

PROFESSOR I. NEWTON KUGELMASS, head of the department of chemistry in Howard College, addressed on November 1 some of the southern chapters of the American Association of Engineers at the general meeting under the auspices of the Birmingham chapter on "Associationometry."

A MONUMENT erected in memory of Surgeon-General George Miller Sternberg, at the National Cemetery, was unveiled on November 5, and remarks were made by Surgeon-General Merritte W. Ireland, U. S. Army, Brigadier-General Walter D. McCaw, Colonel Edward L. Munson and Colonel Frederick F. Russell, Army Medical Corps, and Dr. George M. Kober, of the George Washington University.

THE WEIR MITCHELL oration was delivered by Dr. Charles W. Burr, at the College of Physicians of Philadelphia, on November 1. The subject was "Dr. S. Weir Mitchell as a physician, a man of science, a man of affairs, and a man of letters."

UNIVERSITY AND EDUCATIONAL NEWS

Two industrial fellowships in the department of botany have just been established by the Gypsum Industries Association at the University of Chicago. Each fellowship provides a stipend of \$750 and also \$300 for the purchase of special material and apparatus. The Fleischmann Company has renewed the fellowship in the department of physiological chemistry which was established in 1917. The income of the fellowship provides \$750 a year for two years.

DR. WALTER L. NILES, of New York, has been appointed dean of the Cornell Medical School in New York City, to fill the place left vacant by the death of Dr. William M. Polk.

THOMAS SMITH, lately professor of physics and head of the department of physics in the division of industries of the Carnegie Institute of Technology, has accepted the position of assistant professor in the department of mechanical engineering of the Massachusetts Institute of Technology. Professor John

David, formerly assistant professor of physics in the division of industries of the Carnegie Institute of Technology, has been appointed professor of physics in Adelphi College, Brooklyn, N. Y.

DR. R. R. RENSHAW, formerly associate professor of organic chemistry at Iowa State College, has accepted an assistant professorship of chemical research in pharmacology at the Harvard Medical School, Boston.

DR. HAROLD HIBBERT, of Mount Vernon, New York, has accepted an appointment of assistant professor of chemistry in Yale University. Dr. Hibbert's work will be chiefly in the graduate school, where he will assist Professor T. B. Johnson in the teaching of organic chemistry and directing advanced research in this subject.

It is announced in *Nature* that a new chair of physical chemistry has been established in the University of Bristol on the endowment of Lord Leverhulme. Captain J. W. McBain, lecturer in physical chemistry in the university since its foundation, has been appointed to the chair.

DISCUSSION AND CORRESPONDENCE SUBSTITUTES FOR THE WORDS HOMOZYGOUS AND HETEROZYGOUS

TO THE EDITOR OF SCIENCE: Those who have attempted to explain the fundamentals of genetics to live-stock breeders and to others with a natural distaste for terminological refinements are aware how ineffective some of the available nomenclature is for this purpose. A technical word to be successfully applied to a new idea in a non-technical discussion must suggest its meaning readily, must be free from misleading connotations and should be sufficiently novel so that the point will not be missed by the audience owing to a spurious aspect of familiarity. That the words homozygous and heterozygous are admittedly defective on the first count is shown by the number of evasions to be found in the literature, but it has not been generally recognized that all their substitutes in common use fail in the other two particulars. To prove this statement requires little more than a list

of the common substitutes. For homozygous these are pure and pure-bred and for heterozygous, impure, mixed, hybrid, mongrel,¹ and cross-bred. These terms all designate, rather loosely to be sure, types or methods of mating or progeny of particular matings. The objections to the appropriation of these terms by Mendelists are many. Mendelists do not hold that a knowledge of an individual's origin is an accurate guide to its breeding behavior; the terms indicate that they do. The careless handling of these expressions causes needless concern to those interested in maintaining pure-bred stock, the very class of persons with whom geneticists should set up cordial relations. Confusion results from the dual meanings since in spite of the attempted re-definitions, it is still necessary for geneticists to speak of the different types of mating in the time-honored way. It is absurd to use impure or hybrid in treating of sex-linked inheritance and other forms of obligatory heterozygosis associated with pure breeding. The familiarity of these expressions make it appear that there is nothing particularly new in the distinction between homozygosity and heterozygosity, the recognition of which is perhaps the chief practical addition of genetics to the breeder's store of ideas. The indictment might be further extended, but enough has been said to show that the objection to these substitutes is not captious, but based on practical considerations.

I recognize that the use of these terms began with the early Mendelian work on plant material. The practise perhaps does not appear incongruous to the plant breeder, but it is time that the well-meaning popularizer should be made to realize that from the standpoint of animal breeding these words have much the same kind of appropriateness as "registered" would have as a substitute for homozygous and "grade" as a substitute for

heterozygous. The sooner the misfits are banished, the sooner will we see the spread of a sensible appreciation of genetics in live stock circles. The need of discarding them far outweighs any possible inconvenience that would result from the necessary use of homozygous and heterozygous on all occasions, but the task would be lightened if a satisfactory series of alternatives were available for popular discussions. The object of this communication is to point out that by reviving and extending a usage introduced by Mendel himself, we can readily secure such a series.

