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A DEMAND FOR IMPROVEMENTS—BRING OUT YOUR INVENTIONS!

At no time within the past few years has the demand for machinery and new and useful inventions been so great as at the present hour. The call of war has taken the thew and sinew from the plow, the loom and the anvil, and the wheels in the workshop run slowly and the pulses of the factory throb more feebly by reason of it. On a hundred battle-fields the sons of labor lie dead and dying, and scattered far and near, from the Gulf of Mexico to the Penobscot, those who formerly bore the heat and burden of manual labor now shoulder the musket and fight manfully for our liberties and rights. What shall we do?—how shall we supply their places? Clearly the workshops must not stop their operations because war prevails. Clearly the arts must not be overcome, although the enemy is; and if we take vital energy and human intelligence from the scene of labor, we must supply its place with machines which, although they cannot think, approximate in some degree to mortal powers. You who have a model of a new invention at this moment lying idle in your workshop or your private closet, which needs but a little more study to perfect it, reflect for a moment—has not some idea struck you? If so, seize pencil and paper and sketch out the newly-caught inspiration before it fades and is gone. Robert Bruce watched the ant toiling in vain for six times with its load, each time defeated but still persevering; on the seventh it overcame its difficulties. Think of that Scottish chief taking lessons from the humblest insect and marching forth to conquer; like him press on!—not as he, to slaughter and rapine, but to peaceful and bloodless triumphs.

These words of cheer and friendly counsel are not addressed alone to the professional inventor, but are applicable to all who, having a love for mechanics and the arts, strive to improve it, both to their own and their country's benefit and renown. Old inventors are not easily disheartened, but neophytes are; they are apt to think, when their plans fail, that it is owing to their incapacity, or from a lack of public appreciation for their merits; they lose confidence at the critical time, and throw away weeks and months of brain-work and patient research. There is hardly a youth in a trade, be it of what branch it may, that has not some plan in his head for a new tool or a new machine, as yet dimly foreshadowed, which shall lessen the severity of human labor, and lighten the curse pronounced upon our race. To these, in whatever part of the country they may be, we would say, fall to work on the instant and make a detailed drawing and plan of your work. If you are too poor at present to make a costly model, whittle one out and put it together in that way; we have seen many a beautiful piece of work made with a jack-knife, and they answer as well at the Patent Office, in simple cases. Jealousy is not yet, unfortunately, rooted out of the human breast, and inventors sometimes meet with those who sneer and taunt and throw every obstacle in their way; but this should not discourage them, it should rather stimulate them to new exertions; it is only the sound metal which stands the wring and twist. Very often the manufacturers of the country come forward and demand a machine for a particular service, and it appears almost at their nod and beck, from the fertile brains of our inventors. We hope soon to be able to chronicle a more rapid increase of labor-saving machinery than ever before.

STRIKE AT EMINENCE!

The world waits and the wheels of science falter, at times, in their onward course. The very movements and developments in the mechanical world appear, at certain periods of the century, to be blocked or impeded, and all the material matters dependent on its harmonious action linger apparently until some new impulse sets them going again. What is this new impulse? Genius, talent and mental energy of the first order. Watt came among the dull and plodding artisans of his time, and, boldly attempting new theories, based on scientific principles however, gave the wheels of civilization such an impetus that they run the faster for it to this day. So did George Stephenson, the uncouth, unlettered attendant on his father; working in a coal mine, by his parent's side, he achieved, not suddenly but slowly and patiently, the knowledge which afterwards made him so eminent. Men have existed in every age who seemed created for the special purpose of advancing the interests of the great human family. These men were not prodigies; with some exceptions they were hard working, thinking, self-tutored individuals—men who, by self-abnegation and denial of irrelevant matters, so disciplined their minds that study became a pleasure and research relaxation.

How profitably in our modern day we might imitate the examples of those wise and eminent scientists who are now far removed from the scene of their labors! For just so surely as the sun performs his daily round, so certainly will the services of philosophers and savans be required in the economy of the world. Even now, at the lathe, the vice or the anvil, possibly some restless mind big with inspiration seeks an outlet for its abundant wealth. To such who linger in doubt, to those upon whom pecuniary circumstances bear heavily, we would say be of good cheer? for the future is as certain to be bright to the deserving, as the rainbow is to appear after the thunder-storm. And we have only to look back upon history to find the fullest confirmation of our remarks. There is no toil without reward, no struggle without a victory, and the light is more dazzling to those who emerge from darkness than to those who have continually basked in the noontide ray.

