Even if genes consist of no more than a single molecule they might still be considered to have originated in the manner indicated, because they would naturally tend to approach a certain minimal size, and this, so far as we know, may be molecular. If genes evolved in the way suggested according to this very simple hypothesis, we have a plausible explanation of why they came to have a serial arrangement in the chromosomes. On any other view this peculiar arrangement of genes would require subsidiary hypotheses for its explanation.

In accordance with this method of origin it might be expected that the process of quantitative reduction had not in all cases reached its final stage. One might suppose, as Goldschmidt has done, that the various multiple allelomorphs, such as those occurring in the locus for scute or for white eye in Drosophila, represent purely quantitative changes in the gene due to the loss (or gain) of one or more molecules. Genes vary greatly in the number of different forms they assume, and the readiness with which they undergo change. There are doubtless numerous genes which have never been observed to mutate, even in Drosophila, while there are a few which appear to mutate with riotous unrestraint. Evidently there are genes and genes. It might be that some genes have been reduced to molecular dimensions, whereas others are still multi-molecular and subject to a considerable degree of quantitative variability, albeit by discrete steps. For some reason the various phenotypic changes resulting from mutations occurring in a given locus are, to a considerable degree, interpretable as due to different rates of gene action. The doctrine of mere quantitative variations in genes has been almost entirely banished from genetics, after a due amount of controversy, and I would not venture to defend it in the form in which it was formerly advocated. If we adopt a quantitative theory of gene changes, it must be in some form which harmonizes with the discreteness of mutations.

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A NEW CORDAITES FROM MISSOURI

THE occurrence of fossilized tree trunks in the Burlington limestone series of the Ozarks is quite rare.

When my attention was called to a fossil tree found last year by a farmer on his land near Springfield, Missouri, I made a preliminary study on March 30, and found a trunk, thirteen feet long and eight to ten inches in diameter, imbedded in a ledge of chert which is part of the Upper Burlington limestone series. The chert bed contains brachiopods, crinoids, bryozoans and other marine invertebrate forms typical of that time. The segment of tree evidently was imbedded after having been displaced from its normal position, and was weathered a great deal before induration of silica took place. All outer cortical tissues, leaves, roots and branches, such as might have been present, were lost before fossilization occurred.

Sections prepared on a petrotome to show transverse, radial and tangential aspects include to date only secondary wood. The stem was found to be considerably compressed, crushing much of the woody tissue, but leaving some areas unaffected. The following features are typical.

There is no evidence of annular rings or differentiation due to seasonal growth, a feature of Paleozoic secondary growth generally. The radiating wood rays are numerous and typically uniseriate, but occasionally they become biseriate. Tracheae are absent, so that the wood is made up entirely of tracheids. These in transverse aspect reveal a greater radial than tangential dimension, are quite square in outline and possess bordered pits on the radial walls only.

In the radial view the rays are seen to vary from one cell to twelve cells high. The border and central cells show no essential distinctive differences. Bordered pits connect the ray laterally with the tracheids. Bordering membranes are apparently limited to the tracheal side of the wall. These pits are ofttimes larger than adjoining tracheal pits. There are no pits joining the cells within the ray itself. The ray cells are smooth-walled and are devoid of the sculpturing commonly present in the Lepidodendrids of that period. The end walls of tracheids are long and tapering, with the end walls being radially disposed in such manner as to present the broad face in the radial view. The sloping end wall appears in the tangential view, where it is seen to bear pits of the same type as occur on the radial walls of the tracheid.

In the tangential view the linear series of bordered pits show on the radial and end walls, cut transversely. The tangential walls are devoid of pits. The occasional biseriate condition of the wood rays are evident in this view.

No distinctly scalariform or reticulate elements have been found, although the elongated bordered pits approach the scalariform marking and show all transitional forms between such condition and rounded borders. In all pits, however round the borders may be, the pit itself is elongated. The tracheids with rounded pit membranes are more or less irregularly distributed among those which bear elongated pits, the latter being much more numerous. The axis of the pits varies from horizontal to approximately vertical.

There is no observable thickening or torus on the membrane opposite the pits. Bars of Sanio, which are present in the Ginkgo and conifer forms, are conspicuously absent.

