Communications

Were the Carolina Bays Oriented by Gyroscopic Action?

C. Wythe Cooke (*1*) has presented an explanation for the ellipticity and orientation of the Carolina Bays that is based on an assumed gyroscopic property of a rotating body of water.

I made an investigation of the effects of the spin of the earth on the particles of water in a spinning eddy at 30°N latitude, the circular eddy being 2 mi in diameter and 100 ft deep and having a water velocity of 4 mi/hr near the shore.

The "deflection-to-the-right" effect, together with the centrifugal reaction out from the center of the eddy, causes the level of the water everywhere near the shore to be approximately 6 in. higher than it is at the center of the eddy. These effects are independent of the depth of the water.

The change in the centrifugal reaction out from the center of the earth, caused by the horizontal velocity of the water relative to the earth, causes the water (in the lockwise eddy) to be less than 1/16 in. higher near the north shore than near the south shore. This difference in level increases with the depth of the water in the eddy.

It appears that all these effects could neither cause ellipticity nor influence the orientation of an eddy, for example, a Carolina Bay. Contrary to Cooke's assumption, an eddy does *not* exhibit gyroscopic action. In an earlier publication (*2*) I pointed out that gyroscopic action is exhibited only by rigid bodies and that an eddy is not a rigid body. However, no solution for the problem was presented. The complete report of this study will be submitted for publication elsewhere.

It seems that my conclusion stated in 1951 still is correct, namely, "A meteorite theory of origin of the Carolina Bays appears to be the least unsatisfactory of all the theories that have been published."

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References

1. C. Wythe Cooke, *U.S. Geol. Survey Profess. Paper 254-I* (1954).
2. W. Schriever, *Trans. Am. Geophys. Union* **32**, 87 (1951).

7 February 1955.

Spectral Emission of Composite Liquid Phosphors

It is well known that mixtures of solute phosphors are, in many cases, more efficient light emitters (in the visible) than either of the constituents alone. Owing to the energy transfer from the primary to the secondary phosphor (present in lesser concentration), the spectrum is shifted toward longer wavelengths. As a consequence, the self-absorption (concentration quenching) is greatly reduced, and hence a higher light output is obtained (*1*). Besides, a better match with the S-4 and S-9 cathode sensitivity of the photomultipliers commonly used yields increased quantum-efficiency of the light collected.

The process of successive energy transfers among the various constituents of the solution, even though clear in its main features, is still discussed in its details among different investigators (*2*). Since, according to several authors, the spectral distribution of the luminescence produced is independent of any particular way of excitation (*3, 4*), fluorescence (under ultraviolet irradiation) and scintillation (under gamma-ray or particle bombardment) should both be identical phenomena, insofar as ultimate light production is concerned. Thus, better insight into the energy-transfer mechanism might be gained by directly exciting—through selected narrow bands of ultraviolet light—different constituents of the mixture in succession (*5*). This affords a possibility to examine the processes involved (degradation, quenching, energy

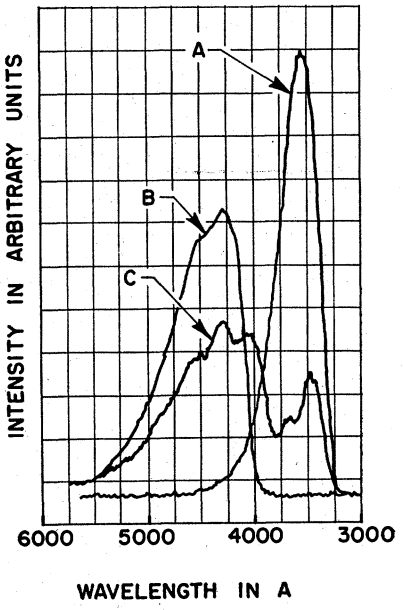

Fig. 1. Emission spectra (under gamma-ray bombardment of Co^{60}) of (*A*) *m*-xylene with 3 g/lit *p*-terphenyl; (*B*) *m*-xylene with 3 g/lit *p*-terphenyl and 10 mg/lit diphenylhexatriene; (*C*) *m*-xylene with 3 g/lit *p*-terphenyl and trace of diphenylhexatriene. A lucite cell (1 in. long) containing the solutions was placed in front of the slit of a Bausch & Lomb quartz monochromator and the spectral distribution was measured with an RCA-C7151 photomultiplier. The spectra (normalized to equal total intensity) show a complete shift in the spectral distribution from the primary to the secondary phosphor at the (optimal) concentration corresponding to case (*B*).