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Giants of Science

Dr. Harry Wexler

Introduction: Dr. Harry Wexler was one of the great figures of Twentieth Century Meteorology. His vision encompassed our earth and its atmosphere and even extended into our solar system as he was among the first to consider the use of meteorological satellites and to be concerned with the atmospheres of other worlds. An inkling of the breadth of his interests is included in a memorial issue of the "Monthly Weather Review" encompassing Volume 91, Numbers 10-12, published for the period October through December of 1963. In itself, these three combined issues of the Monthly Weather Review constitute a magnificent tribute to one of our Nation's greatest meteorologists. Thirty **Contributions in Memory of Harry Wexler** were written by a number of the leading



meteorologists of the era and dedicated to Harry Wexler's memory. Within many of these articles are reminiscences of Dr. Wexler and his contribution to the area of meteorology under consideration or his role in establishing various observation systems. He was no desk-bound science bureaucrat as he traveled the world in search of answers to many of the pressing meteorological questions of the day. Among his scientific adventures, he was the first scientist to intentionally fly into a hurricane for the express purpose of understanding its nature. He was not bound to tradition and was quick to grasp the promise of new technologies. His influence and leadership throughout the meteorological community is displayed below in the selected quotes from the memorial issues.

Contributions in Memory of Harry Wexler

Foreward

Following the untimely death of Dr. Harry Wexler on August 11, 1962, and the shock that came from sudden loss of a warm friend and distinguished colleague, there were many suggestions by his close associates who desired to establish suitable memorials to his scientific work and his personal qualities. Among the suggestions was one that an issue of the *Monthly Weather Review* be devoted to scientific contributions in his honor by his associates. So numerous were his

scientific friends throughout the world who could have contributed creditable papers that initial invitations were limited to his co-workers in the Bureau. Even so, the number of enthusiastic acceptances exceeded the capacity of the *Review*; indeed, the initial response required expansion of the memorial issue from the single number originally planned to the combined issue of three numbers.

Authors of the scientific papers in this issue feel honored to dedicate this work in memory of Wexler and his inspiring leadership and his vigorous role in advancing geophysical sciences. It is fitting that the papers in this memorial treat a wide variety of subjects; they are dedicated to a scientist whose interests were broad and who himself made significant research contributions to many of these subjects. It is also appropriate that these memorial contributions appear in the *Monthly Weather Review* because here Dr. Wexler published several of his earliest scientific papers. Moreover, during many years of the latter part of his Weather Bureau career, first as Chief of Scientific Services Division and finally as Director of Meteorological Research, he found time for general sponsorship of the *Review* in addition to his many other activities. His continuing interest in the *Review* and his lively encouragement of its staff nurtured its rejuvenation as a scientific journal after many years of war-imposed curtailment in scope of the periodical.

As Wexler accepted the expanding scientific responsibilities of his office and its many ex officio associations and shouldered the inevitable additions to his administrative and supervisory work over the years, he did not neglect his own research work. Amazingly, his output increased, an accomplishment that is apparent in the chronological listing of his publications in the bibliography in this issue. He believed that a scientist's career as an administrator should never completely replace his pursuit of independent scientific research.

Dr. Wexler was too occupied with his scientific work to spend much time talking about his philosophy of science, but those of us who worked closely with him knew his lively curiosity for knowledge and his in-born desire to understand. Balancing his enthusiasm was a scientific maturity that steered him away from the pitfalls of pseudo-scientific fads. He believed that progress comes through attention to fundamentals. An admirer of Benjamin Franklin's scientific work, Wexler faithfully practiced what Franklin had advised: "He who would master nature must obey her laws. He must learn her laws and then obey them."

In a brief Foreword, it is not possible to capture in words the vigor and influence of a man like Wexler. In personality, he was warm and dynamic. He liked people. In devotion to science, he was untiring in his efforts and uncompromising in pursuit of facts and fundamentals. He gave himself wholeheartedly to advancement of atmospheric sciences through his own studies, through organization of seminars and symposia, through conferences and committees, nationally and internationally through trips to Antarctica and other remote places, and in many and various other activities. His fine qualities are remembered by all who knew him and his contributions will always be reflected in the pages of science history.

