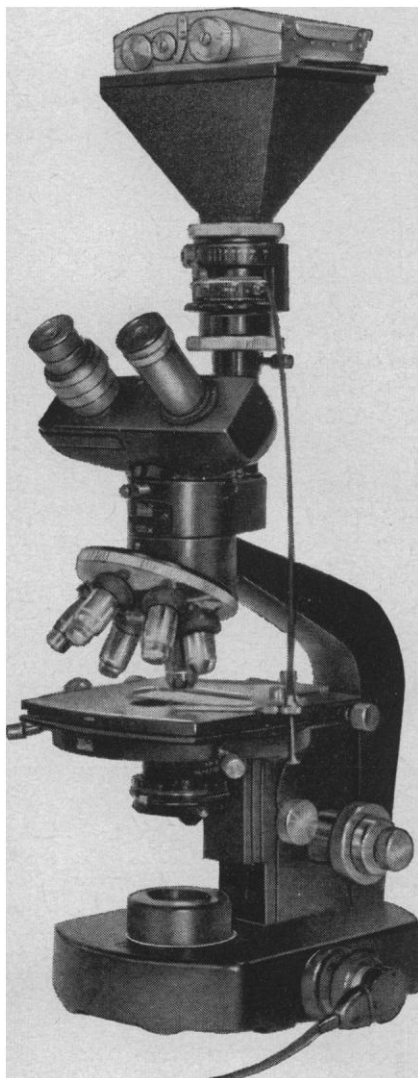


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Letters

Color Phenomena

Recently I reported [*Sci. American* 202, 168 (1960)] that many of the colors described by Land could be obtained binocularly in a procedure that was essentially the same as that of N. Geschwind and J. R. Segal [*Science* 131, 608 (1960)]. Additional unreported results indicate that a "natural image situation" is not necessary for the appearance of colors in a binocular setup. In the attempt to isolate a critical variable and, moreover, to obviate the need for transparencies, I drew two circles in India ink on a white card. The centers were so spaced that when stereoscopic fusion occurred the subject saw two concentric circles. When a red filter (Wratten 25 A) is placed before one eye, the circle stimulating the other eye (no filter) is dark red, and the other circle is green. Changes in the intensity of light can change the green to blue. This result appears to be a case of simultaneous contrast and, of course, is related to colored shadows. The fact that G. L. Walls [*Psychol. Bull.* 57, 29 (1960)] has reinterpreted Land's major results in terms of simultaneous contrast suggests a principle for explaining the colors obtained by me and by Geschwind and Segal.

For an additional point of possible interest I repeated J. L. Brown's procedure [*Science* 131, 155 (1960)] stereoscopically. Brown used a mechanical chopping device for alternately interrupting the two light beams projecting registered images on a screen. Without any filters, Brown reported the usual variety of colors and hues. When I tried this procedure I did not obtain any colors at all.

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The Term "Cosmoparticle"

A meteorite has been defined as "a solid body of subplanetary mass that either is in space or has come therefrom, is falling or has fallen as a discrete unit onto the Earth or onto some other astronomical body, and still retains its essential cosmic character." Since there seems to be some need now for a term to include all particles of submeteoritic mass, it is proposed that the word *cosmoparticle* be used for this purpose. A cosmoparticle may be defined as "a discrete material entity of submeteoritic mass, either in space or having come therefrom."

Cosmoparticles may be "free" or individual molecules or atoms or molecular or atomic constituents of any kind—ions, atomic nuclei, protons, neutrons, electrons, positrons, and so on. Cosmoparticles and meteorites, as here defined, evidently together comprise all material entities below the category of planet.

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Stochastic Models

The article on stochastic models of population dynamics by Jerzy Neyman and Elizabeth L. Scott [*Science* 130, 303 (1959)] contains the statement, "with a little luck in attracting the attention of more workers in the field, the process of clustering, with its further theoretical developments, may easily become the basis of a new theory which we like to call indeterministic cosmology." An offer from these particular statisticians to devote their energies to cosmology should not go without comment at a time when more and more observational data will be coming out of this nation's space science program for use in analysis and testing of various models.

The claim by Neyman and Scott that an indeterministic model will solve some problems in cosmology that the deterministic model is incapable of solving goes counter to the feeling of many in the physical sciences who reject any research not aimed at complete understanding, which, to them, means a deterministic model. Any model that is not deterministic is not considered realistic. An explanation in stochastic terms is no explanation at all. Knowledge must be gained with a deterministic model at every step of the way. An unfortunate result of this attitude is that difficulties in a limited area of a given field of research can slow down progress in the entire field until the difficulties are completely resolved in a deterministic manner. This is like not allowing the use of x to represent an unknown quantity, denying the use of algebra, and insisting that all problems must be solved through the more realistic arithmetic methods. Also unfortunate is the fact that frequently there is no meeting of minds in arguments on this point because these implicit assumptions or subconscious convictions do not come to the surface and the controversy centers around secondary concepts that follow from them.

Now let us look at the other side of the problem. Does a stochastic model