Introductory Notes on Quantitative Chemical Analysis. By CHARLES WILLIAM FOULK, Professor of Analytical Chemistry in the Ohio State University. Second edition, revised and enlarged. Columbus, Ohio. 1910.

This is a very detailed but simple manual for college work in quantitative analysis. 130 out of 239 pages are given to general principles and methods. Detailed description of 14 practical analyses occupies the remainder of the volume.

E. R.

Qualitative Chemical Analysis, Organic and Inorganic. By F. MOLLWO PERKIN, Ph.D., Late Head of the Chemistry Department, Borough Polytechnic Institute, London. Third edition. New York, Longmans, Green, & Co.

This is an excellent manual of systematic, qualitative, inorganic analysis followed by a manual of qualitative organic analysis; the latter necessarily consists chiefly of special tests. It will doubtless be found useful.

E. R.

Publications of the Astronomical and Astrophysical Society of America. Vol. 1, pp. xxvii + 347. Ann Arbor, Mich. 1910.

This volume, published by authorization of the society at its tenth annual meeting in 1909, is devoted (after a brief introductory sketch) to accounts of its meetings, including the two informal conferences which preceded its organization, and to abstracts of the papers presented. The last occupy by far the greater part of the work. To review them would be practically to give an account of the astronomical work done in this country in the last twelve years.

Perhaps the strongest impression left after glancing over them is of the advance that has been made, both in the means and results of observation, since the first conference was held at the dedication of the Yerkes Observatory in 1897.

To the members of the society nothing is likely to be more prominent in memory than the inspiration resulting from its meetings, with their abundant opportunity for conference and discussion, and the cordial hospitality shown at the various places of meeting.

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SPECIAL ARTICLES

THE "DILUTE" FORMS OF YELLOW MICE[1]

A MODIFIED variety of the dark-eyed black mouse exists in the dilute black or "blue" of the fanciers. When the hairs of these dilute black animals are examined microscopically and compared with those of ordinary or intense blacks, it will be found that a reduction in the number of the pigment granules has taken place. It is not a large reduction, but is nevertheless sufficiently pronounced to be recognized with considerable ease. The same relation is observable between the intense and the dilute varieties of brown, known as "chocolate" and "silver-fawn," respectively, as well as in the corresponding varieties of black-agouti and brown-agouti.

The hairs of cream, or light yellow, mice, as compared with those of ordinary yellow mice, show, when examined microscopically, a very pronounced reduction in the amount of yellow pigment. This reduction is clearly more complete than that seen in the dilute black or dilute brown forms. Moreover, the last two forms named are remarkably constant in their degree of dilution, while cream forms may vary through deep creams to light yellows and from these to deep red-orange forms showing a full complement of pigment granules.

It is known that in the case of brown and black the dilute condition behaves as an independent unit-character, and so can be transferred in crosses from brown to black or *vice versa*. The dilute condition is also recessive to the intense, in crosses, so that dilute animals bred together produce only dilute offspring.

The question now arises whether "cream"

[1] Contributions from the Laboratory of Genetics, Bussey Institution, Harvard University, No. 11.

is a dilute form of yellow corresponding in nature to the dilute forms of black and brown. A very simple and direct test of this matter is obtained by breeding "cream" animals together.

Cream-colored, like all other shades of yellow mice, are regularly heterozygous, producing black or brown pigmented young as well as those which are yellow, the yellows being to the non-yellows approximately as two to one.[2] Now if the "cream" condition of yellow is produced by the same factor as the dilute condition of black and brown, the "creams" bred together should produce non-yellow young all of which are *dilute,* since, as stated, dilution is recessive in nature.

Such, however, is not the case. Cream animals mated together produce only cream or light-colored yellow offspring, but the black or brown pigmented young which they produce are commonly of full intensity. Accordingly, it follows that the "cream" modification of yellow is different in nature from the dilute modification of black and must be produced by a different factor.

This fact being established, search was begun for a type of yellow which when bred by itself would produce yellows and dilute forms of black and brown. Such yellows should, when obtained, be distinguishable from the intense yellow as well as the "cream" type, and should show on microscopic examination of the hair a condition of pigment reduction equal in amount to that seen in the dilute black or dilute brown forms.

Such yellows have been obtained. They may be deep red, light cream, or any of the intermediate gradations, but they possess an extremely characteristic washed-out dull appearance, which serves to distinguish them clearly from intense forms, even though these be extremely light colored.

Since this form of yellow occurs in all the gradations from "red" to "cream," it is apparent that it represents an independent form of pigment reduction; and since, unlike the "cream" reduction, it is transferable to black or brown, it is safe to class it as the *dilute form of yellow.*

The fact that black and brown pigment is present in agouti animals in a presumably constant degree of intensity and that the yellow pigment may independently vary in these animals from cream to deep red, may possibly serve to explain the marked variations seen in the type known as intense black agouti (golden agouti).

A table showing the result of crossing "creams" (light yellow) *inter se* follows.

TABLE I

Parents, ''cream'' × ''cream'';
Offspring, ''cream'' 31, black 10, brown 14.
(*light yellow*) (*intense*) (*intense*)

From Table I. it will be seen that non-yellow young of a dilute character are not produced by mating cream-colored animals *inter se.* On the other hand, such young have been produced by dilute yellows crossed *inter se,* as shown by Table II.

TABLE II

Parents, dilute yellow × dilute yellow;
Offspring, dilute yellow 95, dilute non-yellow 52.

Further, when dilute yellows are mated with dilute non-yellows the non-yellow offspring are all dilute (see Table III.).

TABLE III

Parents, dilute yellow × dilute non-yellow;
Offspring, dilute yellow 38, dilute non-yellow 37.

In the foregoing account dark-eyed yellows are alone used in computing the numerical results. Experiments with pink-eyed yellow forms have been conducted, but the data have not yet been tabulated.

C. C. LITTLE

May 22, 1911

[2] See SCIENCE, N. S., Vol. XXXII., No. 833, pp. 868–870.

DIMORPHISM OF THE GAMETES OF ŒNOTHERA[1]

PROFESSOR DE VRIES[2] has brought to light a

[1] Read before the Botanical Society of Washington, May 2, 1911.

[2] ''Ueber doppeltreziproke Bastarde von *Œnothera biennis* L. und *O. muricata* L.,'' in *Biologisches Centralblatt,* 31: 97–104, No. 4, February 15, 1911.