F. W. REICHELDERFER

Chief, U.S. Weather Bureau

August 20, 1963

In: "**Bibliography of the Publications of Harry Wexler**," pp. 477-481.
Concerning inclusion of abstracts in the *Bulletin of the American Meteorological Society*,

" Finally and most significant is the debt of gratitude we owe Dr. Wexler for his encouragement in the early days of meteorological abstracting - in fact, he was the one who gave us the initial impetus to begin abstracting in 1946 when the abstracts were published in the "Bulletin of the American Meteorological Society." P. 481

In: **"Interactions of Circulation and Weather Between Hemispheres,"** by Jerome Namias, pp. 482- 486.

"As the coverage of meteorological data over the world increases and hopefully reaches the stage recommended in the report detailing the "World Weather Watch" in which Dr. Harry Wexler played a major role, meteorologists may reinstitute the search for interactions with the help of synoptic as well as statistical tools, thereby providing more concrete evidence to assist in the formulation of physical theories." P. 482

"Thus the hopes for truly global weather maps and predictions, so frequently expressed in the late Dr. Wexler's stimulating conversation, papers, and talks may someday become a reality and form another testimonial to his foresight." P. 486.

In: **"A Spectral Study of the Warming Epoch of January-February 1958"** by Sidney Teweles, pp. 505-519.

"In 1958 the late Dr. Harry Wexler assigned to the writer the task of organizing the Stratospheric Meteorology Research Project (SMRP) to prepare a series of stratospheric charts and perform research on the upper atmosphere. By the time the map analysis group was phased out in 1962, daily 100-mb. and 50 mb. charts and three-times-monthly 30 mb. charts for the 24 months, July 1957 to June 1959 had been completed." p. 505. "This research was made possible by an assignment to the Massachusetts Institute of Technology for which Dr. Wexler was largely responsible." p. 518.

In: **"A Possible Effect of Atmospheric Circulation in the Daily Variation of the Earth's Magnetic Field"** by Oliver Reynolds Wulf, pp. 520-526.

"The author gratefully acknowledges the encouragement received from Dr. Harry Wexler in this work." P. 526.

In: **"Specification of Precipitation from the 700-Millibar Circulation,"** by William H. Klein, pp. 527-536.

"The late Dr. Harry Wexler was one of the first meteorologists to relate large-scale precipitation regimes to the upper-air circulation. In 1938, he and Namias found that abnormalities of summer rainfall were closely aligned with moist and dry tongues on monthly mean isentropic charts." P. 527.

In: **"The Southerly Low-level Jet Systems Delineated by the Weather Bureau Special Pibal Network of 1961,"** by Walter H. Hoecker, Jr., pp. 573-582.

"Wexler applied the inertial boundary theory of Charney and Morgan on ocean currents to the southerly low-level jet and in a discussion with the author indicated that the theory would apply to flow along the Great Plains from the north as well, and produce a northerly low-level jet." P. 573.

"The author's initial interest in the southerly low-level jet was stimulated and encouraged by the late Dr. Harry Wexler during the preparation of his referenced work on the southerly jet and also as a result of his long-standing interest in the subject. The detailed southerly jet analyses presented here are the product of Dr. Wexler's aggressive imagination and planning."

P. 582.

In: **"Summary of High Level Turbulence over the United States,"** by DeVER Colson, pp. 605-609.

"The author wishes to express his thanks to the late Dr. Harry Wexler who suggested that this research program be undertaken and who furnished very helpful suggestions and encouragement during the study." P. 609.

In: **"The Problem of the Martian Yellow Clouds,"** by F. A. Gifford, Jr., pp. 610-612.

"The first extensive meteorological investigations of other planets were undertaken starting just about 15 years ago at Lowell Observatory. The Project for the Study of Planetary Atmospheres was sponsored at first by the U.S. Weather Bureau, through its Scientific Services Division, which was then headed by Dr. Harry Wexler. Perhaps only those comparatively few meteorologists who participated in these early studies can fully appreciate the keen foresight and remarkable scientific intuition that motivated Wexler's active encouragement of this project in days when research funds were so difficult to come by. The following remarks on the problem of Martian yellow clouds are offered in part as a reminder of the continuing validity of one of Wexler's favorite theses, that meteorologists can with profit study the atmospheres of other planets in order to improve their understanding of the behavior of the earth's atmosphere."

P. 610.

In: **"The Variable Appearance of the Earth from Satellites,"** by Sigmund Fritz, pp. 613-620.

