But striation of the bed-rock or the glacial scratches and polishing of erratics apparently did not attract his attention. In view of the acuteness of his observations of other phenomena this oversight is astonishing. It should be added that Thomas's notes on bed-rock geology are no less illuminating and discriminating than are those devoted to the drift. Thus in the Appalachian Plateau west of Pittsburgh he observes:

> For mile after mile we saw strata . . . in both sides of these rounded hills at equal heights, we saw the same on the sides of the next hill, if equally elevated; but sometimes we passed a considerable distance over those which did not rise up to that level; and on ascending some which are higher, again the same strata appeared. . . . the idea is clearly presented that the vallies were cleared out after the strata had been formed by deposition. . . . These strata extended many miles, but at last disappeared, proving the notion of regular strata round the globe to be an erroneous extreme [pp. 76–77].

Thomas's time was one of much activity in geological science; his interest in such matters is therefore not difficult to understand. That, however, he saw so clearly and came so close to modern interpretations, not through random speculations, but from attempts, by long cogitation, to fit his observations to rational inferences, marks his work as deserving of a recognition it does not seem to have received.

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TUMORS IN DROSOPHILA MELANOGASTER RESULTING FROM SOMATIC SEGREGATION

THE sex-linked gene, lethal-7, produces tumors in the male larvae at various stages of development. Tumor-bearing larvae do not survive to the adult stage and previously tumors of this origin have not been observed in the adults of either sex. To test the effect of this lethal-7 gene when exposed during development by the removal of its normal allele the following experiment was devised. Females carrying lethal-7 were crossed with buff, forked-5 males and the resulting females backcrossed to the same type of males. Forked females with red eyes from this backcrossing were mated to white-eyed, minute-w males. Nearly all the matings showed well-developed tumors in some of the larvae, and in every case half of the males failed to appear. Except for double crossing over, all the red-eyed, normal-bristled females were heterozygous for lethal-7, and such adults were examined for forked bristles and for tumors. Forked bristles appear as mosaics when the normal allele is removed from some of the cells either by deletion, non-disjunction or somatic crossing over.

In two cases forked bristles were found adjoining tumors. In one case a slightly depressed irregular area on the thorax showed small forked bristles on the margin. Underneath the epidermis in this depressed area there were several characteristic black tumors varying in size. The forked bristles were clearly bent at the tips. In the other case a peculiar outgrowth, somewhat resembling a balancer, grew out of the thorax near the base of the right wing. Both balancers were present and normal. This extra growth was accompanied by two large forked bristles near the base and on the outgrowth itself there were several dark-colored and thickened bristles. Apparently the normal allele of lethal-7 was also removed along with the gene for normal bristles.

Other offspring showed forked bristle mosaics without tumors, and tumors without any accompanying change in bristle formation. This is expected, since forked-5 is well removed from lethal-7. Somatic crossing over in Drosophila as shown by paired mosaics (twin spots) has been reported by several investigators. In this way as well as by deletion and other chromosomal irregularities, normal growth-regulating genes are removed from some cells during development in Drosophila as well as in maize and atypical growth results.

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RELATION OF ROOT PRESSURE TO PLANT DISEASE

A SATISFACTORY explanation for the occurrence of epidemics of many plant diseases is still lacking, despite a more clearly defined knowledge relative to the virulence of the pathogen, the inheritable susceptibility of the host and the relation of external environment. Evidence from many sources points toward factors making up the internal environment or "predisposition" of the host as being of fundamental significance. In this connection we wish to point out that the internal water relations of the host as determined by root-pressure may be an important determining factor in predisposition to infection and development of disease. The significance of this factor is naturally likely to be greatest with the less virulent parasites or the relatively more resistant hosts.

By means of the direct application of high-water pressure to the root system, high turgescence, guttation and water-soaking in various degrees may be readily induced for short periods with no permanent visible injury or wounding resulting. Tomato plants, for example, water-soaked in this manner are highly predisposed to infection with *Bacterium angulatum* Fromme and Murray, though they are difficult to in-

[4] Daniel Drake, "Picture of Cincinnati and the Miami Country," pp. 74–75, Cincinnati, 1815.