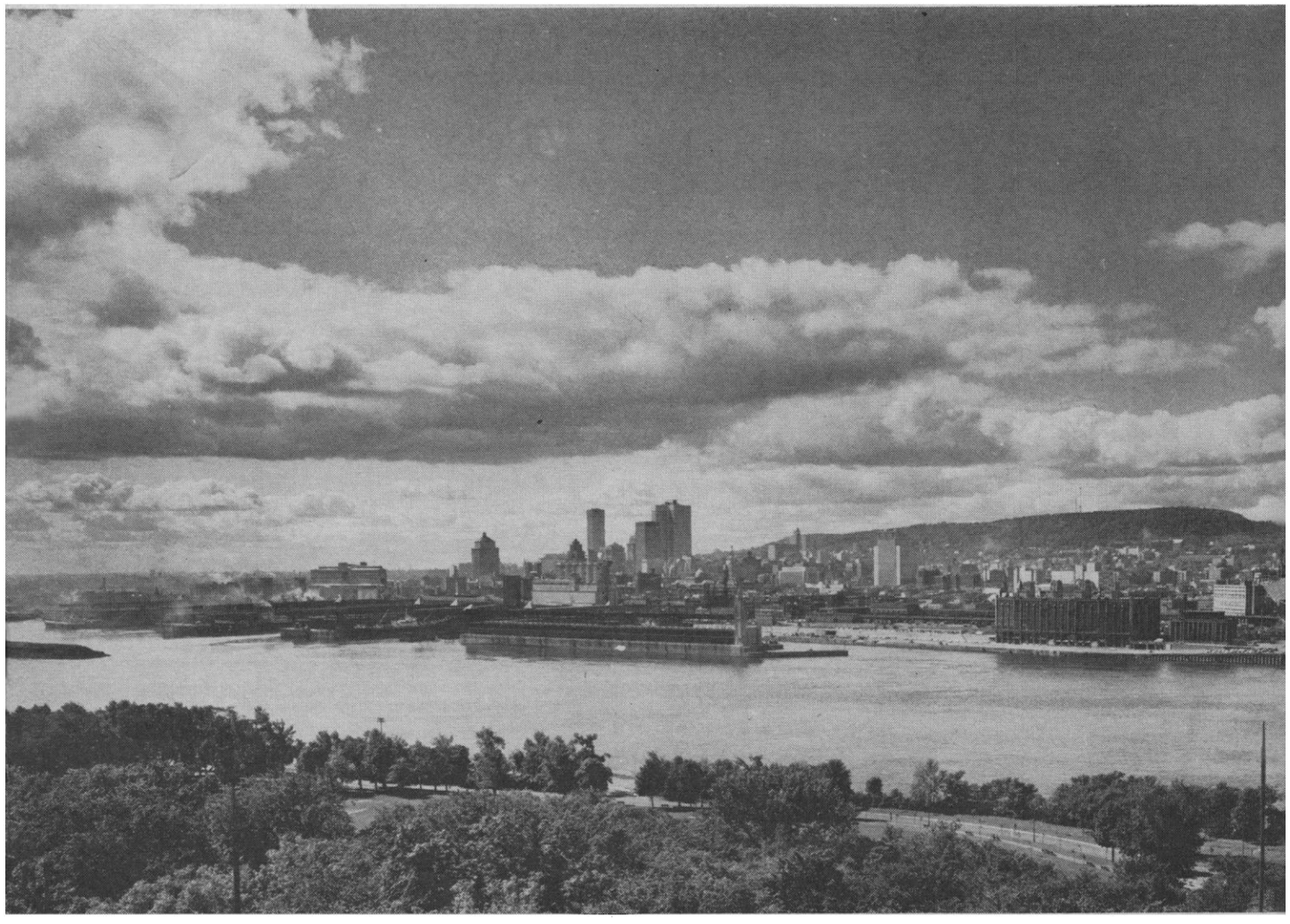
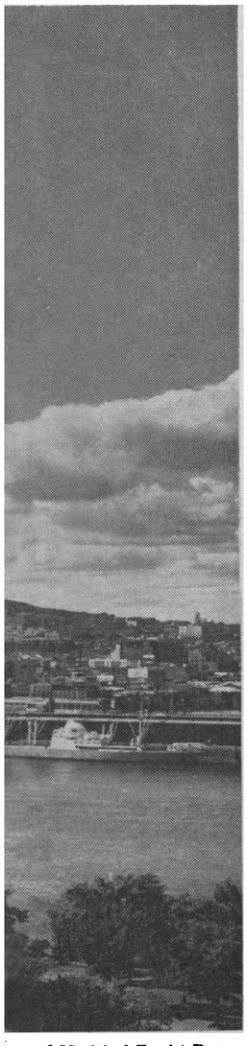


