and the atmosphere is a frontier which we shall attack on an increasing scale and with increasing reward in the immediate future.

Why is this so? The need has always existed, but the opportunities did not. A possibly oversimplified answer is that the scale of natural phenomena—the size of the earth, the inaccessibility of the interior of the earth and the depth of the oceans—have made it difficult for the small scale investigator, no matter how brilliant, to gain an understanding of the large-scale phenomena with which we are coping. We have had to await the development of other sciences and new technologies which make it possible to consider the entire globe as our observational system. The time now seems ripe to move ahead. Computers which can assemble tens of thousands of bits of information from all over the world, measuring apparatus which can be operated automatically in remote places, the availability of satellites both to measure and to transmit data from other sources, all make it possible to look forward over the years to a world weather system which will have the entire globe as its laboratory. We might then understand the atmosphere sufficiently well to predict its future course for weeks and eventually to control its actions.

I won't follow up this dream or many others that occur to all of us. Let me just say that the day of the earth, atmospheric and oceanographic sciences is here. It is plain that we will move ahead rapidly and that as our knowledge and understanding expand so will our ability to use and to control the resources of this earth on a new scale, when we will redesign the water supplies of continents, modify the weather on a global scale and put the seas to work.

news and notes

NAS-NRC Committee on Pollution

A National Academy of Sciences-National Research Council committee on pollution is conducting a comprehensive study of the nature and behavior of land, air, and water pollutants, the physical and social problems they create, and alternative solutions to the problems.

The committee was appointed by NAS President Seitz following endorsement by the Federal Council on Science and Technology in April 1964 of an earlier recommendation by the NAS-NRC Committee on Natural Resources for a broad study of pollution. This committee had reported that man's use of natural resources produced wastes that have "deleterious and costly effects on both man and his environment." Key problems were identified as pollution due to by-products of combustion, industrial wastes, agricultural chemicals, and inefficient processing of sewage.

Under the chairmanship of Dean Athelstan F. Spilhaus of the University of Minnesota, the Committee on Pollution hopes to gain some insight into these problems by trying to delineate the phenomena and characterize the sources, magnitude, and migrations of pollutants, and the capacity of the land, sea, and water to receive and dispose of them.

It is also studying current remedies and the potential of new technology, as well as the administration and cost factors in pollution control. The group plans not only to assess the impact of pollution and indicate the disciplines important to solution of the problems, but also to provide a guide to the information that public groups need to estimate the benefits and costs of various remedies.

The committee is attempting to build a methodological framework upon which specific design studies of pollution in any area can be based; it is not devising particular remedies for individual localities. However, the study is focusing to some extent on a single densely populated region, the Delaware River estuary, because it furnishes an actual case history for which many data are available.

Members of the committee, besides Dr. Spilhaus, are: Dayton E. Carritt, MIT; Allen V. Kneese, Resources for the Future, Inc.; Howard O. McMahon, Arthur D. Little, Inc.; Sumner T. Pike; Timothy E. Shea; Benjamin H. Stevens, University of Pennsylvania; and Abel Wolman, Johns Hopkins University.

The six panels of the committee with their chairmen are:


A report is planned for autumn 1965.

(More news and notes on page 447)
very weak echo, and is associated with the same winds which persist until the time of the fourth picture. On the other hand, the precipitation in the fifth picture models heavy precipitation and a strong radar echo, with strong echo gradients; however, in this model, this stage of development is associated with absence of wind. In the real atmosphere, one might argue, the precipitation in picture 5 might be associated with downdrafts. It is obvious, at any rate, that in the infinitely complicated real atmosphere the development of precipitation content and radar echo are related by time-dependent processes to the wind field, and that observations of instantaneous collocated echo and wind parameters should be expected to show considerable scatter.

4. Statistical relationships between echoes and turbulence

Although it seems that winds and turbulence cannot be mapped in accurate detail in terms of instantaneous radar reflectivity parameters, theory and experience indicate the existence of important statistical associations. Thus, severe turbulence occurs more often in strong echoes with strong echo gradients than in horizontally uniform echoes. And it is plausible that an atmospheric volume containing condensable water and convective air circulations with characteristic sizes, shapes, durations, intensities, and turbulence, is associated with a radar-echo field of correlative statistical properties. It is to the organization of knowledge of these suspected relationships that a significant part of the NSSL program is directed.

