PART III: Environmental Engineering

INTRODUCTORY REMARKS

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Traditionally, meteorologists are concerned with theoretical meteorology and weather forecasting, while engineers are responsible for the best practical and economic use of men and material. It has only been in the past decade that these two professions have got together to use applied meteorology in the broad field of practical engineering as it applies to design, construction, and maintenance.

In retrospect, it may seem difficult to understand why the engineering aspects of applied meteorology have been so slow to develop. In the past, the meteorologist has tended to supply average or normal weather data, and the engineer, a practical man who must arrive at answers for all his problems, has incorporated only these values into his design and operational equations. However, in the past two decades the meteorologists have made great progress in opening up the field of applied meteorology through the proper use of climatological analysis. This has been made possible by combining the application of statistical methods with the use of modern data-processing equipment. Miller's paper on area time frequencies for design in which he uses low temperatures in Alaska is a good example of this recent and useful combination.

Although some applied meteorologists might claim that environmental engineering should include all the engineering aspects of applied meteorology, the meteorological applications of structural and hydrologic engineering are becoming important specialized fields in their own right, and papers on these subjects appear in different sections. Perhaps one of the most practical applications of environmental engineering has been the control of enclosed atmospheres, or (as the application is more commonly known) heating, ventilating, and air conditioning. Representing this

application, Murphy's paper on meteorology and heating load requirements contains determinations and discussions of correlation coefficients between heating requirements and various meteorological parameters.

While the application of environmental engineering to enclosed space is fairly well developed, its application in the use of free-atmosphere conditions for the benefit of man is underdeveloped. For example, many northern areas are plagued each year with the problem of accumulating and drifting snow, and there are many papers in the literature concerning snow removal and the prevention of drifting. In contrast, the paper by Gerdel in this section shows how snow-drift-control procedures may be adopted to a constructive, rather than to a simple protective, program.

Failure of meteorologists in the past to provide engineers with sufficient data and information has arisen partially from the lack of certain basic observations. With this in mind, the operational papers in this section are complemented by one on solar radiation. Boyd describes a study made on daylight availability at Ann Arbor, Michigan and correlates the resulting data with theoretical considerations and climatological data.

Applied meteorology is today an underdeveloped but most promising division of meteorology. Through the training of engineers in applied meteorology and of meteorologists in the practical needs of engineering, through coordinated research by both professions in environmental engineering, and through the joint sponsorship of meetings and conferences, those working in the environmental-engineering aspects of applied meteorology will be making a major contribution to our economy and well-being. The papers that follow will present tangible evidence of useful and varied work in progress.