

PRESIDENTIAL ADDRESS TO THE SIXTH CONGRESS OF THE INTERNATIONAL ASSOCIATION FOR TESTING MATERIALS.*

By Henry M. Howe.†

The purpose of this association is to serve humanity by enabling it to distinguish the fit from the unfit among the materials with which the world's work is done, the materials for its buildings, its bridges, its ships, its railroads, its machinery, and its constructions in general. This is the function of the testing engineer; he stands between the public and the manufacturer who would supply that public, to test the fitness of those supplies, to measure accurately their degree of fitness, and to reject unsparingly the unfit. He is a guardian of the lives of those who travel by land or sea, and of those who live or work in buildings of important size. He is a protector of the material interests of the public, because in the last analysis all structures and all materials of which they are made are for the use and benefit of the public individually or collectively, and are paid for directly or indirectly by that public; and it is to the interest of that public that the fitness of those materials for their various purposes shall be known quantitatively to those who select them.

It is to make this work of the testing engineer more effective, to guard the lives and the interests of the public the better that this association exists. It is an open court in which the public sits in judgment on the various methods of testing. Of that public certain parts are here represented directly by their own engineers. This is true of the great railroads, the great shipbuilding and bridge builders, and the great engineering houses. Other parts of the public are represented indirectly by the middlemen or by the public engineers of tests.

The results of experience in all lands, in all climates, and under all conditions, and the points of view of all races, are here focussed in the most searching criticism of the various methods of testing, to the end that the buyer may gage their fitness with full knowledge, and thus may select intelligently those which give the fullest protection first to himself and ultimately to the public. If one method is unduly favorable to one manufacturer or to the manufacturers of one region or of one country by tending to gloss over the shortcomings of their product and to give undue prominence to its special merits, the public is here warned of the deceptiveness of that test by the evidence offered by the competing manufacturers.

However far distant may be the political "Parliament of man," which is "coming yet for a' that," the industrial parliament of man is already here: The buyer in each country may well say "My country is the world, my countrymen are all mankind," for wherever his abode he selects the fittest goods, quality and cost considered, without regard to their origin. While he is selecting his purchases, friendship, patriotism, national boundaries, empires, and continents cease to exist. To-day's market place is the world, and our society is an essential part of that pentecostal market place, in which we enable all races to speak the common language of the methods of testing, that is of appraising the market place's competing goods.

An important phase of our work is the unification of the methods of testing throughout the world, to the end that the buyer may the more readily and the more justly weigh the re-

lative merits of all competing materials of a given kind, from whatever country they may come. The day has passed when the buyer's ignorance, his inability to ascertain for himself the fitness of what is offered him, forced him to rely on the reputation and on the assurances of the manufacturer or exporter. To-day he relies not on the untested assertions of the seller, however creditable, but on his own tests, or on tests made by his own agents. Purchase is no longer a matter of faith but one of knowledge. It is our mission and privilege to carry this substitution of knowledge for faith ever farther and farther.

Turning our attention now in a different direction and asking what our attitude ought to be toward attempts to replace or supplement our present methods of testing with new methods, we find that, though we have good reason to be dissatisfied with our present methods, yet we should be extremely cautious in the industrial adoption of new ones. Let us consider these two aspects briefly.

For every structure there are certain conditions which are more trying to it than all other conditions, certain conditions which it fulfills with the greatest difficulty. Its ability to meet these most trying conditions is the measure of its industrial and commercial fitness, usefulness, and hence value. The fact that I cannot lay my hand with certainty on these conditions does not affect the truth of this proposition. We may not know these conditions to-day, but they are intrinsically discoverable. The supreme danger to the chimney may be the gale. The supreme danger to the rail may be the unduly rapid impact of an ill-balanced driving wheel when the ground is frozen hard, and after the head of the rail itself has been brought from its initial ductility to the vitreous state by the peening of the wheels. The supreme danger to the hull plate may be dynamic stress along the rivet holes in a collision. That which at last breaks down the well aligned factory shaft may be the inevitable slight variations of stress. In each case there are probably two or more supremely trying sets of conditions; but be they few or be they many, be they recognized or be they still undiscovered, there must in the nature of the case be such most trying conditions, the ability to endure which necessarily carries along with it the ability to endure all of the other conditions of use. It is to these most trying conditions that our tests should address themselves.

We assume reasonably that the ability to meet these most trying conditions will be measured most trustworthily by that test which reproduces these same conditions the most closely. For instance, in the many cases in which the most trying stresses are dynamic, it is reasonable to believe that a dynamic test is fitter than a static one. Of course we should not leap to the conclusion that any and every dynamic test is here fitter than any and every static test.

Here, then, is one direction in which most of our tests are very faulty. Their conditions are radically unlike the most trying ones of service. The light which they throw on the fitness of the object for its proposed service is most indirect. In that respect they are unfit tests.

An objection from a wholly different direction lies against most of our tests, the objection that, because they are tests to destruction, they cannot in their nature be applied directly to the object whose fitness they would gage, but instead they must be applied vicariously to small pieces assumed to represent those objects. We do not test the individual rails, boiler plates, shafts, bridge posts, or concrete columns on whose fitness the lives of our fellows hang, but small pieces cut from them, or for some other reason assumed to represent them. In certain rare cases we do indeed test, not such a small fragment, but a similar whole structure, a like beam or shaft or post. This is not as bad as measuring the endurance of your recruits by finding what

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†Acting President, International Association for Testing Materials; Professor of Metallurgy, Columbia University, New York City.