and nicotinic acid resulted in complete failure of lactation, and that the addition of filtrate factor concentrate prepared from liver extract resulted in success in every trial. Liver filtrate is a potent source of vitamin L_1 but, according to our previous experiments, the other necessary lactation vitamin, *i.e.*, vitamin L_2, is absent from it.[3] The question then arises: how did it happen that Sure obtained successful lactation without vitamin L_2 supplement?

Our recent experiments show that Sure's use of dextrin in his basal diet provides the answer to this question. We confirmed that more or less satisfactory lactation can be obtained on a diet consisting of dextrin 60%, purified fish protein 25%, butter 10%, and McCollum's salt mixture 5%, supplemented with acid earth adsorbate of yeast extract (vitamin B complex) and liver filtrate (filtrate factor and vitamin L_1). If, however, polished rice is used, instead of dextrin, an additional supplement of yeast constituent (vitamin L_2) becomes necessary for successful lactation, liver filtrate supplement being insufficient.

Dextrin diet + liver filtrate (L_1): 35 of 81 young reared (43.2%).

Polished rice diet + liver filtrate (L_1): 5 of 155 young reared (3.2%).

Polished rice diet + liver filtrate (L_1) + baker's yeast (L_2): 23 of 40 young reared (57.5%).

Obviously, therefore, dextrin in diet renders largely unnecessary vitamin L_2, which is absolutely indispensable in polished rice diet.

Since it is highly improbable that dextrin serves as a direct source of vitamin L_2, it may more reasonably be assumed that dextrin diet leads to the production of vitamin L_2 by the intestinal yeasts. In this connection it may be recalled that dextrin diet strikingly favors the proliferation of these yeasts which synthesize vitamin B_2, rendering the rats relatively refractory to B_2 deficient feeding.[4] In any event, it seems now clear that vitamin L_2 deficiency can not be produced by dextrin diet, and that with this diet vitamin L_1 supplement is sufficient to permit successful lactation.

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AN INVESTIGATION OF GROWTH IN PLANTS

A RECENT grant from the Rockefeller Foundation to the Connecticut Agricultural Experiment Station will be used to further a study of normal growth that has been in progress for some time. The long inbred strains of maize that have been continuously self-fertilized for more than 30 generations furnish favorable plant material for an investigation of this kind. These inbred plants are so reduced in size and growth rate and so uniform in all structural details that any mixing with unrelated plants can be certainly detected. In this material heritable changes are occurring from time to time that are known to have their origin in the nucleus. Most of these are degenerations from a normal level of vigor.

Chromosomal rearrangements, both spontaneous and induced, are known to alter growth in the endosperm tissue. The problem is to study their effects upon other parts of the plant where they can be measured statistically.

The interaction of nucleus, cytoplasm and cytoplasmic inclusions in the control of normal growth and differentiation is one of the most fundamental problems in biology at the present time. Knowledge in this field has importance for the further improvement of economic plants and animals and the control of neoplastic diseases.

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PRO AND CON EVOLUTION IN CONTEMPORARY GERMANY

FASCICULE 4–5 of Volume 37 of the semi-scientific periodical *Natur und Kultur* of Muenchen (April–May, 1940) contains an editorial preface by Dr. Franz Wetzel and nine essays by different authors, in all of which are to be found violent attacks upon evolution, especially with regard to the origin of man from apelike ancestors.

It is not intended here to discuss the arguments assigned in those essays, based chiefly on Dacqué's and Westenhöfer's ideas, but attention must be drawn to a fact most striking to a scientific reader: nowhere are the conclusions derived from the results of research; on the contrary, the former are tested as to whether or not they agree with the national socialist racial theory ("Rasselehre"). If they do not they have to be rejected. Evolution seems to be especially suspect because it appears to be contradictory to the invariability of species and races, required as dogma by the "Rasselehre," and is, in consequence, stigmatized by Otto Muck[1] as "Theorie der universalen Art- und Rasselosigkeit." It is no less striking to see that the adversaries of evolution reproach its advocates, alleging that the latter make them politically suspect.

Fortunately, H. Weinert rejects all these anti-evolutionary arguments as "pseudowissenschaftliche Ein-

[3] W. Nakahara, F. Inukai and S. Ugami, SCIENCE, 87: 372, 1938.

[4] N. B. Guerrant and R. A. Dutcher, *Jour. Biol. Chem.*, 110: 233, 1935; U. Tange, *Sci. Pap. Inst. Phys. Chem. Research*, 36: 471, 1939.

