On Blueprinting Man's Future

Robert M. MacIver

It is a pleasure to greet **Inventing the Future** (Knopf, New York, 1964. 254 pp. $4.95), a book by Dennis Gabor, an informed thinker who honestly wrestles with the momentous portents of our times and projects them against the blank unrolling screen of the future. For Gabor the great "trilemma" ahead consists of the menaces of nuclear war, overpopulation, and the approaching age of leisure. He takes, on the whole, an optimistic view regarding the first two menaces and offers some interesting reflections with respect to the third—which for most people does not loom as a menace at all, but rather as a paradisial prospect. Gabor is a physicist who is also at home in the humanities—a happy exception to C. P. Snow's doctrine of the "two cultures." He has no illusion that men can actually predict the future, but since progress depends on our positing goals when we fight present ills, he offers his personal vision of the future.

A major embarrassment of our world in this day of far-extending relationships and swift communications is that its people are "non-contemporary." They live in different centuries, even in different epochs, ranging back to the bronze age. We live in a world of national states, many of them newborn (some perhaps born before their time), others the slower birth of former centuries. Nationalism Gabor calls our worst inheritance from the past; but we might question whether an integrated world can be built except through the free union of national units, and we might also cavil that many of the newly independent peoples are not yet nations but congeries of unassimilated tribes. Our author holds that "we must, at whatever cost, make contemporaries of our non-contemporaries." He regards this as essential for the avoidance of an all-out war, and he claims that the export of capital amounting annually to less than 2 percent of the annual income of the United States would suffice, given some control over population increase and the economic and social education that should go with the aid, to set the development of the backward countries in full motion.

I do not find these prognostications sufficiently convincing. Although I agree that financial and technical aid is urgently needed for undeveloped countries, I do not believe that it will raise them to the status of contemporaries except after prolonged and troubled experience. The mountains and the seas of ancient ways of life and habits and beliefs lie in between. Political maturity—we haven't too much of it ourselves—can only be the slow birth of times. I do not regard the avoidance of nuclear war as primarily dependent on the development of the backward countries, and the author himself finds better grounds. On the whole this section of the book has less of the surefootedness and the perceptiveness that characterize the rest of the work.

In passing, Gabor deals with the menace that the present rate of industrial development will use up the estimated quantity of available mineral resources. If the rate of consumption was as high in all other countries as it is in the United States, copper, lead, zinc, and tin would last considerably less than one decade. Petroleum, iron ore, and aluminum bauxite would last a number of decades, and only coal, including all types, would last some centuries. But these figures do not daunt our author. In a chapter entitled "The challenge to technology," he argues rather convincingly that the challenge can and will be met.

To turn to Gabor's trilemma, he likens the present attitude of the United States and the U.S.S.R. to that of a pair of snarling dogs, each of which possesses in its own backyard a more than ample supply of meaty bones but is scared that the other has designs on its bones. The scare, however, is diminishing. Each knows full well that the other dares not dare. The final deterrent is the "great novelty" in warfare which he calls the "dead man's revenge." Polaris and Minuteman missiles prowl in the seven seas, and no knockout blow can prevent their being launched. Bomb shelters are deathtraps with delayed action, and the emerging good sense of the public, unlike the position of certain politicians, is shown in their coldness to the prescription.

As for the population explosion, Gabor contrasts the death control, which accounts for the rise of population in the backward countries, with the lessened birth control, which has caused a rise in some advanced countries—for example, in the United States. The way in which population growth in the undeveloped countries eats up the potentiality of advancement and is responsible for a higher adult death rate from malnutrition and starvation is a tragic but temporary phenomenon. Past experience has shown that the birthrate will adjust itself to the lower death rate. But the crucial question is at what density of population the equilibrium will be attained. The author regards the increased birthrate in the advanced countries as a "defense mechanism against the age of Leisure." It is an outlet for "the tremendous energy of the young American woman." I cite this last statement "without prejudice."

The approaching age of leisure gives our author much concern. His prognostications concerning it are full of lights and shadows, hopes and fears. He is particularly concerned with the lot of the common man where his working time is reduced to an average of 3 or 4 hours a day. At the present rate of development, most common men won't really be needed at all. Will their resort be to dissipation and watching sports? We must educate the young for leisure, but how? They need a faith, at the least a faith in themselves and in the purposefulness of life. "If man is to retain his sanity, the world *must* make sense for him." The uncommon man is in a better position. He still will have engrossing pursuits. "True science will provide congenial work for uncommon men and women as far as thought can reach." And there are the fine arts and the high crafts, the whole world of the humanities that tease the

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aspirant toward a perfection he can never attain. They can go their own unpredictable way, but science, since in the future it will start "to interfere with the fate of man as never before," imperatively must become fused with the humanistic tradition.