The great growth in the numbers of scientists, scientific periodicals, researches and papers, research organizations, and research funds has produced new problems in the social relations of scientists and in communication among scientists. In order to discuss these problems a two-session symposium at the AAAS annual meeting in Montreal (26–31 December) will deal with the "Sociology and Ethics of Science" (27 December). The first session (morning, 27 Dec.) will be chaired by Robert K. Merton (Giddings professor of sociology, Columbia University).

Recent advances in measuring the growth of science will be discussed by Derek J. De Solla Price (Avalon professor of the history of science, Yale). During the last three centuries, some 50,000 scientific periodicals were established; approximately 30,000 still exist. These journals have produced a world output of about 6 million scientific papers, which have been increasing at the rate of about a half million annually. Similar growth has occurred in the numbers of scientific personnel. In the United States alone, there is a population of almost a million individuals with scientific and technical degrees. The number of men of science and of scientific papers has been doubling about every 15 years. These figures of exponential growth are fairly well known. However, new developments in measuring the growth of scientific manpower and literature suggest that this exponential curve of growth will experience a logistic decline, probably followed by a set of escalations. Saturation of growth, though inevitable, still remains to be determined.

Norman Kaplan (associate professor of sociology, University of Pennsylvania) will review the position of scientists in research organizations located in universities, industry, and government. He questions the widespread belief that the scientists in universities enjoy a greater degree of autonomy in their research than their counterparts in industry. As for the "professional" status of the scientist, this too is often a misnomer. Scientists engaged in basic research in industry, for example, are often involved in a type of social relation with their administrative superiors that is more nearly reminiscent of the artist-patron relationship than that of the professional-client relationship. The occupational role of scientists is changing so rapidly that customary descriptions of that role tend soon to become outmoded.

On the basis of extensive interviews with almost all of the Nobel laureates in the sciences now living in the United States, Harriet A. Zuckerman (lecturer in sociology, Barnard College) examines the various modes of collaboration in which these eminent men of science have engaged. She finds that the traditional opposition between "lone scholars and scientists" and "research teams"



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131st AAAS ANNUAL MEETING

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does not begin to capture the varied and complex ways in which the laureates have performed their scientific studies. She finds distinct patterns of change in the extent and types of scientific collaboration in which the laureates have engaged in the course of their career. The laureates testify to collaboration where it apparently did not occur just as they report much so-called "individual" work when they are heading up research groups. The extent and kind of collaboration among these eminent scientists can be systematically compared with the extent and kind of collaboration among a cross section of American scientists.

Based on the Zuckerman interviews with Nobel laureates, a paper by Robert K. Merton identifies the "Matthew effect" in scientific communications—greater increments of recognition accrue to eminent scientists than to their less well known partners in cases of joint publications. (It is described as the "Matthew effect" after the Gospel according to Matthew: "For whosoever hath, to him shall be given, and he shall have more abundance; but whosoever hath not, from him shall be taken away even that he hath.") Although the laureates indicate the Matthew effect is at the expense of their less known collaborators, it should also be noted that coauthorship of scientific papers with eminent scientists also increases the probability that the papers will be studied by the community of scientists. It thus serves to increase the visibility of these scientific communications. The Matthew effect creates a dilemma for Nobel laureates; should they coauthor papers which are then largely attributed to them alone or should they remove themselves from occasional coauthorship and so run the risk that the scientific contribution will be less promptly and less widely recognized by fellow scientists? This sets the stage for a genuine ethical problem.

The second part of the symposium will continue (afternoon, 27 Dec.) with discussions on the ethical aspects of science. Speakers will include: James M. Mitchell (director, Advanced Study Program, Brookings Institution), on the structure of the problem; Lynn White, Jr. (director, Center for Medieval and Renaissance Studies, University of California, Los Angeles) on the etiquette of research and publication, Barry Commoner (professor of plant physiology, Washington University) on the ethics and the social relations of science, and T. C. Byerly (U.S. Department of Agriculture, Washington, D.C.) on the scientist's professional ethics.

This is the first in a series of articles which will describe important symposiums—Moving Frontiers of Science, International Conference and Symposium on Primate Behavior and others—scheduled at the 131st AAAS Annual Meeting.