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**OUR NEXT VOLUME.**

We have a richer supply of matter for the opening of our next volume than we have ever had in hand at any one time since we commenced the publication of the SCIENTIFIC AMERICAN.

For more than a year, the Commission appointed by the Secretary of the Navy to devise and conduct a set of experiments to determine the practical value of working steam expansively, have been engaged in the preparation of apparatus for this purpose; the machinery is now complete, and the series of experiments will be commenced just in time for us to give a complete history of them in our next volume.

The series of experiments by Messrs. Hecker & Waterman, to ascertain the value of working steam both expansively and non-expansively, in a cylinder with and without a jacket of steam, will also be fully recorded in the volume of the SCIENTIFIC AMERICAN that commences next week. As the Government experiments try the effects of a cubic foot of steam used in cylinders of different sizes, while in those of Hecker & Waterman the steam is worked with different measures of expansion in the same cylinder, one set of experiments will be the complement of the other. The two together ought to settle the disputed question of expansion, and thus to furnish the most valuable contribution to the knowledge of the action of steam that has ever been made.

We have also in our drawer a full statement by Fairbairn of his experiments to determine the proper thickness of steam boilers, with his carefully-prepared tables of the thickness required for shells, tubes and other parts in boilers of various sizes. To all manufacturers of steam boilers these tables will be worth more than the cost of the SCIENTIFIC AMERICAN for a hundred years.

Our sixteen pages will enable us to publish full accounts of these valuable experiments in addition to our usual variety, which embraces all matters of interest to be found in English and French publications devoted to science and the mechanic arts, as well as a minute history of the improvements which are constantly being made in all departments of our own varied industry. Our arrangements are better than ever before for the prompt publication of all contributions to scientific and mechanical knowledge which are being made in this country.

In spite of the gigantic war which is being waged in the land, the intense industry, the provident spirit, and the eager thirst of knowledge which characterize the graduates of our common schools, sustain an ever-increasing demand for our paper, and enable us to appropriate constantly-augmenting resources to the useful labor to which we have devoted our lives, the dissemination of the ever-accumulating knowledge

of the world abroad among the multitudes of our people.

**SIMMERING.**

To the dog, stretched upon the kitchen hearth, the hissing murmur of the water over the fire before it begins to boil is an unmeaning sound, or at best it is vaguely associated with the sensation of warmth; to the more intelligent cook the same sound is a warning that the water is about to boil; while to the still more intelligent student of science it is a manifestation of the most complex relations of the properties of matter and forces of nature.

Probably no substance has been the subject of more varied and laborious investigations than water, and among the properties which it is found to possess is that of absorbing gases.

It absorbs a little more than its own volume of carbonic acid gas, whatever the pressure, and as the gas is condensed by pressure, the amount absorbed increases in direct ratio with the pressure. At the ordinary atmospheric pressure, 100 cubic centimetres of water absorbs 106 cubic centimetres of the gas, which weighs 196 grammes. Now if the pressure is doubled, the same volume of gas will weigh 393 grammes, and all of this will still be absorbed by the 100 cubic centimetres of water. This property is made available in the manufacture of soda water. Carbonic acid is forced into the water under pressure, and when the pressure is removed by drawing the water into the open air, the gas gradually escapes, producing effervescence.

Water also absorbs the two gases which, mechanically mingled, form atmospheric air, but it absorbs the oxygen in larger proportion than the nitrogen. It is this oxygen absorbed by water which supports the life of fishes. Fishes perish instantly when placed in water from which the air has been expelled. This statement applies only to true fishes which breathe by means of gills; whales and porpoises are supplied with lungs, and breathe atmospheric air, rising to the surface at every breath; consequently they could live in water deprived of air.

When gases are absorbed by water their volume is enormously reduced; they are changed in fact from the gaseous to the liquid form. This change of form converts a large portion of their latent heat into sensible heat, raising their temperature. Ice absorbs sulphurous and chlorine gases so rapidly that the heat set free melts the ice.

The less absorbable gases, however, such as oxygen and carbonic acid, are almost wholly expelled from water by the freezing of the liquid. Carradori found that after water had been repeatedly frozen, a fish immersed in it died instantly.

The application of heat to water also expels the gases absorbed by it, the larger portion of the gas being expelled before the water begins to boil. It is this expulsion of gases by heat that produces the gentle commotion and hissing which is called simmering.