Fig. 5 shows the radar signature of a squall line, representative of the severe weather which poses serious problems to safe, on-schedule traffic. Such radar data is being digitized at NSSL and analyzed by computer programs (Kessler and Russo, 1963a, b) to determine objectively the average echo intensity and intensity variance, the tendency to pattern bandedness and the orientation of bands, and the characteristic length, development rate, and motion of pattern elements. These data, combined with turbulence information recorded during flights of research aircraft through the echo areas, and with the radar observations along the aircraft path, should provide improved bases for rational estimation of the economic and human factors associated with flight through particular identifiable weather situations, and for operational decisions which incorporate these factors.

References


(Continued from news and notes, page 442)

Additions to staff at University of Miami

Three new appointments to the staff of the Institute of Atmospheric Science of the University of Miami's School of Environmental and Planetary Sciences were announced in June by Dean S. Fred Singer. The three scientists are: Dr. Mariano Estoque, who will hold the rank of professor of atmospheric science; Dr. Kuldip P. Chopra, associate professor; and Dr. Luis M. Herrera-Cantilo, research scientist.

Dr. Estoque has spent the past year at the University as a SEPS visiting professor and visiting research scientist at the Weather Bureau's National Hurricane Research Laboratory. He will rejoin the University of Hawaii faculty, where he is chairman of the Department of Meteorology, for the coming academic year and assume his permanent appointment at the University of Miami in June 1966. Dr. Chopra, an atmospheric physicist, joined the SEPS faculty in July. A native of India, he was most recently head of the space physics laboratory of Melpar Research, Inc., in Virginia. He has also taught and conducted research at the University of Maryland, University of Southern California, and the Polytechnic Institute of Brooklyn.

Dr. Herrera-Cantilo, who began his duties at Miami in August, was formerly on the faculty of the University of Buenos Aires. He is a specialist in radar meteorology.

(For news and notes on page 477)
This test assumes that the farthest spectators will be not more than 6 to 7 times the projection screen width from the screen.

As for 2 X 2's or other visual aids—The principles outlined apply as well to 2 X 2-inch slides and other sizes. However, if you plan to use other than 3\(\frac{1}{4}\) X 4-inch slides, make sure that adequate, professional-type projection equipment will be on hand. Also, remember that the 3:4 projection screen ordinarily available will probably not accommodate square slides, such as 2 X 2-inch, with the longer dimension of the standard mask opening arranged vertically.

---

The system described should assure you of a superior set of slides. All that remains to make them truly successful visual aids is for you to use them skillfully. If you succeed, your story is sure to reach a receptive audience.

---

Fig. 16. Full-size standard 3-1/4 by 4-inch slide prepared by recommended procedures.

---

(Continued from news and notes, page 447)

Brazil joins sounding rocket program

Brazil is the latest country to join with the United States in a cooperative scientific sounding rocket program. The purpose of the agreement, announced in May by the National Aeronautics and Space Administration (NASA) and the Brazilian Space Commission (CNAE), is to investigate the lower regions of the ionosphere with emphasis on the effects of cosmic rays in this area.

Under the agreement CNAE will provide the launching range at Natal and launch two rockets provided by NASA. Brazilian engineers and technicians are receiving training related to the experiments at the Wallops Island facilities and at NASA’s Goddard Space Flight Center, where the Brazilians will construct the scientific payloads. CNAE and NASA will cooperate in providing the necessary ground support equipment. In addition NASA will launch one sounding rocket from Wallops Island in a complementary experiment.

Both Brazilian and United States investigators will participate in the analysis of data and publication of results, which will be made available to the world scientific community.

(More news and notes on page 516)
5th Berkeley Statistics and Probability Symposium

The American Meteorological Society will cosponsor the Weather Modification Section of the Fifth Berkeley Symposium on Mathematical Statistics and Probability to be held during the last week of December 1965 in Berkeley, Calif., as part of the Annual Meeting of the AAAS. It is anticipated that internationally known scientists will report on major experiments either already performed or in progress.

The Weather Modification Section is intended to summarize the experience gained over two decades of experimentation with particular reference to precipitation. Summaries of advances in methodology of design and evaluation of the experiments and also of substantive results are expected. It is planned that papers presented will appear in a separate volume of Proceedings, which will serve as a compendium of the state-of-the-art in this particular field.

