a limiting value calculated to be about $38.67 \times 10^{15} \text{ V m}^{-1}$, at which the properties of space are changed. There are regions of finite dimensions in which the divergence of the electric field is not zero but has the integrated values $+q$ and $-q$ ($q = 1.6 \times 10^{-19}$ coulombs). It is in such divergent zones that photons are produced. From these assumptions and with the aid of Maxwell's equations, and the Lorentz transformations used simply as a mathematical operator, but without using the relativity principles, the author derives the fundamental equations of quantum mechanics, wave mechanics and gravitational fields. He thus obtains the same results as existing theories but gives a clearer physical picture of the phenomena, including models of the photon and electron. The theory also leads to some new results. The velocity of light and Planck's constant are not universal constants but limiting values of more fundamental quantities which depend on the material matter in the medium. For example, the velocity of light has the limiting value c in intersidereal space but a value 0.1 m s^{-1} less than this at the surface of the Earth.

A transverse electromagnetic field is accompanied by a gravitational field and there is a simple relationship between gravitational potential and the velocity of light.

The book is clearly written and is mainly descriptive in character, the author's aim being to make it readable and comprehensible to both experimental and theoretical scientists. It would have been improved by the addition of an index and a list of symbols.

L. ESSEN

Amines in Neurones

6-Hydroxydopamine and Catecholamine Neurones. Edited by T. Malmfors and H. Thoenen. Pp. 368. (North Holland: Amsterdam and London; Elsevier: New York, July 1971.) \$22.50.

COMPOUNDS with novel properties crop up all too often in the pharmacological literature, only to disappear from view with great rapidity. A welcome exception is that interesting isomer of noradrenaline, 6-hydroxydopamine. The compound has now been the subject of an exclusive symposium drawing together much of the knowledge accumulated over the period of about eight years since it was first studied, and extending it with hitherto unpublished information.

Interest was aroused when it was discovered that 6-hydroxydopamine could induce a depletion of the noradrenaline content of the mouse heart which lasted up to 30 days. This depletion was not due, at least after the first hour, to

replacement of the neuronal noradrenaline by 6-hydroxydopamine and no direct relation between amine depletion and loss of adrenergic function could be seen. Rather later the dramatic demonstration by electron microscopy that 6-hydroxydopamine caused severe morphological damage to the peripheral adrenergic nerves indicated that the drug had a unique type of action. Following injection, it could cause a long lasting sympathectomy and could really be described as a "pharmacological tool".

This intriguing possibility stimulated research into both the mode of action of 6-hydroxydopamine itself and into the action of other drugs in animals sympathectomized by pretreatment with 6-hydroxydopamine. As a result the printed output of these investigations snowballed and culminated in this present symposium with many of the major investigators brought together under one roof.

The result is a beautifully produced volume, excellently presented but, of course, at a high cost. It succeeds reasonably well in its aims, stated in the foreword, to publish new data and not just to provide a second airing for results already published. Discussion has been carefully edited down to practical dimensions by the chairmen of the various sessions and in consequence contributes rather more to the book than is often the case. There are fairly frequent typographical and other errors scattered around, but not enough to detract significantly from the overall quality. But sometimes, as a result, it is really hard to puzzle out the author's meaning. This is part of the price one must pay for a rapid publication and the international character of the gathering.

The remarkable biochemical and morphological changes produced by this drug are explored in some depth and with some duplication by the contributors. The local injection of 6-hydroxydopamine into the brain to interfere with the catecholamine containing neurones is well described. The compound, once concentrated within the neurones by their normal catecholamine uptake systems, leads to destruction of their transmitter store and functional integrity. These changes can be shown by electron microscopy and by the formaldehyde induced fluorescence technique. Even the nerve fibres themselves, which do not readily fluoresce with formaldehyde, can be revealed by the accumulation of transmitter immediately above the 6-hydroxydopamine induced lesion.

Functional studies following the production of these central lesions are not ignored, nor also are the effects of the drug on the peripheral adrenergic nervous system. It does come as a surprise, however, to find an occasional paper that

does not use the rat, and, in particular, that useful animal the chick makes an appearance.

This book is a commendable effort on the part of both contributors and editors. It is an excellent source of information and should maintain its usefulness for another year or so.

B. A. CALLINGHAM

Bilingual Bones

Atlas of Animal Bones for Prehistorians, Archeologists and Quaternary Geologists/Knochenatlas für Prähistoriker, Archäologen und Quatärgeologen. Drawings by Otto Garraux. Pp. vii+159. (Elsevier: Amsterdam, London and New York, 1972.) Dfl.90; \$28.25.

THIS bilingual (English and German) atlas, by a well-known practitioner, has a strictly limited aim—to provide, for archaeological students and excavators, illustrations of the most representative animal and human bones commonly found on excavations. One might criticize the English version in point of occasional linguistic oddity, but it is always perfectly intelligible.

Seven short introductory sections and a bibliography explain why one should preserve bones from archaeological sites, how they should be treated, how to build up a collection of comparative material and the kinds of cultural and historical results that may be obtained by their study. There is a classification of living mammals and a list of technical terms.

The illustrations do not pretend to be complete, but are confined to the principal bones, teeth, horns and antlers of horse, ox, red deer, sheep, pig, wolf, bear, beaver, hare and man—the chief domestic species and those usually hunted for food or fur, as well as being representative members of their orders. In this way, they should enable some opinion to be formed, even by non-osteologists, of the likely nature of remains belonging to species not illustrated. The wolf, for example, stands for the digitigrade carnivores, so that even members of other families should be approximately identifiable by their general resemblances.

The plates point out, in brief notes appended, some characteristic differences between the corresponding parts of the species referred to, so that even fairly fragmentary material ought to be readily recognizable.

Within its chosen limits, this book fills a decided gap in the literature available to workers in the field, and may confidently be recommended to them. The drawings are splendidly simple and clear, the text brief and much to the point and the production of high quality. Author, illustrator and publisher are all to be congratulated.

I. W. CORNWALL