[1] *L.c.*, pp. 133, 135.

wände gegen die menschliche Abstammungslehre,"[2] but even he[3] endeavors to support his scientific opinion politically, asserting that, should the origin of man be questioned, the adversaries of the national socialist "rassenhygienische" tendencies could cite the uncertainty of science.

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SCIENTIFIC BOOKS

GEOMETRY OF CURVES AND SURFACES

Metric Differential Geometry of Curves and Surfaces. By ERNEST PRESTON LANE, professor of mathematics, University of Chicago. Pp. viii + 216. Chicago: The University of Chicago Press. 1940. $3.00.

THIS book is quite elementary in character. Plane, analytic geometry and the usual first-year course in calculus are sufficient prerequisites. In addition some knowledge of three-dimensional analytic geometry (direction cosines, equations of straight lines and planes in space, etc.) will be helpful, but this can be developed as the need arises in any class using this book as a text.

As mentioned in the preface by the author, most of the material included is classic. Consequently, the scope of the book is perhaps sufficiently well indicated by an enumeration of the chapter headings with a few additional comments. Chapter I, "Curves": This includes a discussion of arc length, curvature, torsion, the osculating sphere and circle and the Frenet formulas. Chapter II, "The Moving Trihedron," contains an application of the moving trihedron to such topics as involutes, evolutes, parallel curves and Bertrand curves. Chapter III, "Surfaces": Here the first fundamental form is introduced, the envelopes of surfaces, developable surfaces and ruled surfaces are considered. Chapter IV, "Curves on Surfaces": This contains a discussion of such topics as minimal curves, asymptotic curves and the second fundamental form, conjugate nets, lines of curvature and geodesics. Chapter V, "Curvature": This includes among other topics the radius of normal curvature, principal normal curvatures, geodesic curvature and geodesic torsion. Chapter VI, "Transformation of Surfaces," contains a discussion of conformal representation, applicability and parallel surfaces.

The reviewer was very favorably impressed by the simple and easily understandable style in which Professor Lane has written this book. An important and very desirable feature of the book is the abundance of definitions. By encouraging students to reason upon carefully worded definitions, Professor Lane has performed an essential mathematical service. Definitely stated theorems expressing the results obtained are also much in evidence throughout the book. In these respects Professor Lane is strongly to be congratulated.

In the opinion of the reviewer, if this book were used as a text in an undergraduate class composed of students who have completed their first or second course in calculus, it would constitute an interesting application of their previous mathematical work and be a source of inspiration toward further mathematical activity. But in the preface Lane states that the book is designed as a text for first-year graduate students. Here the author and reviewer are in decided disagreement and as the matter is an essential one the reviewer would like to make his position clear.

The book is essentially "undergraduate" in character. For example, in the very first sentence of the book (p. 1) we find ". . . curves and surfaces in ordinary three dimensional space." Now this is the way we speak to undergraduates. When a student has entered upon graduate work (and this includes presumably only such as are genuinely interested in the subject) he will ask what is "ordinary three dimensional space" in the mathematical sense. He will ask this question and he will be entitled to an answer. But he will not find the answer in Lane's book. Again in deriving the formula for the arc length of a curve (equation (3.6) on p. 8) we find that the arc length Δs appears in the derivation. Surely a graduate student is entitled to have this formula (which in reality defines the arc length) presented to him in such a way that the concept of arc length is not inherent in the derivation. No doubt other such objections could be found, but the reviewer has not sought them, and they are mentioned here only as an indication of the "undergraduate spirit" in which this book is written.

But the main objection to this book as a graduate text lies in another direction. The subject of tensor analysis can best be introduced and illustrated as part of a course on differential geometry. Moreover, the ideas and methods of the tensor analysis enter basically in the theory of relativity, are useful in the calculus of variations, mechanics, hydro- and aerodynamics and have appeared in certain phases of such widely divergent fields as engineering and topology. In the opinion of the reviewer one should continually seek in graduate instruction to enlarge and enrich the viewpoint of the student and in failing to base his text on the invariant formulation of the tensor analysis Professor Lane has lost not merely an excellent opportunity to introduce his readers to a point of view useful in other fields

[2] *Verhandl. d. Deutsch. Ges. f. Rassenforschg.*, Vol. X, Sonderheft, 1940, pp. 96–99.
[3] *L.c.*, p. 98.