should be put into open vessels of hot water, when an oily liquid is formed, which is a solution of soluble glass. Either of the silicates of potash or soda, will generally be discolored from the presence of organic matter. This will, however, settle to the bottom, if the solution be allowed to stand for some days; when the clear supernatant fluid may be drawn off.

But even then, according to Mr. Barff, the solution is unfit for use in painting, on account of the presence of too much alkali. To remedy this defect, he recommends charging it as much as possible with silica, in the form of white powder obtained from the fluoride of silicon by precipitation with water.

We think it is probable that this alkaline quality would render soluble glass coating less permanent, wherever applied, and as Mr. Barff's experiments point out the way by which the defect may be remedied, a trial of his method could easily be made in any of the general applications of this substance for which it has been recommended.

TYPE-SETTING MACHINES.

The invention of a type-setting machine has justly been considered one of the most knotty problems ever attempted by mechanics. When it is considered how many characters and sorts are comprised in the upper and lower cases of the compositor's desk, and then that the exigencies of modern printing demand the multiplication of these cases, the frequent use of characters not found in the ordinary case at all, and also the fact that all these sorts must be kept unmixed in the cases, it would seem, at first glance, sheer madness to attempt to accomplish by automatic machinery what requires for its present performance intelligence to guide the work at every step. What the printers call "instification," that is, the spacing out of the lines so that they shall be of equal length, also requires that if words or syllables which cannot be divided, cannot be made to go entire into a line, the line must be lengthened by the insertion of spaces between the letters and the word be carried on into the next line.

It is evident that there must be intelligence to guide somewhere, and that if a machine shall ever be made that can be successfully employed to set type, it must require the atten-

tion of a compositor at every movement. But if a single motion of the compositor's hand could set in operation mechanism by which all the other movements, now required to place each type, or their equivalent, could be automatically performed the problem would be solved, provided the single movement could be made much quicker than the several movements are now made and the machine could be made sufficiently cheap and durable.

Machines have been constructed approximating these conditions very closely, considering the difficulties to be surmounted; but none have ever yet been able to compete with the living type-setter.

The host of difficulties attending the construction of type-setting machines might be greatly reduced could certain conventionalities of printing be relinquished. We have never been able to see any good reason, other than that "it is the fashion" for dividing words by syllables, or indenting paragraphs. Of course it would look very singular at first to forego these conventionalities, but their omission would certainly simplify the problem of type setting by machinery very much, if not open the way to its complete solution.

It is singular with what tenacity conventionalities like these are adhered to in the arts. We once saw a machine for putting up Seidlitz powders, which would do the work with extreme rapidity, yet the inventor informed us, the powders would not sell, because they were not put up in the way the trade had been accustomed to.

So long as the art of printing is hampered by the conventionalities we have mentioned and many we have not mentioned, there will be little chance for type-setting machines.

The inventor of a machine, an account of which is given in another column, has, we believe, hit upon the right principle in the construction of such machines, namely, that of making impressions of letters in some soft material from which casts can be taken.

THE USES OF HABIT.

There has been much declaiming on the part of a certain school of philosophers against the propriety of allowing the mind to run in a groove; or, in other words, to acquire any particular habit of thought. All habits, say these declaimers, are bad. There are no good habits. No man should do anything from mere force of habit. The effect of habit is to prevent thought and to open the door for error in reasoning. It cramps the mind within limits beyond which it cannot expand, and thus becomes an obstacle to healthy growth.

We regard these views as false in the extreme, and propose to devote a brief space to the presentation of the uses of habit, meaning, of course, good habit.

We assert that all expertness is the result of persistent habit. Perhaps this proposition can be best illustrated by examples of manual expertness. One of the most striking of these examples is the skill acquired in musical execution. At first the beginner finds the process of producing the various tones on an instrument in their proper sequence and length, very slow and painfully fatiguing. But by dint of long and arduous practice, he comes to a point where the fingers move by mere habit, without any sensible effort of his will. Indeed, the habit of doing what he has to do right, becomes so strong, that to attempt to do it wrong, would be almost as painful and tedious as his first attempt to acquire the proper method.

So in the performance of all kinds of mechanical work, dexterity is only to be acquired by habit formed by continuous practice. These facts seem so obvious in connection with manipulation, that it appears strange they should be disputed when applied to mental operations, or moral impulses.

As in manual operations a certain sequence and order, strictly followed, will enable the operator to perform each detail with greater facility and accuracy, and so shorten the time expended in reaching the desired result, as well as make the result more perfect, so a proper method gives rapidity and accuracy to thought. A mind trained to think methodically is a mind which has acquired habits of thought.

This methodical thinking is absolutely indispensable to success in many professions, of which we may cite "law" as one conspicuous example.

But perhaps in no field of study is it of greater importance than in invention, and this brings us directly to the main objection urged against habit in thought; namely, that it is a foe to originality. We take direct issue on this point, and assert that, on the contrary, it is the very basis of originality in so far as originality is useful or desirable.

The originality that is desirable in literature, in invention, in the arts, is employment of elementary principles in new combinations. We may refer to music again for an illustration of this point. The elementary combinations are represented by the exercises upon which the pupil is required to devote his practice. These exercises comprise difficult combinations, elements of composition which, in themselves, are dry and unpleasing, but which, combined in various ways, are formed in the compositions of the great masters. The elements being acquired by practice, the originality appears in the combination of them into new and melodious arrangements.

So in invention, a new device always consists of a novel arrangement of elements previously known. An original thinker, worthy of the name, is one who, while he perhaps explores new fields, employs in his research the facts of previous experience and the methods he has found valuable in former investigations, modified to suit the particular exigencies of the case. Let him throw aside ascertained facts and methodical thought, and he at once degenerates into a framer of baseless theories, which are original only because they are like nothing else.