We urge every young man in any branch of trade or manufacture to give a certain portion of his time to mental exercise. Think, and be strong! Strike at eminence, and if you do not attain it you will at least rise intellectually above the ignoble throng who despise that wealth which riches cannot buy and who ignore all the advantages to be derived from the world that teems with information useful to the race. Strike at eminence! and be not content with that superficial knowledge which smacks of attainment, but which is to real acquirement what a thin veneer is to the precious wood.

WORKING-BEAM ENGINES.

It is not a little remarkable, in the history of the present struggle, that the beam engines in the naval service should have escaped material injury—that all steam engines, in fact, above and below the water line, have been but slightly damaged, considering their exposure. He would have been a rash man who had predicted at the beginning of the rebellion that steam machinery in our gunboats would have escaped, while the hulls of the ships themselves have been riddled by the fire from forts and batteries with which they have been engaged. Of course, when it has been necessary to blow up some of our vessels, the engines have been scattered with the other fragments, to the four winds of the earth; but we have not yet upon record any instance where a beam engine particularly has been entirely crippled for any length of time, still less destroyed. When the wrought-iron strap of a working beam breaks, the skeleton is also fractured, the piston is forced out through the cylinder head, the front links are bent, the frame is thrown out of line, in short, there is dire confusion and utter wreck. It is a comparatively easy thing to predict what would occur in case a huge round shot struck a working beam; in fact, there is no question but that it would place the machine *hors du combat* instantly. Since, however, we have no data to refer to, no such incident having ever taken place, all inferences are gratuitous. It is noticeable that the steam machinery of our wooden vessels and ironclads have performed well, and that no accidents of a general nature have taken place, showing them to be unreliable in time of need. Had any one of the *Monitors* or the *Ironsides* become unmanageable before Fort Sumter, they would, ere this, have been resting upon the bottom of the harbor, and the fact that they performed well generally is creditable to the skill of our engine-builders. The gunboats maintain their stations on the blockading squadron and are not continually running home for repairs; and whether they attain as much speed as would be desirable or not, it is certain that thus far they have done the nation good service in time of need.

THE CONSTRUCTION OF ARMOR STEAMSHIPS.

No subject has engaged more public attention lately than the construction of armor war-vessels. Compared with such those vessels which are constructed wholly of wood are worthless, all other things being equal. But the building of armor-clad vessels is comparatively a new art respecting which much ignorance necessarily prevails even among those who have practically devoted themselves to the subject. This is the reason why so many different opinions have been propagated and so many different plans proposed for war-ships, with claims of superiority for each. The first important consideration towards arriving at correct ideas respecting the construction of the best vessels of this character is a knowledge of their requirements. An efficient armor ship should have a very strong frame; be as impenetrable to shot as it is possible to make it; be a good sea-going vessel, capable of going anywhere upon the ocean; have good accommodations for crew and supplies, and be competent to steam at a high speed. Ship-builders, engineers and sailors admit that these requirements are necessary conditions to a really efficient armor war-vessel. The merits and demerits of those iron-clads which have already been built may be judged of by considering how near they come up to, or depart from, these requirements.

Unless an iron vessel has a strong frame and is heavily plated it is nearly, if not equally, as defective as a wooden vessel. The best system of framing for an armor vessel is a question of vast importance and scientific interest. William Fairbairn, C. E., the distinguished practical and scientific engineer, has laid down the proposition that all iron vessels should be treated, with respect to strength, like hollow girders. They should be of cellular construction along the upper deck, bottom and part of the sides. An armor vessel should have sufficient strength of frame to support heavy plates, and when completed, it should be capable of being sustained on one point or between two supports, like a girder. The cellular principle of building iron ships affords the most strength with the greatest economy of material. Rigidity is one of the necessary qualifications towards securing impenetrability, and the cellular principle affords this in a high degree.

Wooden frames for iron plates are not to be recommended. In fact iron frames are the only kind suitable for screw merchant steamers or war steamers. The French frigates, which are constructed with armor plates upon wooden frames, like *La Gloire*, have not given satisfaction. The heavy plating is liable to work loose on the timber framing when the vessel labors in a heavy sea.

From the late triumphs of heavy artillery in penetrating thick armor, both with solid shot and shell, it is now held that plates of 4½ inches in thickness are required to resist 68-pound shot, moving at a velocity of 1,500 feet per second; 6½-inch plates for 130-pound shot; 7½-inch plates for 200-pound shot; 8½-inch plates for 300-pound shot; 10½-inch plates for 400-pound shot; 11½-inch plates for 500-pound shot. Armor composed of a number of these plates bolted together is not equal in power of resistance to the same thickness of solid metal, and the fastenings are more liable to break when struck with heavy shot. A greater thickness of thin plates bolted together is herefore required to obtain the same resistance. It