"This article is an outgrowth of Dr. Harry Wexler's renown in the scientific world. Because he was associated with scientists in many disciplines, he was asked to supply a chapter, dealing with earth-satellite observations, for an astronomy book about planetary atmospheres. He suggested that I write such a chapter. After an early draft had been written, the editors decided not to produce the proposed book after all. That early draft, although intended for an astronomy book, has been revised and shortened into the present article. In a sense, articles about the appearance of the planet are continuations of Dr. Wexler's own forward-looking concepts on this subject. And so Dr. Wexler's influence continues." P. 613.

In: **"Cloud Patterns Part I: Some Aspects of the Organization of Cloud Patterns,"** by V.J. Oliver and M.B. Oliver, pp. 621-629.

"In a memorial to Harry Wexler it is appropriate to include a discussion of the patterns formed by convective cloud cells because although Wexler wrote a number of papers on the organization of large-scale circulation of the atmosphere, he was also concerned with whether individual convection cells are randomly spaced or whether they, too, are organized into patterns. It was his conviction that they must be organized, as a result of the interaction of physical processes and the terrain; and if they are organized, it seems reasonable that they should be predictable, once the physical basis of the patterns is discovered. Moreover, organized clouds should indicate the presence of mesoscale horizontal atmospheric eddies. Wexler was interested in determining how such eddies add or subtract meteorological properties (such as angular momentum or kinetic energy) to the general circulation. Two of us among the many who leaned heavily on Wexler's advice and enthusiastic encouragement would like to present here as a tribute to him the results of our examination of cloud patterns which we undertook during the summer of 1961." P.621.

"To summarize, we have found the clouds in patterns, as Wexler thought we would; but to forecast cloud patterns, their development, and motion, we need to understand more about atmospheric energy sources, sinks, transports, and exchanges, and more about how the upper flow and surface phenomena organize clouds into patterns. For comprehensive cloud and weather prediction, we eagerly await the fruition of Wexler's 'World Weather Watch', regular observations from the whole globe at all levels, spot reports from unmanned sea stations, ships, surface land stations, upper-air sondes, radar, and planes, tied together into one cohesive picture by data from satellites." P. 629.

In: **"Picture of the Month,"** by L. F. Hubert, pp. 633-634.

"The Monthly Weather Review series "Picture of the Month" is continued here as a contribution in memory of Dr. Harry Wexler. The picture chosen for this issue is

particularly appropriate. It displays the sort of unsolved problem that always stimulated Dr. Wexler - the problem of air-sea interaction and the endless complications of atmospheric hydrodynamics." P.633.

"Everyone who knew Dr. Wexler can appreciate how this problem would have whetted the appetite of his inquiring mind. I would like to point out that, in a way, he has bequeathed this fascinating puzzle to us, because we have been able to recognize it and to define its extent only with the meteorological satellite, an advancement so vigorously sponsored by him." P. 634.

In: **"The Temporal and Spatial Variations in the Planetary-Scale Outgoing Long-Wave Radiation as Derived from TIROS II Measurements"**, by Jay S. Winston and P. Krishna Rao, pp. 641-657.

"One of Dr. Harry Wexler's major interests in meteorology was in the atmospheric heat sources and their relation to the general circulation. In his strong advocacy of meteorological satellites in the mid-1950's he foresaw the possibilities of measuring time variations in the radiative energy supply received by the earth-atmosphere system to see how they were related to changes in the planetary flow patterns over a broad spectrum of time periods ranging from days to many years. He was hopeful that satellite data would reveal connections between heating in equatorial regions and circulation changes in temperate latitudes of both hemispheres and that they would also reveal more about interactions between the circulation regimes in the two hemispheres.... It is clear that we are now on the threshold of many broad-scale investigations of the relationships between the heat budget as measured by satellites and the general circulation. To a great extent the stimulation of research in this area stemmed from Wexler's enthusiastic conviction that meteorological satellite data would provide new answers to some very fundamental questions about the behavior of the circulation of planet Earth." P. 641.

In: **"Average Annual Solar Radiation Per Day over Northern North America,"** by Torrence H. MacDonald, p. 658.

"Early in 1946, Dr. Harry Wexler appointed Sigmund Fritz as the supervisor of a solar radiation and upper air research unit at the Weather Bureau Central Office. Early planning by Dr. Wexler and S. Fritz resulted, among other benefits, in a great increase in the number of solar radiation measuring stations in the United States. In July of 1962 there were about 85 such stations - more than twice as many as in 1946 when expansion began. It seems appropriate that the Wexler Memorial Contributions should contain a condensation of the data produced by the solar radiation network with which Dr. Wexler was so intimately associated." P. 658.

