

doubt correct. As far as I have been able to determine, when they first enter the egg, these granules differ in no wise from those in other parts of the food stream that develop into yolk spherules.

Now the early developmental features of the germ cells in this species point not so much to a process of active differentiation as one of passive isolation, which results in the pole cells retaining or preserving the reproductive potentialities of the cleavage nuclei; the pole-disc meanwhile serving as food material for the pole cells which "as a result of this special kind of nutrition undergo a peculiar method of metabolism which differentiates them from the somatic cells"—just as a certain kind of food is necessary for the early growth and development of a child, but is by no means the cause of its becoming a man instead of an ape.

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January 27, 1911

THE PYTHAGOREAN THEOREM

DR. NORTHRUP'S article¹ is not a proof of what is sometimes—perhaps incorrectly—called the *Pons asinorum*, unless it be shown *experimentally* that the kinetic energy of a body is the sum of its energy of translation and of rotation. The deduction, however, of this theorem of energy from the fundamental propositions of mechanics depends on the law of vector superposition, the mathematical expression of which involves the Pythagorean theorem. In general it is not economical to derive mathematical propositions from experimental physics; moreover, the process fails to bring out that difference between mathematics and physics which is shown, for example, in Hilbert's "Foundations of Geometry" and Mach's "Science of Mechanics."

I should like to be permitted the liberty of objecting to the statement:²

"No motion, force or acceleration which exists at the point p can produce rotation of 1—2 about p as center. This must be so, as it is axiomatic in dynamics that, when there is

a force or acceleration at the center of mass only of a body, there remains no couple to produce rotation": first, because the word "axiomatic" seems to be used in the Kantian sense of "self-evident," and second, because Dr. Northrup's proof (?) in no way depends on whether p has linear or 1—2 has angular acceleration.

Equation 7 of the paper expresses a geometric fact—I am tempted to say "accident"—which text-books raise to the dignity of a theorem.

R. F. DEIMEL

TO THE EDITOR OF SCIENCE: Referring to your December 16 issue, if we are to have "A Dynamical Proof of the Pythagorean Theorem," why not let it be a simple one? For instance, if the force F whose rectangular components are X and Y , acts upon a particle of mass m until it has imparted the velocity q whose components in the same plane are u and v , then the work done upon the particle by X is equal to $\frac{1}{2}mu^2$, while the work done by Y is $\frac{1}{2}mv^2$. But the work done by the components is identical with the work $\frac{1}{2}mq^2$ done by their resultant. Equating and cancelling the factor $\frac{1}{2}m$,

$$q^2 = u^2 + v^2.$$

But the velocity components u and v are the two legs of a right triangle of which q is the hypotenuse, so that here again is our Pythagorean relation.

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QUOTATIONS

THE TENURE OF PROFESSORSHIPS

AMONG the reforms suggested by the "efficiency expert" of the Carnegie Foundation who investigated the administration of some of the principal American universities was the appointment of professors for a brief period, so that they could be dropped without fuss whenever for any reason a change was desired. His idea was to get young, vigorous men, work them hard as long as they could stand the strain, and then pension them off in the interest of efficiency. Somewhat similar views have of late been expressed by several univer-

¹ SCIENCE, XXXII., 833, p. 864.

² L. c., p. 864.