Rare Chemicals of Armour Research Foundation, Chicago, are sodium alpha naphthalene sulfonchloramide, 3-p′-tolueneazo-p-cresol, 3-m′-tolueneazo-p-cresol, 2,3,4- or 2,3,5-trimethyl pyrrole, thorium iodide, o- or p-tolylhydrazine hydrochloride, 2,2,3,3-tetramethyl butane, triphenyl aluminum or antimony, triethyl antimony, tin or thallium, tetraethyl or tetrabutyl tin, d-arabo ascorbic acid, arachidonic acid, allyl cyanamide, 1-allyl piperidine, boroethane, 1-benzyl piperidine or morpholine, bilobol, coenzyme II, 5,6-cyclopenteno-1,2-benzanthracene, and masurium or its compounds.

DISCUSSION

PIGMENT AND BIOCHROME

MY colleague, Professor Fox, has dragged into the open a feud which has been smoldering between us for many years.[1] While the mores of our species, both as to the use of words, and the use of pigments themselves, are little influenced by arguments, it has seemed to me worth while to put some of my contentions in this field on record again.

I have long been irked by some of the prevailing uses, in biology, of the word "pigment." Dr. Fox admits the force of these objections, in part, though he insists upon retaining this word as a convenient vernacular (?) term. For more accurate scientific usage, he has adopted the suggestion of a professor of Greek, and substituted a new word "biochrome."

Whether it is reasonable to set up, as a special class, all the colored substances which can be extracted from animals or plants, in contrast with those substances which do not happen to be colored, is decidedly debatable. However, if we grant the desirability of such a term, "biochrome" would seem to meet the requirements pretty well. That "pigment" does not do so, I have already argued.[2] For this word has a definitely functional connotation, which we can hardly escape. In the inorganic world, colored substances are "pigments" only in so far as they are used as such. Thus lead chromate is (or may be) a pigment; copper sulfate never is. Save for an unfortunate precedent, I can see no excuse for applying any different criterion in the organic world. Why every colored substance, derivable in any way from a living organism, should forthwith become a "pigment" is difficult to understand.

Needless to say, I am offering no general protest against the use of the word "pigment" in biology. I have used the word freely, in connection with my own studies and shall continue to do so. But I believe that the word, when transferred to the organic world, should retain its functional significance. There is no propriety in calling a substance a "pigment" except in so far as it is used by the organism to influence its color scheme. I trust that it is no longer necessary to insist that the *appearance* of an animal is at times one of its important biological assets. Thus, melanin, the carotenoids, guanine and some other substances, occasionally even hemoglobin, may play the functional role of pigments. In so saying, let us repeat, we are not thereby assigning these substances to a definite physical and chemical category.

My chief protest against current usage in this field relates to the expression "respiratory pigment." We are here combining words belonging to two utterly different vocabularies. It is like talking about a "locomotor enzyme" or an "invertebrate catalyzer"! Dr. Fox, in his recent communication to SCIENCE, has given some theoretical reasons for believing that the same features of molecular organization which give to certain substances their color may likewise render them available as oxygen carriers. But even if this association between these attributes should prove to be true, we should hardly be justified in such a bit of semantic miscegenation as we have in "respiratory pigment"! Nor would "respiratory biochrome" be much better.

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[1] SCIENCE, November 24, 1944.
[2] *Scientific Monthly*, April, 1937.

LATENT VIRUSES IN STONE FRUITS[1]

RESEARCH workers in the field of stone-fruit viruses have become aware of the presence of latent or hidden viruses or virus complexes in cherry trees. These viruses have been demonstrated by placing apparently healthy sweet or sour cherry buds in various peach varieties, in which case the inoculated peach tree becomes dwarfed, rosetted, with split or cracked bark, ring spots in the foliage or various combinations of the above symptoms. Some trees recover after the initial shock, while others die, apparently depending on the strain or variety of virus present. The more severe strains are easily detected on peach, but the mild strains may cause only a slight dwarfing, with rapid recovery, or may show only an occasional leaf with ring spotting. The Kwanzan and Shirofugen

[1] Published as Technical Paper No. 446 with the approval of the director of the Oregon Agricultural Experiment Station. Contribution from the Botany Department.