In: **"A Discussion of Indirect Sounding Methods with Special Reference to the Deduction of Vertical Ozone Distribution from Light Scattering Measurements,"** by S. Twomey and H. B. Howell, p. 659.

"Primarily at the behest of Dr. Harry Wexler, one of the writers embarked a couple of years ago on an investigation which, it was hoped, would produce a new and superior method for deducing the vertical distribution of ozone from purely ground-based passive measurements.

"The results up to now have shown that the projected methods, while comparable and potentially superior to existing ground-based passive methods, can never produce detailed distributions with the resolution of fine scale structure of which direct (balloon-borne, for example) sounding is capable." P. 659.

In: **"Mauna Loa Observatory: The First Five Years,"** by Saul Price and Jack C. Pales. Pp. 665-667.

"It seems especially appropriate that a collection of papers dedicated to Dr. Harry Wexler should include this account of an enterprise so intimately associated with him..." P. 665.

"The Observatory staff reported directly to Dr. Wexler; and although MLO [Mauna Loa Observatory] was but one of his many responsibilities as Director of Meteorological Research, he gave it always a special measure of his interest and attention, and helped see to its continued existence. He visited the Observatory often, for Honolulu was a way station between Washington and the many destinations to which his activities took him; and he seldom failed, despite the press of other business, to leave time for the flight to Hilo and the drive to MLO. He took intense pleasure in the ecology of the lush rain forest, and found in the bizarre landscape of the upper mountain, on which the Observatory was the only reminder of the world below, renewed confidence in the promise of so remote yet accessible site.

"As he foresaw, the years have brought a wide and increasing use of MLO's facilities and data and a growing awareness of its potentialities..." P. 666-667.

In: **"Evidence of Geographical Differences in Ice Nuclei Concentrations,"** by Dwight B. Kline, pp. 681 -686.

"... The investigation was undertaken with the encouragement of the late Dr. Harry Wexler who was especially instrumental in fostering use of the facilities at Mauna Loa Observatory..." P. 686.

In: **"An Analysis of Hurricane Cleo (1958) Based on Data from Research Reconnaissance Aircraft,"** by N. E. La Seur and H. F. Hawkins, pp. 694-709.

"On September 14, 1944, a little more than one year after the first aircraft flight into a hurricane, Dr. Harry Wexler (then a Major in the Army Air Corps) participated in what may be called the first research reconnaissance flight into a hurricane. In his published account of the mission, which describes the data collected (largely visual observations and qualitative physical impressions) and gives his interpretation of their significance in terms of hurricane structure, Wexler arrived at a conclusion which was truly prophetic: "One is led to the conclusion that the major portion of this hurricane cloud was caused by a strong but narrow area of ascending air near the center of the storm and that outside this area, descending air was found."

"This result was partly fortuitous since the penetration was made in the left-rear quadrant of a mature hurricane which was accelerating northeastward after recurvature, the very circumstances under which this type of structure is most easily perceived from qualitative observations. Wexler was quite aware that conditions observed on one particular flight might not be representative of all sectors of all hurricanes at every stage in their life cycle, but he must be credited with the courage to present the interpretation suggested by these meager data even though it was completely at variance with the accepted models of that time."

In: **"A Note on Vertical Motions in the Region of the Antarctic Circumpolar Current,"** by Feodor Ostapoff, pp. 727-729.

"Many discussions on the nature of the Antarctic Polar Front (Antarctic Convergence) with Dr. Wexler, in connection with his work, stimulated the author's interest in these problems. Generally, it is agreed that relatively strong vertical motions exist in the region of the Antarctic Circumpolar Current..." P. 727.

In: **"The Weather and Circulation of July, August, and September 1963..."**, by James F. O'Connor, pp. 737-748.

"Dr. Harry Wexler's interest in large-scale circulation and weather anomalies was well known. He was instrumental in initiating this series of articles in January 1950. Despite his numerous responsibilities, he often expressed interest, made comments and suggestions, and relied on these articles for briefing and reference to past events.

"In tribute to Dr. Wexler's foresight in many areas of atmospheric science, especially in the exploitation of electronic computers, most of the illustrations in his article were computed and drawn by machine, as is true of many charts routinely prepared at the National Meteorological Center..." P. 737.

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Last Updated: June 8, 2006 9:24 AM

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