Preliminary examination would indicate a new species of cordaites for which I propose the name *Cordaites Missouriense.*

The destruction of central pith preceding induration and subsequent compression have destroyed the structural evidence which would have otherwise been presented by the central elements of the stele. It is hoped that, preceding a more extensive description of this form which I will submit soon, evidence as to the nature of the primary wood and pith might be found.

J. E. CRIBBS

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CLIMATIC CHANGE IN JAPAN

A PRELIMINARY report by Jimbo[1] indicates that recent changes in vegetation, and presumably in climate, near Mount Hakkôda in Japan correspond to those already established for Europe[2] and North America.[3] The results of stratigraphic studies of fossil pollen in peat are summarized by the author as follows:

> Pollen of *Abies,* which were found in a larger number in the upper layer, could scarcely be seen in the lower layers, while those of *Fagus* and of *Quercus* were abundant in the lowest layer, decreasing remarkably towards the surface. This fact may be considered as an evidence of predominant growth of *Fagus* and *Quercus* in older times, while *Abies* is dominant in the present time. It may be presumed, therefore, that deciduous forests in this region have been invaded by the montane conifer.

We have thus a new and important link in a chain of evidence almost girdling the northern hemisphere. Without serious exception this evidence points to a recent increase in coolness and humidity following a warm, dry period of three or four thousand years ago. It is interesting to note that on this point microstratigraphy has confirmed inferences based upon floristic study; for the value of floristics as a means of obtaining perspective in ecological work is perhaps not sufficiently appreciated.

PAUL B. SEARS

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FALL OF A METEORITE IN SOUTH CAROLINA

A NEW meteorite has just come into my possession. The stone, which weighs about twelve pounds, fell July 1, 1933, within a few feet of a church at Cherokee Springs, South Carolina. The fall was very satisfactorily observed by two intelligent men, who state that the stone, which was picked up immediately, was too warm to hold comfortably in the hand, though not hot.

It is roughly rectangular in outline, bounded by rather flat surfaces showing a rather striking absence of the usual pitting. A considerable broken area at one end shows it to be apparently a light gray spherulitic chondrite, with very strongly developed chondrules and conspicuous inclusions of troilite. One or two smaller broken spots show traces of a secondary fusion crust. The primary crust is for the most part intact and more than ordinarily thick. I am proceeding with a full description, which will be completed as soon as practicable.

STUART H. PERRY

THE ADRIAN DAILY TELEGRAM
ADRIAN, MICHIGAN

SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN APPARATUS FOR DEHYDRATING NEMATODES

THERE is in use at the biological laboratory at New York University an instrument designed by the writer for the purpose of dehydrating nematodes which possess very thick cuticula. This structure, characteristic of many species of nematodes, especially the free living types, is very impermeable to dehydrating fluids, and therefore, if the change from an alcohol of a given percentage to one of a higher percentage is not carried out gradually, the nematode collapses. The apparatus to be described carries out these changes very slowly and needs little of the worker's time.

As shown by the figure, it consists of a series of five tubes set at an angle of about 30° onto a piece of glass tubing T about 550 mm long and 4 mm in diameter. All the glass tubes reach a height of about 700 mm above the bend G in the tubing. Each of the tubes is sealed to the tubing T by means of a large bore capillary. The capillary bore from tube 1 to tube 5 becomes increasingly larger; that is, the capillary of tube 1 is smaller than that of tube 2 which is smaller than that of tube 3, etc. The capillary of tube 1 has such a diameter that when the tube which rests on it, if full of water, will deliver the liquid at a rate equal to the rate of flow of water through capillary 2 when tube 2 is filled with water. Similarly, capil-

[1] Tadao Jimbo, "Pollen-analytical Studies of Peat Formed on Volcanic Ash," *Sci. Rep. Tohoku Imp. Univ.* 4th Ser. (Biol.), VII, 1: 129–132, 1932.

[2] G. D. Fuller, "Pollen Analysis and Postglacial Vegetation," *Bot. Gaz.,* 83: 323–325, 1927.

[3] P. B. Sears, "Postglacial Climate in Eastern North America," *Ecol.,* 13, 1: 1–6, 1932.