Further particulars may be obtained from Dr. J. Neyman, Dept. of Statistics, Statistical Laboratory, Univ. of Calif., Berkeley, Calif. 94720.

7th Conference on Agricultural Meteorology

On 30, 31 August and 1 September 1966 the Seventh Conference on Agricultural Meteorology of the American Meteorological Society will be held at Rutgers University, New Brunswick, N. J., in close cooperation with the International Society of Biometeorology. The latter organization is organizing the Fourth International Biometeorological Congress at Rutgers University, 26 August to 2 September 1966. The program of the Agricultural Meteorological Conference is being arranged with minimum conflict with the Biometeorological Congress. This will permit participants in the Agricultural Meteorological Conference, who wish, to register for and attend the I.S.B. Congress.

Co-Chairmen of the Agricultural Meteorological Conference are Paul E. Waggoner, The Connecticut Agricultural Experiment Station, Box 1106, New Haven, Conn., representing the American Meteorological Society and George W. Robertson, Plant Research Institute, Dept. of Agriculture, Ottawa, Canada.

The Chairmen would welcome volunteer contributions for this scientific Conference and suggestions for program topics.

AIAA 3rd Aerospace Sciences Meeting

The American Institute for Aeronautics and Astronautics will hold its third Aerospace Sciences Meeting on 24-26 January 1966 at the Statler-Hilton Hotel, New York, N. Y. Included in the sessions for which papers are invited is a session on Atmospheric Environment organized by E. Brewster Buxton, Senior Staff Meteorologist, United Aircraft Corporate Systems Center, Farmington, Conn.

Acceptance of papers will be based on extended abstracts of about 1000 words, in duplicate, and which should include graphical presentations of significant results and conclusions. Acceptance is contingent on receipt of manuscripts for pre-printing by 1 December 1965. Abstracts must be received by the session organizer by 1 September 1965.

Meetings of interest

10-15 October: 1965 Congress of the International Federation for Documentation, Sheraton-Park Hotel, Washington, D. C., sponsored by the National Academy of Sciences-National Research Council and the American Documentation Institute. Registration is open to all interested in documentation and information science; registration fee is $35. The main subjects to be treated are: Education and training of documentalists; Organization of information for documentation; Information needs of science and technology; Information needs of society; Principles of documentation and systems design. Write to: 1965 FID Congress, 9650 Wisconsin Ave., Washington, D. C. 20004.

30 Nov.-2 Dec.: American Federation of Information Processing Societies’ Fall Joint Computer Congress will be held at Las Vegas Convention Center, Las Vegas, Nev. The conference scope will include state-of-the-art surveys and original R&D reports in the areas of hardware and software, design, selection, installation, and management of information processing. Further details from: AFIPS Headquarters, 211 East 43rd St., New York, N. Y.

IGY World Weather Maps available

The United States Weather Bureau announces the publication of the December 1958 issue of the IGY World Weather Maps, Part I, Northern Hemisphere Sea Level and 500 Millibar Charts. The Northern Hemisphere portion of the IGY World Weather Maps series is now completed. The Tropical Region portion, which is being prepared by the Federal Republic of Germany, and the Southern Hemisphere portion, which the Republic of South Africa is producing, are both well along with several issues of each available. The Northern Hemisphere series, July 1957 through December 1958, may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, at a cost of $2.75 per monthly issue.

(Continued from news and notes, page 477)

TIROS X satellite at work

The TIROS X weather satellite, launched from Cape Kennedy on 1 July, was reported in a nearly perfect sun-synchronous orbit, the best yet achieved in the weather satellite series, according to officials at NASA’s Goddard Space Flight Center.

“The orbit is almost perfect for space photography,” said Robert Rados, TIROS project manager at Goddard. “We were shooting for an equator crossing time of 10:45 (local) and we were only one minute off.”

In its sun-synchronous near-polar orbit, TIROS X drifts westward about one degree a day—the same rate and direction as the earth moves around the sun. This provides maximum lighting for photography and is ideal for keeping the spacecraft’s batteries fully charged and its temperature at the desired level. The orbit has an apogee of 517 statute miles and a perigee of 458 statute miles above the earth. The satellite completes an orbit every 100.6 minutes and crosses the equator at a rate of 81.4 degrees. It is programmed to photograph the hurricane-breeding area north and south of the equator.