I cordially commend this book. It is sage and informative, and it continually wrestles with great issues that concern us all.

Mathematics

Degrees of Unsolvability. Gerald E. Sacks. Princeton University Press, Princeton, N.J., 1963. xii + 174 pp. Illus. Paper, $3.50.

This is a specialized monograph on a specialized topic in mathematical logic. A basic understanding of elementary recursion theory is presupposed.

The main subject of this work is an investigation into the structure of the Kleene-Post semilattice of degrees of unsolvability. Among the topics discussed are minimal degrees, minimal upper bounds for sequences of degrees, recursively enumerable degrees (including an interpolation theorem for recursively enumerable degrees), the relation of the jump operator to the ordering of degrees, and incomparable degrees.

The technique that the author employs in his investigation is usually referred to as the *priority method*, a method which owes its inspiration to the work of Friedberg and Muchnik. In fact, this monograph may be viewed as an application of the priority method to the study of degrees of unsolvability. The author exhibits considerable ingenuity in applying priority arguments to this study.

Interspersed throughout the monograph are numerous comments on the priority method per se and its applicability. Chapter 4, entitled "The priority method of Friedberg and Muchnik," is devoted to an attempt to establish a definite form of priority argument (theorem 1 and proof), which the author states "will be useful to anyone who wishes to develop an intuitive understanding of the workings of the priority method in all of its manifestations." This belief is questionable on two grounds.

1) It appears to be pedagogically simpler to read Friedberg's original papers to obtain an "intuitive understanding" of the priority method.

2) Many priority arguments are not readily cast in the form given in chapter 4. This raises doubt about whether an intuitive understanding of the priority method "in all of its manifestations" can be obtained by the work of chapter 4.

In general, although many of the author's priorities appear to adhere to his comments on the priority method, it is not certain that all possible priorities do. We are still a long way from a complete understanding of the nature and scope of this method. Perhaps a study of "structural" priorities, as was done by some other logicians, will be a help in this direction.

The author has informed me that he is preparing an errata. The prospective reader is advised to consult this errata before reading the monograph.

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Learned Societies

American Learned Societies. Joseph C. Kiger. Public Affairs Press, Washington, D.C., 1963. viii + 291 pp. $6.

In *American Learned Societies* Joseph C. Kiger ambitiously undertakes the American aspects of a story which, in the broader context of Western Civilization, he feels ushered in the Modern World. This belief is bolstered by nothing in his book. Apart from vaguely correlating the rise of the city to the rise of the modern learned society Kiger presents very little evidence that the societies function in "society." It is always dangerous to criticize a book on the ground that the author should have written another book entirely, but in this case the dangerous course is the only course.

A list of everything omitted would require another book, but consider one example. A thorough reading demonstrates why the National Resources Committee was not included in the index: it is nowhere mentioned in the text. In 1935 the National Academy of Sciences–National Research Council, the Social Science Research Council, and the American Council on Education began sending representatives to sit on a science committee of the National Resources Committee, later the National Resources Planning Board. For 7 years this interesting interdisciplinary committee, composed of members of the three largest learned federations, evaluated and made occasional abortive attempts to coordinate the nation's scientific resources. But the science committee was only one facet of a rich and important story that deeply concerned American learned societies in the 1920's and the 1930's—a story that extends well into the present. Kiger has ripped these societies out of the political and social soil that nourished them.

The serious deficiencies of the book seem to grow out of problems of definition. By taking up each society in turn they are isolated from the more important influences which brought them into being and shaped their development. Can one talk about the origins of the Social Science Research Council without mentioning C. E. Merriam or W. C. Mitchell? Can one discuss the 1920's as a fecund season for the social sciences without nodding toward *Recent Social Trends*? The truth is that Kiger is trapped in his own static organization, which is never dynamic or fluid enough to permit the free movement of imagination or insight.

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Trigonometry

The Non-Algebraic Elementary Functions. A rigorous approach. Andre L. Yandl. Prentice-Hall, Englewood Cliffs, N.J., 1964. xiv + 266 pp. Illus. $5.95.

This trigonometry text, which is for "above-average" high school seniors or college freshmen, has as its stated objective "the training of the student for a rigorous calculus course."

After a brief treatment of sets, the real number system is introduced as a set of objects, together with the addition and multiplication operations, satisfying field, order, and completeness properties. Functions (defined as sets of ordered pairs) and inverse functions are carefully presented and their properties discussed.