

uniformity in the weights and measures used in the sale of corn and other crops, the Corn Sales Bill is now being considered by a Committee of the House of Commons; but as the standard proposed is one of 112 lb., while the whole of the futures market is based on the decimal system, the Bill can be nothing more than a makeshift measure. In the textile industries, from which comes the chief opposition to the use of metric measures, the standards of measurement vary greatly in different centres, and there is no common relationship between them. British and American measures with the same denomination, such as the pound, yard, gallon, and bushel, also differ in quantity in the two countries. The advantages of a uniform system—a common language—from the point of view of world service are obvious, and the jealous attitude of conservative corporations towards it represents, not the spirit of progress, but rather that of obscurantism.

The fact that local and trade usage sanctions such a variety of weights and measures as that now existing in this country and in the United States is in itself sufficient to justify a movement towards reasonable uniformity. There is an official British system of weights and measures, but when trade transactions are concerned its standards are often varied to suit industrial convenience or local custom. A proposal that the British standards should be made compulsory in all transactions, and that no departures from them should be recognised, would evoke quite as much opposition as is now offered by certain industries to the introduction of the metric system. No one supposes that by making the metric system compulsory after a period of years the people as a whole would think in terms of metric units. Local denominations of fractions and multiples of such units are commonly used in all countries where the metric system has been adopted, but they do not interfere in the slightest degree with the larger transactions of trade and commerce.

If the Government adopted the metric system as the sole legal system in all its Departments, and announced that after a particular date all specifications for its work would have to be expressed in terms of that system, a great step would be taken towards its general use. This course and the publication of all official trade statistics in metric terms would lead to similar action by municipalities, railways, and other corporations, and promote the voluntary adoption of metric standards by the trading community generally.

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### Lamarckism Unashamed.

*Initiative in Evolution.* By Dr. W. Kidd. Pp. x + 262. (London: H. F. and G. Witherby, 1920.) 15s. net.

FOR more than twenty years Dr. Walter Kidd has interested himself in the arrangement of the mammalian hair, and pondered over its significance, especially in relation to theories of evolution. He has shown that definite patterns due to the diverse lie of the hair are of common occurrence, that they are subject to change, and that they are hypothetically interpretable on Neo-Lamarckian lines. Whether one agrees with his interpretations or not, one must thank him for a very enjoyable book, written with whimsical humour and with a delightful urbanity in controversy. One admires also the candour with which Dr. Kidd states and seeks to dispose of some serious criticisms brought against his position as expressed in previous books.

A study of the lie of the hair on a cow shows great definiteness; thus it slopes first backwards and then forwards on the neck; behind a whorl over the shoulders it slopes backwards again; along the middle line of the upper part of the tail there is a streak of hairs at right angles.

"Arrangements of its hair so audacious as these need explanation, and it is found in the mode of life of the cow. So large a part of its daily life is spent in the business of grazing with her muzzle close to the ground, during which the neck of the animal is constantly stretched downwards from the back at the level of the shoulders, that the skin, which is very loose in this and most other portions of its body, is dragged upon to allow of the extreme flexion of its neck. This traction is for all this time acting against the normal or backward slope of the hairs, and has given rise to this victory of a new force through a thousand generations. It is equally clear that a mechanical explanation of the line of erect hairs on the first nine or twelve inches of the tail is forthcoming, for one has only to watch a cow standing on a hot day, undergoing her torment of flies, to see it writ large. . . . It is hardly necessary to point out how the underlying muscles would drag upon the skin of the tail over them and gradually reverse more or less the 'lie' of the hairs."

