tion of Sir Isaac Newton to develop the higher calculus of the engineering of life which is so necessary if our increased productive power is to increase total human happiness!

Haven't you sometimes wondered whether this whole Century of Progress might not be just a superficial and temporary phenomenon after all? The increase of physical output in three generations is so extraordinary that we've tended to think that this is what man is meant for. It seems to me a terribly inadequate yardstick of civilization. A man has food, clothing and shelter; wherein does he differ from the beasts of the field? Surely these are not the things which distinguish the civilized from the uncivilized. Food and shelter and the other necessaries in any rational order ought to go without saying. They ought to be as automatic and as universal, in this day of technological achievement, as the air we breathe. It is from this point on that life begins.

A characteristic of the engineer is his willingness to face the cold truth about the task to which he addresses himself. Engineers have brought to their jobs a more fully developed intellect than any other class of our citizenry. Sloppy, opportunistic thinking is simply inexcusable in the engineering world. I would be the last to suggest that the engineer abandon the precision of his thinking and his honesty in facing facts. I am merely asking that the same qualities be brought to bear in so far as possible on the more complex situations which have to do with living organisms and our social life. I fear, however, that in our social and economic life the objectives must always come from that mysterious realm which all engineers and scientists should treat with the greatest respect but with which engineering and scientific methods are totally unable to grapple.

In brief, then, we wish a wider and better controlled use of engineering and science to the end that man may have a much higher percentage of his energy left over to enjoy the things which are non-material and non-economic, and I would include in this not only music, painting, literature and sport for sport's sake, but I would particularly include the idle curiosity of the scientist himself. Even the most enthusiastic engineers and scientists should be heartily desirous of bending their talents to serve these higher human ends. If the social will does not recognize these ends, at this particular stage in history, there is grave danger that Spengler may be proved right after all, and a thousand years hence a new civilization will be budding forth after this one has long laid fallow in a relative Middle Ages.

SCIENTIFIC EVENTS

RADIO OBSERVATIONS OF THE ECLIPSE

ON February 14, 1934, a total eclipse of the sun will be available for observation, being total at noon on Wake Island in the Pacific Ocean. During the last total eclipse, August 31, 1932, radio observations of the ionization of the upper atmosphere (90 to 200 km above the earth's surface) were made by many observers, including J. T. Henderson and D. C. Rose[1] in Canada, H. R. Mimno and P. H. Wang,[2] G. W. Kenrick and G. W. Pickard,[3] S. S. Kirby and L. V. Berkner[4] in the United States, and T. R. Gilliland and K. A. Norton[4] at Sydney, Nova Scotia. An analysis of the results indicates that such observations determine the recombination coefficient of the ions in the upper atmosphere as well as the magnitudes and relative importance of the various ionizing forces in the upper atmosphere. The recombination coefficient was only approximately determined by the 1932 eclipse, while the results indicate that most of the ionization in the layers with maximum ionization at about 115 and 180 km was due to ultra-violet light from the sun. However, a small part of the ionizing force in the 115-km layer, and most of the ionizing force in the 220-km layer, were not eclipsed by the moon at the time of the normal light eclipse. A more acurate determination of the recombination coefficient and a further study of this non-eclipsed ionization would be of the utmost importance, shedding light on the constitution of the ionosphere and on the theories of the variations of terrestrial magnetism, etc. Recent technical advances[5] in radio methods of observation of the ionization of the upper atmosphere would greatly facilitate such observations. It is hoped that facilities for radio observations will accompany any expeditions for the observation of the February eclipse, since the conditions are peculiarly favorable to success, the sun being near the zenith and the date near a sunspot minimum. The success of radio observations, being independent of the presence of clouds, is a function only of the care with which preparations are made and the past experience of the observers.

Any observers must leave very shortly in order to be at the proper place in the Pacific in time for the eclipse work.

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[1] *Canadian Jour. of Research*, 8: 1–36, January, 1933.
[2] *I.R.E.*, 21: 529–546, April, 1933.
[3] *I.R.E.*, 21: 546–567, April, 1933.
[4] *Bureau of Standards Journal of Research*, December, 1933.
[5] T. R. Gilliland, *Bureau of Standards Journal of Research*, July and October, 1933.