

La Jolla, California. Systematic measurements of the temperature of the Pacific near the coast show occasional upwelling of cold water. Simultaneous biological studies reveal a change in the distribution of microscopic organisms with the temperature of the water. This has an immediate practical bearing, because the distribution of the organisms is a dominant factor in the distribution of certain food fishes. The source of the temperature changes, and their influence on meteorological phenomena, are other interesting phases of this work.

In the field of engineering, the possibilities of co-operative research are unlimited. The fatigue phenomena of metals have been chosen by the Engineering Division of the National Research Council, acting in conjunction with the Engineering Foundation, as the subject of one of many co-operative investigations. Metals and alloys which are subjected to long-repeated stresses frequently break down, especially in aircraft, where the weight of the parts must be reduced to a minimum. The elastic limit and, to a lesser degree, the ultimate strength of steel can be raised by working it cold, provided that a period of rest ensues after cold-working. The tests indicate, however, that increased static strength due to cold working does not necessarily indicate increased resistance to fatigue under repeated stress. In the case of cold-stretched steel, for low stresses the fatigue strength is actually less than for the same steel before stretching.

These phenomena, and others that illustrate the complexity of this problem, afford abundant opportunity for further research. The membership of the committee includes representatives of educational institutions, the Bureau of Standards, and several large industrial establishments. The work was divided among the members, two dealing with its metallographic features, two with machines for testing, two with mechanics of the materials involved, and one with a survey of the subject from the standpoint of the steel manufacturer. The results already obtained promise much for the future success of this undertaking, which will now be continued at the University of Illinois, with the co-operation of the members of the committee.

Scores of other illustrations of effective co-operation in research might be given, especially in astronomy, where each of the 32 committees of the International Astronomical Union is constituted for the purpose of organizing co-operative investigations. In spite of the length of this list of committees, it cannot be said that astronomy offers any unique possibilities of joint action. The division of the sky among widely separated observers is only a single means of co-operation, which may be paralleled in geology, palaeontology, geography, botany, zoology,