forced march suffices to kill their brothers, but it is open to the same kind of objection, the objection that because it is destructive it must needs be vicarious.

But a great range and variety of indestructive tests suggest themselves, tests which leave no more effect on the piece tested than seeing, tasting, or smelling it would. The presence of cavities may be detected through the density: and that of plastic deformation through the potential. Microscopic examination is already well advanced. Magnetic testing has received much attention; and the electrical disintegration is now pointed out as a means of test. The number of physical properties which offer themselves as possible means of testing is very great.

Here we note that Miers and Isaac determine the supersolubility curve of solutions by measuring their index of refraction of light, and that Hönigsberg and Coker study the lines of stress by the behavior of polarized light passed through transparent specimens. What do these things mean? They mean that light, a manifestation of energy, in crossing these bodies undergoes a change; and the nature of that change teaches us concerning properties in those crossed bodies little related to light; or in short the action of the body tested upon a form of energy passed through it or reflected from it may be made to disclose and to gage properties of that body but little related to that form of energy, and with no residual effect on the body itself.

But light is only one of a considerable number of forms of energy which seem open to such use. Sound, electricity, the divers kinds of radiations which only lately disclose themselves to our amazement, and the many yet undreamed ones awaiting discovery, these are forms of energy some of which may be harnessable to a like use.

Let us remember that later our analysis of these subtler manifestations of energy will be even fuller than our present analysis of the coarse radiations of sound. As to-day we know not only the pitch and volume, but the timbre, overtones, and harmonics of sound, so later shall we know corresponding characteristics and phenomena of these other kinds of radiation, so that we seem embarrassed by the riches of the variety of agencies from which the testing engineer of an age less crude than ours may choose.

Here lies the suggestion that we may learn the properties of the very rails and girders which we are to use, and later the properties of assembled structures themselves, such as boilers and bridge posts, and conceivably in the far, far future the assembled hull, by their action and re-action with some form of energy. Who shall say that the pitch or volume or timbre of sound emitted by a rail as the result of a given excitement may not be made to disclose pitilessly its hidden defects and to measure the fitness, not alone of the material of which it is composed, but of the rail as a whole structure? Or giving rein to our fancy we hear the inspector report, "This one-hundred story building indeed responds to G sharp, but its timbre has this abnormality and these harmonics are exaggerated."

These indestructive methods indeed have the defect of being indirect in one respect to weigh against their advantage of being direct in another; they are indirect in that they gage the properties actually needed in service by means of other properties; they are direct in that they may be applied to the very objects to be used, instead of vicariously to coupons or like objects to be destroyed in the test itself.

Their natural service seems to be to supplement the vicarious destructive tests. Thus the tester of the future may prove his material by the vicarious destructive tests of coupons, and prove his structures themselves by these indestructive tests.

Having thus considered the purposes of our society, let us turn to some tangible evidence of the progress made in accomplishing them since our last congress. First, four additional countries are represented in our Council—Japan, China, Canada and Brazil, by Messrs. Saito, Kwong, Hersey and di Paolo—bringing the number of countries represented on the Council up to 25. Second, our membership has increased from 2,160 to 2,680, or by 24%, and now represents 30 countries, and every continent. Adding the members for the present Congress year, our membership becomes about 3,700. Third, in addition to the existing national societies closely affiliated with us in Germany, America, Italy, Austria, and Hungary, two new national societies have arisen in Russia; and in addition to the existing organization of our own members into a racial group in France and Belgium, a like national Swiss group has formed. I appeal to the members of Council from other countries to institute like works. Perhaps by this means better than by any other can they discharge that solemn trust which they accepted in entering the Council.

That we are recognized not as a private club for our own benefit and enlightenment but primarily and essentially as a benevolent institution, successfully aiming to benefit mankind; an institution to which our contributions of time and thought are such as no sordid motive could evoke, is shown by the generous and widespread response to our appeal for aid in this work, and by the action of many governments and important public bodies in appointing representatives on our commissions.

Here it may be mentioned that the volume of papers for this congress is about twice as large as that of any previous congress.

The Council contemplates ways of lessening the impediments to the efficiency of our international committees, due both to the language difficulties and to the usual need of carrying on their deliberations by correspondence instead of face to face.

The immediate purpose before the founders of our society was to perfect and unify the methods of testing; the ultimate purpose was to enable the public to get fit goods. But if I am to learn whether my purchase is fit by testing it, I must know not only how to test it, i.e., how to measure its properties, but also how much of each property it ought to have. Of what use is a process for testing axles by impact or tension unless I know quantitatively what tensile properties they ought to have and what impact they ought to endure? Of what use are methods of testing without reception specifications? One is the necessary complement of the other.

It so happens that, in building a society fitted for the immediate end of improving methods of testing, we have simultaneously fitted it for the indispensible supplement, specification making. In bringing together those competent to improve methods of test we have also brought together those most competent to draw specifications. We have "builded better than we knew." We have unconsciously made an organization fitted for filling both needs of the public, for telling it both what properties, quantitatively, its purchases need and also how to measure those properties.

I am not unmindful of the obstacles and pitfalls in the way of specification making. I understand the gravity of the commercial questions involved. I see that commercial interests may readily be antagonized into the positon of resenting supposed interference. But let us look at obstacles as things primarily to be overcome and pitfalls as things primarily to be bridged, remembering that where there is a will there is a way; that the human beings with commercial interests on other continents do not differ in their innermost nature from the corresponding human beings on this continent; and that if it has proved possible to bring maker and