taneity at different places is a notion of which we do not have immediate awareness. We require some convention or agreement before we can say whether distantly separated events are simultaneous or not. In following up this idea one cannot avoid an intimate association of space and time. A realization of this brings him towards one of the fundamental notions of the theory of relativity, namely, that measured space and time are so intimately connected and entangled that we can not deal with either apart from the other. We are forced to think of space and time as indissolubly conjoined into a four-dimensional continuum of space-and-time. This intimate junction of two things previously separated, a junction necessary at least in the measurements of physics, is one of the basic conceptions on which the whole theory of relativity rests. In his first lecture Einstein shows how this comes about and gives something of the mathematical means by which this conjoined space-and-time is to be investigated.

The second lecture is devoted to the milder form of the theory of relativity as Einstein presented it in 1905. This special relativity can be treated without any very complicated mathematical machinery, though even here a full understanding of its detailed development is impossible without considerable mathematics. Einstein here develops the main part of this theory in intimate connection with the various general ideas to which it is related. The exposition is suited to the needs of a serious student of the subject who has already acquired some of the simpler ideas.

Now this special relativity is not comprehensive enough to embrace the phenomena of nature beyond a certain rather narrow range. A more general theory is necessary to bring about agreement with cosmic phenomena. Einstein's construction of this more general theory was set forth in a memoir of 1915. The third and fourth lectures of the present volume are devoted to an exposition of that more general theory. An attempt is made to show the nature of its details and to explain its connections with the famous phenomena of astronomy which have afforded so remarkable a verification of the theory. Full details can not be given in so short an exposition. But the author can and does succeed in making clear the general ideas and in setting before the reader the spirit and trend of the argument and in leading him to see much of the detail of the whole theory. The exposition is thus a very useful one.

A review of such a brief book on relativity should not be ended without indicating the place which it should have with a learner who is working himself into a knowledge of the theory. It is obvious that the book must be authoritative. But it cannot serve as a single volume to lead the reader into a fair introductory knowledge of the whole theory; indeed this was not the purpose of the book. (The reader who desires a single short volume suited to lead him to a fair preliminary conception of the whole subject will find such a book in the second edition of my "Theory of relativity" published by Wiley & Sons, New York.) But the book can be made to serve an important purpose for the learner who wants a fairly rapid and yet comprehensive introduction to the whole theory. He might well begin with Einstein's more elementary book (translated by Lawson, published by Holt & Co. in 1921) entitled "Relativity—the special and general theory." This will lead him readily into the simpler aspects of the theory. This might be followed with the book named at the head of this article. He could then proceed to Weyl's comprehensive "Space—time—matter" (translation by Brose published by Dutton in 1922). Or, he might precede Weyl's book by Eddington's "Space, time and gravitation." By means of these four or five books, all of them available in English, it is possible for one to get a rapid and comprehensive introduction to the whole theory of relativity. They are recommended only to the serious student of the subject. None of the volumes constitutes "light reading."

R. D. CARMICHAEL

TUBEUF'S MONOGRAPH OF THE MISTLETOE

ONE of the most encouraging signs of surviving intellectual life in Mid-Europe is the occasional appearance of masterly publications like the MONOGRAPHIE DER MISTEL (The Oldenbourg Verlag, Munich) by Professor Tubeuf of the University of Munich. For many years

Tubeuf has stood well to the forefront among plant pathologists in the world and his publications on the mistletoe are classic.

The present quarto volume (xii+ 832 pages, 181 text-figures, 35 plates and five distribution maps) will form the starting point for all future studies of this interesting autotrophic plant which nevertheless is parasitic and even divisible into biologic strains in its host selection.

From the day of Theophrastus, the Greek founder of botanical science, the rôle of the mistletoe in saga, folklore and practical horticulture is sketched, and its present-day significance is shown. Special chapters deal with geographic distribution, morphology in its various branches, ecologic relations with other plants and animals, and its many-sided significance as a harmful parasite or an attractive adjunct to a landscape.

Every American University library should possess the book, and no surer indication can be given of America's wish to help the countries of Europe in the heroic struggle of their scholars to hold fast to what they have of culture, than by the prompt purchase of such sterling works as Tubeuf's monograph now that the Mid-European scholar is so hard pressed to keep body and mind and soul together.

WILLIAM TRELEASE.
UNIVERSITY OF ILLINOIS,
URBANA, ILLINOIS

SPECIAL ARTICLES

FURTHER NOTES ON THE "WINTER CYCLE" IN THE DOMESTIC FOWL

IN an earlier note[1] we pointed out that the maximum value of the inter-annual correlation between the egg production of the various "cycles" of laying activity in the first and second year in the White Leghorn fowl does not fall on the winter "cycle" as might be expected from current genetic theory, as developed for the Barred Rock breed, but on the autumn "cycle."

We have since shown[2] that the relationship between the first year production of the mother and the first year production of the daughter is $r = 0.128 \pm .033$ while that between the

TABLE 1. DAUGHTER'S FIRST YEAR.

Mother's First Year	Winter	Spring	Summer	Autumn	Annual
Winter	+.1387 ± .0330 4.20	+.0593 ± .0335 1.77	—.0011 ± .0336 0.03	+.0596 ± .0335 1.77	+.0976 ± .0333 2.93
Spring	—.0064 ± .0336 0.19	+.0246 ± .0336 0.73	+.0174 ± .0336 0.51	+.0876 ± .0334 2.62	+.0365 ± .0336 1.08
Summer	—.0084 ± .0336 0.25	+.0074 ± .0336 0.22	+.1173 ± .0332 3.53	+.0429 ± .0336 1.27	+.0564 ± .0335 1.68
Autumn	+.0727 ± .0335 2.17	+.0377 ± .0336 1.12	+.0750 ± .0335 2.23	+.1991 ± .0323 6.16	+.1320 ± .0331 3.98
Annual	+.0959 ± .0333 2.87	+.0536 ± .0336 1.59	+.0721 ± .0335 2.15	+.1380 ± .0330 4.18	+.1279 ± .0331 3.86

TABLE 2. DAUGHTER'S FIRST YEAR.

Mother's Second Year	Winter	Spring	Summer	Autumn	Annual
Winter	+.0578 ± .0335 1.72	+.1057 ± .0333 3.17	+.1025 ± .0333 3.07	+.1630 ± .0327 4.98	+.1440 ± .0329 4.37
Spring	+.0743 ± .0335 2.21	+.1496 ± .0329 4.54	+.1311 ± .0331 3.96	+.0971 ± .0333 2.91	+.1555 ± .0328 4.74
Summer	+.0727 ± .0335 2.17	+.0607 ± .0335 1.81	+.0625 ± .0335 1.86	+.1042 ± .0333 3.12	+.1054 ± .0333 3.16
Autumn	+.1064 ± .0333 3.19	+.0762 ± .0334 2.28	+.1043 ± .0333 3.13	+.2207 ± .0320 6.89	+.1759 ± .0326 5.39
Annual	+.1078 ± .0332 3.24	+.1265 ± .0331 3.82	+.1315 ± .0331 3.97	+.2039 ± .0322 6.33	+.1962 ± .0323 6.07

[1] Harris, J. Arthur, and Lewis, H. R., "The 'winter cycle' in the fowl," SCIENCE, N. S., 56: 230-231, 1922.

[2] Harris, J. Arthur, and Lewis, H. R., "Biometric considerations on the inheritance of fecundity in the White Leghorn fowl, *Poultry Science* (in press).