Preface

The symposium on Statistical Models and Turbulence was partially sponsored by the Institute for the Application of Statistics in the Physical Sciences. The organization of such a symposium was motivated in part by J. Neyman, then president of the IASPS, as one of a set of meetings accompanying the meeting of the International Statistical Institute in Washington, D.C. in 1971. The symposium was supported by the National Science Foundation through grant GP 27337 and the Office of Naval Research through contract N00014-71-C-0104 Task No. NR 042-268 and Task Order N00014-69-A-0200-6016 in the Mathematics Department of the University of California, San Diego, with M. Rosenblatt as principal investigator. The meeting could not have been held without support from these grants. The organizing committee consisted of

J. Lumley

M. Rosenblatt, Chairman

C. Van Atta

A. Yaglom

The object of the symposium was to provide a milieu in which people with a background in statistics, probability theory or fluid mechanics and an interest in the problem of turbulence would present and discuss results and ideas of current relevance. The meeting was held at UCSD in La Jolla from July 15th through Wednesday July 21st, 1971. The list of lectures presented is given below.

Thursday July 15

J. Lumley, Pennsylvania State University,
"Application of central limit theorems to turbulence problems"

M. Rosenblatt, University of California, San Diego
"Probability limit theorems and some questions in fluid mechanics"

Friday July 16

J. Dutton, Pennsylvania State University
"Some observed characteristics of atmospheric turbulence"

B. Mandelbrot, Watson Research Center, IBM
"Intermittent and sporadic turbulence: generative stochastic models"

C. Van Atta, University of California, San Diego
"Statistical selfsimilarity and inertial subrange turbulence"

E. J. Hannan, Australian National University
"Spectra changing over narrow bands"

E. Parzen, State University of New York, Buffalo
"Some recent advances in time series analysis"

Saturday July 17

D. Ruelle, Institut des Hautes Etudes Scientifiques
"Strange attractors as a mathematical explanation of turbulence"

K. Case, Rockefeller University
"Burger's equation: generalizations and solutions"

W. Munk, University of California, San Diego
"Turbulence in a stratified ocean"

E. Lorenz, Massachusetts Institute of Technology
"Investigating the predictability of turbulent motion"

W. Meecham, University of California, Los Angeles
"Use of Cameron-Martin-Wiener representations for nonlinear random process applications"

Sunday July 18

S. Corrsin, Johns Hopkins University
"Some random geometry problems suggested by turbulent flows"

W. B. Thompson, University of California, San Diego
"The statistical mechanics of the guiding center plasma"

Monday July 19

R. H. Kraichnan
"Comparison of some approximations for isotropic turbulence"

S. Orszag, Massachusetts Institute of Technology
"Numerical simulation of turbulence"

G. S. Deem, Bell Telephone Labs, IBM
"Numerical simulation of 2D incompressible Navier-Stokes and magnetohydrodynamic turbulence (comparisons and insights via movies)"

C. H. Gibson, University of California, San Diego
"Observations of the variability of the dissipation rate of turbulent fields"

F. Frenkiel and P. Klebanoff, Naval Ship Research and Development Center, and National Bureau of Standards
"Probability distribution of turbulent fields"

J. Wyngaard, Air Force Cambridge Research Laboratories
"Some measurements of the fine structure of large Reynolds number turbulence"

Tuesday July 20

J. M. Burgers, University of Maryland
"Statistical problems connected with asymptotic solutions of the one-dimensional nonlinear diffusion equation"

M. Kac, Rockefeller University
"Singular perturbation in some problems of statistical mechanics"

L. S. G. Kovasznay, Johns Hopkins University
"A simple statistical model for turbulence shear flows"

F. Busse, University of California, Los Angeles
"The bounding theory of turbulence and its physical significance in the case of turbulent couette flow"

W. J. Cocke, University of Arizona
"Non-analytic character of the shear-tensor distribution function in incompressible turbulence"

H. K. Moffatt, University of Cambridge
"Dynamo instability and feedback in a stochastically driven system"

Wednesday July 21

G. Kallianpur, University of Minnesota
"Homogeneous chaos expansions"

T. S. Lundgren, University of Minnesota
"A closure hypothesis for the hierarchy of equations for turbulent probability distribution functions"

Thanks are due to D. Coles, S. Corrsin, C. Eckart, R. Getoor, J. Herring, C. Leith, P. Lewis, J. Miles, P. Saffman, T. C. Sun and W. Thompson who chaired Sessions of the meeting. Roy H. Pearce and Paul Saltman spoke for the University of California and William H. Pell for the National Science Foundation in welcoming the meeting. We are especially indebted to Lillian C. Johnson and Elaine Morici who helped solve the many small problems that arose during the meeting.

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