growth of microorganisms. For this reason the book will be of interest to a great number of people working in these widely
diverse fields. The papers not only include many cases new information
herefore unpublished, but also, excellent reviews that can bring an unfamiliar reader immediately up to date in each of
several fields. About one-fourth of the book is concerned with
various aspects of manganese nutrition and methods of deter-
munity in soils. Of course, the book cannot cover the aspects of
trace elements in the three fields as outlined. However, the
emphasis is such that a majority of the trace elements were
considered and with the excellent literature reviews, the book
should be excellent for reference purposes in a number of
fields for a long time to come.

The papers in the symposium make it obvious that a great
deal more work on the subject is required. The book that did
go a long way in stimulating research on trace elements as well
as becoming a valuable reference.
The summary of Dr. Elvehjem emphasized, as did many of
the papers, the importance of fundamental research of trace
elements in the search for solutions to many practical agricul-
tural problems. Applications of results to the practical field
problems have been, in the past, very important and spectacu-
lar and the knowledge of trace element deficiency for cattle
has led to correction easily and cheaply. As is pointed out in
the book, we still seem to have barely scratched the surface
in reaching an understanding of how and why the cures have
worked.
The wide diversity of topics, the variation in styles of the
authors, and the great amount of information presented make
the book easily available and a very valuable source of informa-
tion.—K. C. Bensem, University of Wisconsin, Madison.

ADVANCES IN AGRONOMY, Volume X
Edited by A. G. Norman, Academic Press, Inc. 111 Fifth Ave.,

This is the tenth volume in this series prepared under the
auspices of the American Society of Agronomy—all of them
with the able editorial direction of A. G. Norman of the Un-
iversity of Michigan. Dr. Norman notes in the preface that 20
topics have been dealt with in the 10 volumes with little
repetition or overlapping, but always with the central theme of
soil-crop relationships. Quoting from the preface to Volume
I, Dr. Norman states that "the editors' definition of what con-
stitutes agronomy is catholic; they will be guided in their
choice more by what information may be of use to agriculturists
than by what constitutes agriculture."

This latest issue continues the policy of including material
on regional agriculture with a chapter covering agronomic
trends and problems in the Great Plains. The contributions of
six soils have been coordinated as follows: the following
topics: field crops, by E. G. Heyne; pasture and range crops, by
J. R. Harlan; soil moisture conservation, by J. A. Brown; soil
fertility problems, by H. F. Briggs; irrigation, by H. R. Haise;
and wind erosion by W. S. Story.

Another feature of the series has been articles in the general
field of soil classification and morphology, as well as contribu-
tions from other countries. A chapter on Australian soils and
their responses to fertilizers, by C. G. Stephens and C. M.
Donald, continues this practice. In addition to soil classifica-
tion, the authors discuss crop response to major and minor
nutrient elements.

Space limitations permit only brief mention of the other
chapters and authors, but this reviewer finds all of them con-
cise, well-written, up-to-date reviews of topics with wide
interest.

Soil scientists will be particularly interested in the chapters
on changing concepts of plant nutrient behavior and fertilizer
use by W. A. Warner, L. Nelson and George Stanford: reactions of
ammonia in soils, by M. M. Mortland; new grasses and legumes
for soil and water conservation, by A. L. Hafnerrichter: the
role of sulfur in soil fertility, by H. V. Jordan and L. F. Ens-
mire for an expanded discussion of soil productivity, by G. H.
Dungan, A. L. Lang and J. W. Pendleton, and liming, by N. T.
Coleman, E. J. Kamprath and S. B. Weed.

Crop scientists will be interested in the chapters on race
156 wheat—what it means, by C. C. Stakman and H. A. Rodenhizer:
castorbeans—a new oil crop for mechanized production, by L. H.
Zimmerman; and safe: control by J. E. Reeser.

The useful practice of listing an author index for the host
of references cited is continued. This volume is well over 100
pages larger than any of the previous numbers, which prob-
ably accounts for the relatively high price.

As agronomic knowledge continues to expand and individual
agronomists tend more and more to specialize, the review type
articles published in this Advances series serve as an increasingly
important role in keeping all agronomists informed of progress
in fields of activity other than their own. This is a role which
cannot be easily served by the periodical technical journals.

The fact that authors who already have added the Advances
to their reference shelf will not be disappointed in this latest
number. Any agronomist not acquainted with the Advances
will find Volume X an excellent issue to start with.—R. C.
Dinauer.

MENTION

Agricultural Drought in New England
By R. S. Palmer, Tech. Bull. 97, Agr. Exp. Sta., University of
New Hampshire, Durham, in cooperation with the SWCRD,

This is a contribution to the Northeast Regional Technical
Committee NF-22, Soil-Water-Plant Relationships. The author,
an agricultural engineer, states that the purpose of this publica-
tion is to present data which should prove useful in evalu-
afruction; the need for irrigation in New England. The Blaney-
Criddle formula was used to determine the seasonal soil
moisture needs of crops at 15 locations in the region. Crop
moisture needs were correlated with the effective seasonal rain,
to determine the seasonal soil moisture deficit. The
material is presented in graphic form for use by technical
persons concerned with the design of irrigation systems, or with
advising farmers on the feasibility of using irrigation.

Certain Properties of Selected Southeastern United States
Soils and Mineralogical Procedures for Their Study
Southern Cooperative Series Bull. 61. Report of Cooperative
1959.

This is a progress report of the S-14 technical committee.
The master project title for S-14 is "The Influence of Chemical,
Physical and Mineralogical Properties of Soils on Their
Structure and on Plant Growth." This bulletin is a cooperative
effort of the agricultural experiment stations of Alabama, Arkansas,
Florida, Georgia, Kentucky, Louisiana, Mississippi, North and
South Carolina, Oklahoma, Puerto Rico, Tennessee, Texas and
Virginia, and the SCS and SWCRD, USDA.

Chemical, physical and mineralogical data are reported for
at least three profiles of each of the following soil series: Ap-
pling, Cecil, Davidson, Grenville, Houston, Lake-
land, Norfork, Ruston and Sharkey. Major differences in these
data are discussed by physiographic regions. Thirteen
points out that problems in soil classification, pedogenesis, soil
fertility evaluation, and methodology to be used in the separa-
tion and identification of clay minerals have been aided by data
found in this project. A wealth of analysis and the mineralologi-
cal methods used are presented in detail in the final section of
the bulletin.

The review editors for this bulletin were C. I. Rich, L. F.
Scatze and C. W. Kunze. Requests for the bulletin from outside
the cooperating states should be addressed to the Virginia
Agricultural Experiment Station at Blacksburg.

Research Studies of Methods for Increasing
Soil Trafficability
By A. G. Pickett and M. M. Lemcoe, Southwest Research Inst.,

The research reported in this publication was sponsored by
the Geophysics Research Directorate of the Air Force Cam-
bridge Research Center at Bedford, Mass. Its purpose was to
make a basic study of clay tops soils in order to establish means
for controlling the parameters which cause variation in shear
strength of such soils. A part of such studies was for research on
water film strength, chemical bonding, and relation of orienta-
tion of the clay particles to shear strength. The research group
calls for study of clay bonding mechanisms by radiofrequency
spectroscopy and the direct study of alteration of crystal structure and fabric by environmental
control, study of bacteriological effects on soil trafficability, de-
velopment of special-purpose turf, and statistical study of a
means of forecasting trafficability. Soil physicists, mineralogists,
and chemists will be interested in this publication.