Similar interpretations, often very ingenious, abound in the pages of Dr. Kidd's book. There is an unusual pattern of hairs on man's back; it is to be correlated with his ancestors' habit of sitting with their backs against the side of the cave, or sleeping with their heads raised on some sort of pillow. From between the eyes of a cat the hair on the broad snout slopes downwards, but on a dog's snout it slopes upwards; this is put down to the fact that the dog rubs his head on the

sward from the front of the snout upwards, while the cat dresses her snout downwards with her paw. We should think this was a *hysteron proteron*—the cart before the horse. The dog has on his chest a reversed area of hair—spreading out on each side. “When lying with his head supported on his paws the lower part of his chest is closely applied to the upper or flexor surface of the fore legs, and the long-continued pressure of the latter against the downward or normal streams of hair on the chest leads to its slope being reversed.” The downward slope of the shaggy hairs of the two-toed sloth, that spends so much of its time upside down below the branches, is to be attributed to the action of gravity upon the long hairs. We wonder that the author does not allude to the downward pull which the coating of green Algæ on the hairs must involve!

The factors recognised by Dr. Kidd in the formation of hair-patterns are four: friction, pressure, gravity, and underlying muscular traction. His thesis is that changes in the conditions of life—e.g. in modes of locomotion and in attitudes of rest—have directly brought about modifications in the lie of the hair, and that these modifications have been cumulatively entailed on the race.

“Initiative in animal evolution comes by stimulation, excitation, and response in new conditions, and is followed by repetition of these phenomena until they result in structural modifications, transmitted and directed by selection and the laws of genetics—a series of events which agree with Neo-Lamarckian principles.”

Now it is familiarly easy for Lamarckians to interpret structural peculiarities as the outcome of transmitted exogenous modifications (the direct somatic results of peculiarities in function, habit, nutrition, and environment), and Dr. Kidd is much too thoughtful an investigator to be content with mere interpretation. He brings forward evidence to show that the lie of the hair can be modified in the individual; he also brings forward some evidence to show that parental modifications may reappear in the offspring. Speaking frankly, we do not think the evidence is strong, but it is progress to have any evidence at all.

As regards individual modifications of the hair-pattern, reference is made to the way in which the peculiar functioning of the muscles in the vicinity of the human eyebrow alters its shape and character.

“It is shown by numerous examples in the human eyebrow that the muscles underneath the hairs which are embedded in the true skin for a tangible depth, do play havoc with the normal arrangement of hair, as the conflict proceeds, the resultant ‘pull’ being actually engraved, signed

and sealed by physiological wrinkles of the forehead and face.”

It may be so, but one must tread warily. There are individual idiosyncrasies in the eyebrows hinted at very early in life, long before the time of wrinkling, which become emphasised when the eyebrow hairs grow longer, as they so often do in later life. First catch your modification.

A little more cogent, it seems to us, is the chapter on the modifications in the hair-patterns of horses, modifications which can be traced to peculiarities of harness. Yet here again there is need for scepticism. One has to be sure that the peculiarities observed are not constitutional variations, quite independent of harness; and here one must go back in Dr. Kidd’s book to the excellent treatment of the whorls, featherings, and crests that frequently occur on the horse’s neck, most of which cannot, without great difficulty, be regarded as modifications. Moreover, one has to remember that in a hard-worked horse there may be a coercive reversal of the moist hair, which never gets a chance to right itself, and is not, therefore, a true modification which persists after the inducing factors have ceased to operate. As to the ten foals showing a reversed area or pattern on the under surface of their necks similar to that which their mothers showed, we wish to be sure that the maternal reversal was due to the collar. But of the value of collecting cases like this, even if they do not convince sceptics, there can be no doubt, and Dr. Kidd will be thanked by all biologists.

Dr. Kidd supports his case with facts relating to the formation of new bursæ under the stress of mechanical forces and to Pavlov’s experimental production of new reflexes in the life of the individual, but he stakes his argument on the lie of the hair. His general position is that initiatives or new departures in evolution are direct answers to peculiarities in nurture (activity, rest, food, and environment), and that these answers are transmissible in a representative way which becomes cumulative, unless, indeed, selection intervenes. He coins the word “plasto-diëthêsis,” combining the metaphors of mould and sieve; the organism is moulded in some new way by peculiarities in function and environment, and the moulded organisms are sifted. “So the banns between Lamarck and Darwin are published, not for the first time of asking, and who shall say that there is cause or just impediment why these two should not be joined in holy matrimony?”

