

Apparently Michaux was of the same way of thinking in reference to the Origin of Species as Dr. Willis.

J. ADAMS.

Central Experimental Farm,
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THIS reference is of great interest. As I have shown in the Introduction to my recent book upon "Age and Area," both Lyell and Hooker had conceived the ideas which I have elaborated. The incoming of the Darwinian theory of evolution, however, with its novel conception of universal gradual change, diverted effort from the lines that it was beginning to follow, and to which it shows signs of returning, with the increasing recognition of the fact that gradual change is not possible in the case of most characters.

JOHN C. WILLIS.

Zoological Nomenclature : Musca and Calliphora.

IN accordance with the rules of the International Zoological Congress, the attention of the zoological profession is invited to the fact that Dr. L. O. Howard, W. Dwight Pierce, and twenty-one other professional zoologists have requested the International Commission on Zoological Nomenclature to exercise its plenary power in the case of the Linnæan genus *Musca*, 1758, and, under suspension of the rules, to declare *M. domestica* as type of this genus; also, under suspension of the rules, to validate *Calliphora*, Desvoidy, 1830, with *C. vomitoria* as type.

The request is based on the grounds of practical utility, and an almost unbroken history of consistent usage since 1758 in the case of *Musca*, and since 1830 in the case of *Calliphora*. It is claimed that a strict application of the rules will produce greater confusion than uniformity.

According to the premises at present before the Commission, if the rules are strictly applied, the generic name of *Musca* would take either *M. cæsar* or *M. vomitoria* as type, and the species *M. domestica* would be cited either in *Conostoma*, 1801 [?] (type *Ascaris conostoma* = larva of *M. domestica*), or in *Conosoma*, 1802 (type *Ascaris conosoma* = larva of *M. domestica*), or in *Promusca*, 1915 (type *M. domestica*), thus resulting in a very regrettable change in the nomenclature of the species in question as almost universally used in entomological, zoological, medical, epidemiological, and veterinary literature.

The secretary of the Commission invites any person interested in these cases of nomenclature to communicate his opinion on the subject as soon as possible. On account of delay caused by the war, the final vote of the Commission will not be taken until about January 1, 1924.

C. W. STILES

(Secretary to Commission).

25th and E Streets, N.W.
Washington, D.C.

Tesla Spectra and the Fraunhofer Effect in Complex Compounds.

IN conjunction with Mr. W. H. McVicker, we have begun an investigation of the spectra emitted by the vapours of compounds when subjected to waves from a Tesla transformer passing between two glass-coated electrodes. For the sake of clarity, these spectra may be termed electro-luminescence spectra.

Among the substances examined by us was benzene. At ordinary pressure and at the boiling-point, the vapour of benzene emits only a fragmentary spectrum which seems to be built up from portions of the

carbon spectrum, only the strongest bands making their appearance. On reducing the pressure of the vapour, an extremely regular spectrum is emitted by benzene; a very regular set of band-groups, each of which has the same general internal structure as the others. Six of these band-groups lie between $\nu = 3194$ and $\nu = 3752$; while traces of yet another band-group were observed in the region beyond 3194. Beyond 3765, the absorptive power of the vapour itself cuts off part of what is evidently another set of band-groups.

Each of the band-groups has the following structure: four strong bands, each accompanied by a weaker band; then two broader and weaker bands, which may possibly be produced by the fusion of the strong and weak companions of a doublet.

The whole spectrum shows an extraordinary regularity. There are no air-lines or spark spectra traceable throughout its extent; nor are there any lines visible on the parts of the plate unaffected by the luminescence spectrum. The following figures represent the wave-numbers of the four strong bands in each group:

Group	A.	B.	C.	D.	E.*	F*.
	3752	3652	3554	3454	3357	3257
	3736	3636	3537	3438	3339	3242
	3717	3618	3521	3422	3322	3229
	3703	3602	3504	3405	3308	3211

For the band-groups marked with an asterisk, the readings on the plate were difficult—the bands being diffuse—and the figures are probably not exact.

The whole of the bands in the electro-luminescence spectrum appear to be directly related to each other; their wave-numbers are calculable from the following formula:

$$\nu = 98 \cdot 712n - \frac{98 \cdot 712m}{6}$$

where n is successively equal to 33, 34, 35 . . . and m is successively 0, 1, 2 . . .

The electro-luminescence spectrum presents especial interest when it is compared with the fluorescence and absorption spectra of benzene. Hartley (Phil. Trans., 1908, 208, 519) and Grebe (*Zeit. wiss. Phot.*, 1905, 3, 363) found that the change from benzene vapour to a solution of benzene in alcohol produced a shift of 10-20 units in the position of the absorption bands towards the less refrangible rays. If the same shift be assumed to occur in the case of fluorescence, then it appears that the full fluorescence spectrum of benzene corresponds, band for band, with a part of the luminescence spectrum, as the following figures show:

Electro-luminescence bands	. . .	$\nu = 3454$	3554	3652	3752
Fluorescence bands	. . .	$\nu + 19 = 3454$	3556	3650	3752

An even more surprising result is obtained by comparing the electro-luminescence and absorption spectra of benzene vapour. Hartley (*loc. cit.* 484) divides the absorption bands into four series. When his least refrangible bands are compared with our most refrangible set, the coincidence between the two is most remarkable. For the sake of brevity, only the first strong series is given here:

Absorption bands	. . .	= 3650	3683	3700	3716	3734	3749-52	3761
Luminescence bands	. . .	= 3652	3686	3703	3717	3736	3752	3765

Thus, if an obvious constant difference of 2 units between our scale-readings and those of Hartley be assumed, all these bands coincide within our experimental error.

This appears to establish that parts at least of the benzene absorption spectrum are replaced by luminous bands in the electro-luminescence emission spectrum, just as the dark Fraunhofer sodium line in the solar spectrum corresponds to the D-line in the emission spectrum of sodium. In other words,