the central part under other conditions. The motor mechanism involved in this movement is doubtless located in the colorless cytoplasm through which the granules move. It certainly is not in the colored substance itself. In other words, while it is evident that the pigment masses (chromatosomes) change enormously in form, there is no evidence indicating that they *per se* change in size, *i.e.,* expand and contract, and that the change is due to processes within them. It seems to me therefore that the phrase "expansion and contraction of these masses" (chromatosomes) describes the phenomena in question but little, if any, more accurately than the phrase "expansion and contraction of chromatophores."

Under the conditions which induce movement of the pigment granules out into the branches of the chromatophores they become distributed through a relatively large space, and under those which induce movement in the opposite direction they become concentrated in a relatively small space, and their function is obviously specifically associated with the space they occupy, *i.e.,* the extent of this distribution. I would therefore suggest the phrase "distribution and aggregation of pigment granules" (melanin, xanthine, *et al.*) in place of "expansion and contraction of chromatophores" or "chromatosomes." In a paper[2] and in lectures on the subject, I have used the verbs "spread out" and "aggregate" to designate respectively movement out into the branches and in the opposite direction. These phrases express precisely what occurs, and until more is known about the mechanics of the processes involved, I see no need for any others.

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SLICKENSIDES

IN the fireclays and other underclays beneath the beds of coal in the Pennsylvanian system of the United States, the countless millions of slickensides command the interest of the geologist, who studies them, and provoke the question as to their origin. Many of them, perhaps most of them, are but a fraction of an inch in length and in no wise involve the overlying or underlying beds. Neither does any one of them cut the whole of the clay bed in which they exist. They must have been formed by the material on one side of each of these minute fractures slipping past the material on the opposite side. But even so, the motive force is not evident; neither is the manner in which it operated, because these small fracture surfaces extend in all directions and dip at any angle, even in the same mass of clay.

Where the slickenside surface involves the whole of a bed or cuts across two or more beds no such problem exists. The slickenside surface was produced by the pressure of one side of the fractured surface against the other side as the two parts moved away from each other along the faulted surface. Such slickenside surfaces are most easily produced in plastic clays and clay shales and most difficultly formed in pure quartz sandstones, as in Wisconsin, where the friction had to be sufficiently great to fuse the quartz grains into a natural enamel, but enamel which still preserved its striae.

Because of the problem involved in the origin of these slickensides in the fireclays and underclays, it was with keen interest that, in 1929, slickensides in the making were observed in the delta of the Mississippi River off the mouth of South Pass. Mud lumps are numerous here. They are shoved up to the surface and a few feet above it rather suddenly, instantly to be attacked by the waves and worn down to gulf level. One such mud lump, tied to west jetty-end by a sand spit or sand bar, was being undercut by the waves on the gulf side. As the waves cut back, the unsupported overlying mass of plastic clay slumped irregularly back into the gulf, producing the most beautiful slickensides imaginable. Of course these slickenside surfaces, at the moment of their development, dipped steeply downward, but the undercutting of a partly slumped mass could produce a new set of slickenside surfaces intersecting the earlier set at any angle whatsoever, just as these surfaces do in the fireclays and underclays.

The process of development of these slickensides in the mud lumps of the Gulf of Mexico suggests that at least some of the slickensides in the fireclays and underclays could have been formed by the waves in the Pennsylvanian swamps attacking the material of the soil in which the coal vegetation grew. The process could not produce slickensides in those fireclays and underclays in which the roots and root impressions of the coal vegetation still extend downward into the clay, but it would be interesting and instructive to observe whether or not clays penetrated by plant roots have slickenside surfaces intersecting at all angles; whether or not they have slickensides of steeply inclined surfaces only; or whether or not the clays penetrated by roots have fewer slickenside surfaces than have the clays free from such roots and root impressions.

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[2] S. O. Mast, "Changes in Shade, Color and Pattern in Fishes, and Their Bearing on the Problems of Adaptation and Behavior, with Especial Reference to the Flounders Paralichthys and Ancylopsetta," *Bulletin of the Bureau of Fisheries,* 34: 177–238, 1914. Albert Kuntz, "The Histological Basis of Adaptive Shades and Colors in the Flounder *Paralichthys albiguttus*," *Bulletin of the Bureau of Fisheries,* 35: 1–28, 1915.