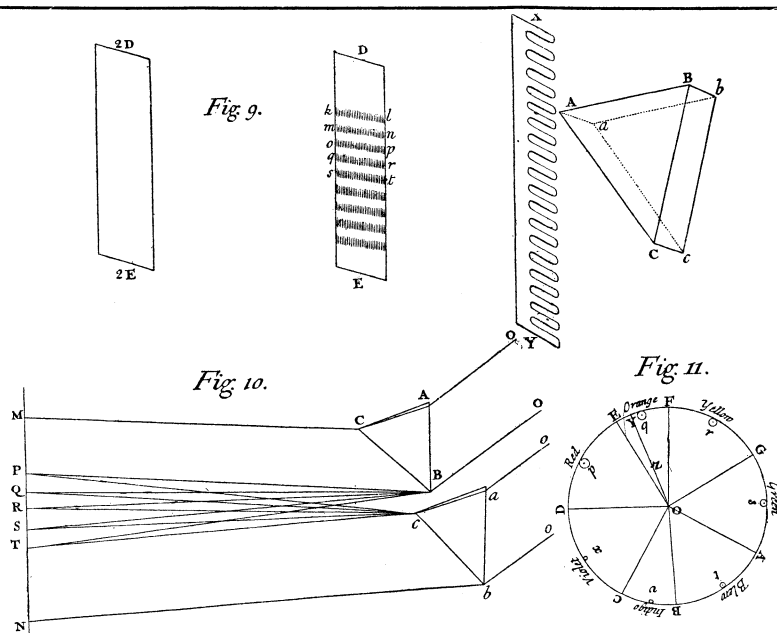


Classics of Science: Whiteness Compounded of Colours



Newton explains his arrangement for obtaining white light from two spectra: "If the most refrangible rays (blue) coming from the superior Prism take up all the space from M to P, the rays of the same sort which come from the inferior Prism ought to begin at P, and take up all the rest of the space from thence towards N"

OPTICKS: OR, A TREATISE OF THE REFLEXIONS, REFRACTIONS, INFLEXIONS AND COLOURS OF LIGHT, by Isaac Newton, London, MDCCIV.

In the following experiments Newton proved the fact, not understood in his day, that white light is composed of the several colors of the spectrum. First he combined the spectra cast by prisms, showing that colored lights mix to form white light. Next he mixed pigments to form a neutral gray, and showed that gray may be considered a shade of white.

Two prisms and a common comb with coarse teeth are needed for the first experiment. For the second, substitute modern pigments, in approximately the following proportions: chrome yellow, 3 parts; ultramarine blue, 1 part; red iron oxide, 1 part, as it is impossible to duplicate the pigments which Newton used—"Orpiment, blue Bise, Viride Aeris, and a certain purple which Painters use."

Sun's Light Compounded of Colours

Let two prisms ABC and abc, whose refracting angles B and b are equal, be so placed parallel to one another, that the refracting Angle B of the one may touch the Angle c at the base of the other, and their planes CB and cb, at which the rays emerge, may lie in directum. Then let the Light trajected through them fall upon the Paper MN, distant about 8 or 12 Inches from the Prisms. And the Colours generated by the interior limits B and c of the two Prisms, will be mingled at PT, and there compounded white. For if either Prism be taken away, the Colours made by the

other will appear in that place PT, and when the Prism is restored to its place again, so that its Colours may there fall upon the Colours of the other, the mixture of them both will restore the whiteness.

This Experiment succeeds also, as I have tried, when the Angle b of the lower Prism, is a little greater than the Angle B of the upper, and between the interior Angles B and c, there intercedes some space Bc, as is represented in the Figure, and the refracting planes BC and bc, are neither in directum, nor parallel to one another. For there is nothing more requisite to the success of this experiment, than that the rays of all sorts may be uniformly mixed upon the Paper in the place PT. . . . This is the reason of the composition by which whiteness was produced in this Experiment, and by what other way soever I made the like composition the result was whiteness.

Lastly, If with the Teeth of a Comb of a due size, the coloured Lights of the two Prisms which fall upon the space PT be alternately intercepted, that space PT, when the motion of the Comb is slow, will always appear coloured, but by accelerating the motion of the Comb so much, that the successive Colours cannot be distinguished from one another, it will appear white.

Grey Colours Compounded

Lastly, in attempting to compound a white by mixing the coloured Pow-

(Just turn the page)

Stone Age Skulls in Africa

What was the strange race of men that lived in equatorial Africa in the twilight time between the Old Stone Age and the New?

An English anthropologist, L. S. B. Leaky, who has been conducting extensive excavations in Kenya Colony, brings back with him a budget of extremely puzzling skeletal remains but refrains for the present from offering any answer to his own riddles.

Most of the bones he found at his two principal working locations, Mr. Leaky states, were badly broken, but he did find at least one skeleton in nearly perfect condition, and several good skulls. The skulls are most extraordinary. They do not resemble the skulls of the Negroes now inhabiting the locality at all, and they are very little like any Negro skulls, except that they are very narrow for their length.

Their faces, however, are high and narrow instead of being short as typical Negro faces are.

One of the most notable characteristics that marks these skulls as non-negroid in aspect is the very narrow

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CHEMISTRY

More Methanol From Wood

Double the yield of methanol, the common denaturant of alcohol, may be obtained by distillation of wood under high pressure with hydrogen. This discovery was made by P. K. Frolich, H. B. Spalding and T. S. Bacon of the Massachusetts Institute of Technology. If this process proves to be practical and profitable on a commercial scale it may be the salvation of the wood-distillation industry of America, which has been hard hit within the last two years by the importation of cheap methanol made in Germany by combining carbon monoxide and hydrogen.

It may also enable the United States to meet the coming competition of the new German process of making synthetic gasoline, carbolic acid and the like from coal and steam. The investigators have found that wood may be almost completely converted into gaseous and liquid products by heating with hydrogen under a pressure of 3000 pounds per square inch, using nickel as a catalyst to assist the combination. Many of these products would be serviceable for motor fuel or might replace organic chemicals we now obtain by the fermentation of grain.

Science News-Letter, November 12, 1927