We suspect that the lie of the hair is fixedly determined by the slope of the hair follicle beneath the surface of the skin, and that this slope, though

adjustable temporarily by contraction of the smooth muscles associated with the follicle, is determined by old-established skin conditions—e.g. of muscularity, blood supply, and innervation. We should compare the general lie of the hair to the pterylosis in birds, and also, in kind, to the way in which the hairs of different mammalian types occur in distinctive or specific little groups, the members often differing in size. It may be that the vertically upstanding hair of the mole represents a primitive mammalian condition without any lie at all. Whether this be so or not, the lie of the hair is variable, as the study of the horse's neck suffices to show. These variations, comparable to variations in other skin-features—e.g. papillary ridges—may be the somatic expression of germinal variations, and it may also be that they are correlated with larger variations of a more obviously utilitarian character. We need not think of them as “anyhow” changes, but rather as more or less consistent with a harmonious viable constitution previously established. In any case, they are the cards put into the hands of the full-grown mammal—cards which he has to play, the result being the sifting out and survival of the “lies” most conformable with the creature's habits. But we cannot prove our Neo-Darwinian theory any more than Dr. Kidd has proved his Neo-Lamarckian one. Some may say not so much.

J. A. T.

### Dyes and Dyeing.

*Application of Dyestuffs to Textiles, Paper, Leather, and other Materials.* By Dr. J. Merritt Matthews. Pp. xvi+768. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1920.) 57s. 6d. net.

THE author introduces his subject with “Craft Dyeing,” followed by a short history of dyeing. In discussing tie-dyeing (knot-dyeing), batik and stencil work—some of the earliest methods of producing coloured patterns on fabrics—he makes the rather interesting suggestion that craft dyeing should be encouraged, as the field for it in America is a broad one, because in it “we have the possibility of reaching into realms of colour art that is not present in ordinary trade dyeing.” As in the author's former work, “The Laboratory Manual of Dyeing and Textile Chemistry,” each chapter is followed by instructions for carrying out experiments relating to the processes described. These should be of considerable assistance to students in technical colleges.

Chap. ii. deals with the scouring of textile  
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fibres. In this an illustration is given of what purports to be an “Open Kier for Treating Cloth with Caustic (H. W. Butterworth and Sons Co.),” which, however, is not a kier, but the preparing and batching arrangement employed in impregnating the fabric prior to boiling in the open-width Jackson kier. The kier proper has been omitted. On pp. 136–37 the author describes the preparation of sodium hypochlorite by passing chlorine gas into caustic soda or soda ash. Bleachers in this country will be interested to hear that “this method of bleaching has come into very extensive use in the United States.”

Under “Representative Acid Dyes” (chap. viii.), a “Nomenclature of Dyestuffs” is given. We agree with the author that as regards dyestuffs his task in bringing the information up to date must have been one of considerable difficulty. He is to be congratulated upon this part of the work, and we think he has acted wisely in that he “has deemed it advisable to retain the names and the dyestuffs that were well known before the war, and which could be easily and intelligently recognised in the industry all over the world.” The alphabetical list of trade names of the various groups of dyestuffs, in which the class to which each belongs and the manufacturer are given, and the list of the principal dyestuff manufacturers, will be found very useful indeed. A very complete list of all the principal dyestuffs, arranged according to shade, is also given.

In the following chapters the stripping of colours, the testing of the fastness of dyes, and the application of the various artificial and natural dyestuffs are discussed. This is followed by a brief description of the mineral colours, and in the next chapter (which should have been numbered xxiii.) by “Dyeing of Fabrics containing Mixed Fibres.” In this some very useful tables showing the affinity of a number of dyestuffs for different fibres are given. The dyeing of other fibres, including linen, jute, and artificial silk, is referred to very briefly. Cellulose acetate silk is not mentioned.

The theory of dyeing is outlined in chap. xxv. It is to be regretted that in this chapter only three references to the literature are given. The name of one of the investigators mentioned should read “Vignon.”

The author has compiled an extensive bibliography. The value of this would have been considerably enhanced if references to it had been given in the text. This is an unfortunate omission which it is hoped the author will rectify in a new edition of the work.