Early in his 1865 paper, after demonstrating the 3:1 ratio, Mendel makes his first distinction between homozygotes and heterozygotes in these words: "Das dominirende Merkmal kann hier eine doppelte Bedeutung haben, nämlich die des Stammcharakters oder des Hybridenmerkmals." Throughout the paper he consistently refers to heterozygotes as hybrids—thus giving rise to our own unfortunate practise—but as soon as he has presented data showing the true nature of the F_2 ratio, he begins gradually to speak of the homozygotes, whether dominant or recessive, not as plants showing the parental character, but as those having the special trait of remaining constant in successive generations. "Sie besitzen nur constante Merkmale und ändern sich in den nächsten Generationen nicht mehr." His use of "constant" is indeed so insistent as to suggest that he intended to give to this adjective the technical meaning we attach to homozygous. Certainly our word might be substituted for his in passage after passage without making the slightest alteration in the sense or necessitating a textual change. Moreover in one place at least he makes constant a noun using it as the precise equivalent of homozygote. My suggestion is then that we follow Mendel in using *constant* for homozygous and homozygote, but that we use *inconstant* to replace his hybrid in the sense of heterozygous and heterozygote. The words *constancy* and *inconstancy* would then be available for abstract discussions, and if any one objected to the use of constant and inconstant as substantives, he could adopt

¹Not common but used by Bateson on several occasions, including his address as president of the British Association for the Advancement of Science (1914). Employment of this term in America would add further to the undesirable implications owing to the bracketing of "scrubs and mongrels" in the stallion laws of several states.

the expressions *constant form* (frequent in Mendels paper) and *inconstant form*.

The proposed terms are simple, easily remembered and not spoiled by previous functioning in the literature of plant or animal breeding. They imply nothing as to the origin of the zygote, thus eliminating any possible suggestion that homozygous individuals necessarily arise from pure-breeding and heterozygous ones only from mixed breeding. The word constant conveys the valuable impression that there is a dependability in the germ cell formation of the homozygote, but it will be necessary to give warning that the word inconstant is not meant to suggest complete lawlessness in the breeding results of the heterozygote. However the word heterozygote itself and all substitutes hitherto proposed are defective in that none of them gives a hint as to the law of gamete formation in heterozygotes. While *inconstant* is thus open to the objection that it might convey misinformation, it obviously emphasizes a point of essential importance to the breeder. Hybrid and other substitutes also require a word of explanation, since many hybrids are popularly supposed to breed true, but to retain such an impression would be worse than suggesting excessive irregularity. In short, the new terms if adopted would derive much of their value from the fact that a breeder will be quick to realize which kind of individual he wants in his herds or flocks and will thus be interested in knowing how the two types arise.

It is to be hoped that these two words or similar inoffensive ones will be accepted or at least not repudiated by professional geneticists. Some sort of agreement—either by common consent or by general indifference—will be necessary before the conscientious expounder may introduce the words to an audience without mentioning their technical equivalents.

Nothing in this note must be interpreted as a desire to displace homozygous and heterozygous or cognate forms from the technical literature.

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SOME PORT HUDSON OUTCROPS IN LOUISIANA

THE Port Hudson beds, so named by Hildgard from their exposure at Port Hudson, La., consist for the most part of beds of clays, usually bluish or black but occasionally yellowish in color. At Port Hudson, La., the type locality, the lower beds consist of black to bluish tenacious clay with frequent logs, stumps and fragments of wood, mostly cypress. At St. Francisville, La., nine miles northwest of Port Hudson, the black, cypress bearing clays outcrop at Black Hill, one half mile east of the town with the following section:

20–25 feet of loess.

4 feet of waxy black and brown tenacious clay with fragments and limbs of cypress, Port Hudson.

2 feet of massive gray and brown sands with scattering sub-angular chert pebbles, probably Lafayette.

The upper beds of the Port Hudson were evidently eroded before the deposition of the loess. The black clay lies unconformably on the Lafayette below with very sharp line of contact. Apparently the same black clay bed is to be seen in the bed of Scott Creek, near Laurel Hill, La., about 21 miles north of Port Hudson and 3 miles south of the La.-Miss. line. Evidently the lower Port Hudson beds in places underlie the western Florida parishes of Louisiana and probably also the adjacent southern counties of Mississippi.

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QUOTATIONS

THE RECOMPENSE OF SCIENTIFIC WORKERS

WE are very glad to hear that the Science Committee of the British Medical Association has elected a sub-committee to confer with the British Science Guild and other bodies "in the matter of the inadequate recognition and recompense by the government and other bodies of medical workers in the field of science." We are also glad that the Science Guild is nominating some of its members to confer with this sub-committee of the British Medical Association. The members are as follows: For the British Medical Association,