**THE PITCHES OF SCREW THREADS.**

Reason and expedience both demand the early introduction of some fixed system for the pitches of machine screws. At present there is no standard whatever, and the inconvenience, delay, and expense resulting is felt every day. Repeatedly engines are stopped, presses stand idle, and pumps deliver no water, for the reason that some bolt has broken and another has to be made before operations can be resumed. But these delays, although vexatious and costly, are trifles compared to the want of mechanical system shown in this subject by the trade in general, it is a standing reproach to our machine-makers. None know the truth of this assertion better than they, and it is because no one moves earnestly in the matter that so little interest is manifested about it.

If all the foot-rules varied, or the standard of inches and fractions of it were at the mercy of any person, what confusion there would be, and yet a derangement similar in character exists at this moment in the subject of pitches for screw threads. It is safe to say that scarcely two shops use the same standard. One superintendent thinks twelve threads too coarse for half-inch bolts, another thinks it too fine; so between them they split the difference and make one of eleven and a half, or eleven and three-quarters of the inch; or what is still worse, an almost infinitesimal fraction less than any regular number, as for instance

thirty-three or thirty-four threads in three inches. It is almost impossible to measure such threads on a single inch, and no true mechanic would ever make one for standard use. Such threads are made, however, and used daily; we have had positive demonstration of this fact.

The Whitworth standard is very generally used in England; so much so that it may be called the standard there, but with us there is no fixed idea, although there is great need for one. If the bolts of commerce, or those sold in hardware and ship-chandler stores, were all of one pitch, for the relative diameters, it would be a convenience that many machine-shops would avail themselves of, and extensive works, even, could purchase sets of bolts, certified of the best iron, at less prices than they could manufacture them for in their own works. The advantages to be derived from some standard pitch seem to be worth working for.

**GRUMBLERS.**

Reforms are not instituted by growling and fault-finding. There is an old fable of Esop's which shows how a wagoner who was bemired extricated himself. The hopeful genius in question, immediately upon his accident, sat down by the roadside and bitterly bewailing his predicament, called on Hercules to help him; instead of doing so Hercules gave advice and told the man to put his own shoulder to the wheel and help himself; in effect to stop grumbling and go to work. The wagoner did this, was successful, and went on his way rejoicing. There are a great many people in the world like the wagoner in this fable. They are always in hot water, forever in trouble. They throw the blame of their own misdeeds and want of judgment upon others, and if one might believe them, society would be found in a shocking state. They rail at everything, lofty or lowly, and when they have no grumbling to do, they begin to deprecate. They endeavor to make good actions seem contemptible in other men's eyes, and try to belittle every noble and praiseworthy enterprise by casting suspicion upon the motives of those connected with it.

Such individuals, whether men or women, are an incubus on any society, and the best way to paralyze their efforts to create discord, is to ignore them altogether. Let grumblers form a select circle by themselves. Let them herd together; give them the cold shoulder when they appear and make them uncomfortable during their sojourn, and if they cannot be cured they may be more easily endured, and perhaps discover the error of their ways and reform.

**ENGLISH ESTIMATION OF OUR MONITOR SYSTEM.**

Some time since we chronicled the fact that two officers of high rank in the British navy had arrived in this country for the purpose of inspecting our iron-clads; the monitors we suppose, for we have but one other sea-going plated ship besides them, and that one is the *Ironsides*. These gentlemen have had every facility offered them to examine our vessels, and they are said to have recommended to the English Admiralty the adoption of the three principal features of importance in the monitors. These are Ericsson's turret, the compressors used in working our eleven and fifteen inch guns, the new ventilating system, and several other details of lesser importance. English prejudice against everything essentially American is so strong, however, that if the report is true, we have no idea that it will meet with favor, and the true-born Briton would much rather be sunk in his own craft than saved in ours.

**The Hecker & Waterman Experiments.**

We have received notes of the first observations taken in this elaborate series of experiments, giving a clear idea of the mode in which they are conducted, but we postpone the publication till our next issue, in order that the history of the experiments may be complete in the coming volume.

**HORSES PULLING AT THE HALTER.**—Many remedies have been proposed for curing this bad habit, but a simple and effective one is, to discard the common halter, and get a broad strong leather strap to buckle around the neck for a few inches below the ears. A horse may pull at this, but will soon give it up.