or smothering under its rank foliage every green thing that stands in its way. It is no uncommon thing to see whole acres of haw thickets and other shrubby growth enveloped in its deadly meshes, and destined to slow extermination by this ruthless invader. Among its victims I have seen a remarkably fine specimen of "tree haw" (*Cratægus viridis*) 4 dm. in diameter, 12 m., more or less, in height, and about the same in spread of crown, reduced to little more than a mere leafless skeleton under the throttling grasp of its oppressor. So closely was it enveloped in the meshes of the woody twiner, that I had to cut my way through them with a hatchet in order to take the measurements given above.

While it prefers a rich, moist soil, as most plants do when they have the choice, this aggressive intruder can accommodate itself to almost any conditions, trailing like an humble creeper along the barren slopes of arid hillsides, rambling over wire fences along the borders of dusty roads, from the cool slopes on the plateau of Lookout Mountain, to the deepest ravines in the valley, and onward, over the granite hills of the Piedmont region, it has made itself at home. I could supplement this case with some equally striking instances of the rapid distribution of herbaceous plants, but it seems to me that the example of a shrubby species which, in spite of the fact that these are, in general, much less efficient travelers than herbs, has been able to naturalize itself, within the memory of people now living, over an area extending from the Gulf of Mexico to the estuary of the Hudson, and for a thousand miles up the great Appalachian Valley, may be taken as sufficient evidence that other factors than time influence the distribution of species over a given area.

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ORIGIN AND DEVELOPMENT OF THE PHOTOGENIC ORGANS OF PHOTURIS PENSYLVANICA

THERE are at present three conflicting views regarding the origin of the photogenic organs in insects. One view is that they are modified hypodermal cells, another that they are formed from both ectoderm and mesoderm, and lastly, that they are mesodermal, being derived from fat cells. Of these three views that of the fat-cell origin has been the most generally accepted. Moreover, recently two important papers have appeared which apparently definitely settle the question in favor of the theory of fat cell origin. The first of these was by Vogel ('12), who worked on the embryology of *Lanopyris noctiluca,* the other by Williams ('16), based on a study of the embryology of our native species *Photuris pensylvanica.*

Unaware of Williams's work, I had undertaken, at the suggestion of Dr. W. A. Riley, a study of the embryonic development of the photogenic organs of *Photuris pensylvanica.*

During the summer of 1916, the eggs of this species required, on an average, 26 days to complete their development.

These eggs cut in sagittal sections 3 microns thick, showed in the fourteen-day embryos that the hypodermis on the ventrolateral portion of each side of the eighth abdominal segment, in its anterior region, was definitely thickened, due to proliferation and enlargement of its cells.

In the fifteen-day embryos the organ appeared as a distinct nodule which projected from the inner surface, though at this stage there was no evidence of any separation from the hypodermis. Further, it was found that there was no evidence of any relation between the fat cells and those of the nodule, in this, or the fourteen-day embryos.

In the sixteen- to seventeen-day embryos the organ is completely separated from the hypodermis, except at its two ends, where it remains attached. From Vogel and Williams's descriptions of the earliest condition of the light organ that they observed, one would be led to believe that it was the study of this stage of development, on which they based their conclusions regarding its origin. At this time the fat cells lie in rather close proximity to those of the light organ and somewhat resemble them.

In embryos nineteen to twenty days old, there occurs a differentiation of the cells of

the photogenic organ, by which the two layers are formed. About this time the tracheal and nerve connections become fully established. At the age of twenty-two days the organ begins to emit light.

In this connection it may be stated that my observations confirm Dahlgren's recent announcement that the adult organs in the pupa arise from the hypodermis.

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JOSEPH YOUNG BERGEN

To the Editor of Science: In my paper in memory of Joseph Young Bergen, which appeared in Science, January 4, 1918, I stated that he was the son of a clergyman. I am now informed by Mrs. Bergen that this statement is incorrect.

Edwin H. Hall

Cambridge, Mass.,
January 30, 1918

SCIENTIFIC BOOKS

The Casting-Counter and the Counting-Board. A Chapter in the History of Numismatics and Early Arithmetic. By Francis Pierrepont Barnard. Oxford. At the Clarendon Press. 1916. 357 pp. + LXIII. plates. Price £3 3s.

When we consider the rôle played by the abacus in the history of calculation, first as the primitive and probably prehistoric dust board and finally in the form of the elaborate reckoning machines of the present day, we can see that the history of mechanical computation is closely tied up with the history of the race. It is true that for long periods we have no reference to such a device as the abacus, but for equally long periods we have no reference to many of the common customs of life and to the everyday implements used in the home. It is probable that one would have to search long in the written records of the early periods to find any reference to such homely words as button or shoestring, or to such common actions as the combing of the hair, the milking of a cow or a goat, the cooking of a piece of beef, or the making of a sandal or a shoe, and yet all these words and actions have been commonplaces for thousands of years. The recording of the use of common devices is generally inversely proportional to the frequency of their use, and this is probably one reason why the abacus, in one form or another, is not more frequently mentioned in the chronicles of various peoples.

There were three standard forms of the abacus in ancient times, the dust board, which was the forerunner of the wax tablet as the latter was of the slate; the board on which counters or small disks were moved about, these counters appearing in Rome as pebbles or marbles (calculi); and the bead abacus, the counters running in grooves or on wires, a form still found in schools in our country and familiar as the Chinese *suanpan,* the Japanese *soroban,* and the Russian *tschotü* or the Armenian *choreb.*

Of these various forms, the most interesting for the general reader of the Western World is the board on which calculi were moved, since these counters are so often mentioned in our literature. Adelhard of Bath (c.1120) speaks of such a table, saying that "quidem mensam pithogoream ob magistri sui reuerentiam. sed postī tamē abacum dixerunt," having probably in mind a passage from Boethius: "Pythagorici vero . . . mensam Pythagoream nominabant . . . a posteribus apellabatur abacus." We find the name of *abacisti* given to those who were skilled in computation with the counters, and even the verb "to abacus" is occasionally found, as in a certain manuscript of the eleventh century—"Hoc si abacizando probaveris." In later times the references to counters become very numerous. So we have in English such expressions as "Sitte doun and take countures rounde," "A nest of cowntouris," "The kitchin clarke . . . jangling his counters," "A counter caster," "Any that can but cast with Counters," and "I shall reken it syxe tymes by aulgorisme or you can caste it ones by counters." From the use of the word as representing a disk we also find it employed to represent the person, as in the expression, "Ther is no countere nor clerke con hem recken alle," and also to repre-