pages 28 to 33, the conclusion has been reached that here, also, the gumbo is so related to the drift that it is undoubtedly the thoroughly weathered product of the Illinoian drift.

As a result of the field investigations and the chemical studies it is now proposed that the somewhat indefinite term "gumbo" be no longer used for these super-drift clays, but that the name "gumbotil" be used. Gumbotil is, therefore, a gray to dark-colored, thoroughly leached, non-laminated, deoxidized clay, very sticky and breaking with a starch-like fracture when wet, very hard and tenacious when dry, and which is, chiefly, the result of weathering of drift. The name is intended to suggest the nature of the material and its origin, and it is thought best to use a simple rather than a compound word. Field work has already established the fact that in Iowa there are three gumbotils, the Nebraskan gumbotil, the Kansan gumbotil and the Illinoian gumbotil.

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THE EVOLUTION OF HERBS

The article by Edmund W. Sinnott, published last week in Science, *44*: 291, supports conclusions on this subject arrived at from quite a different standpoint.

The idea that trees are primitive forms is involved in the proposition advanced by Henry L. Clarke, in the *American Naturalist, 27*: 769–81, September, 1893, that in their order of blooming the generalized precede the specialized.

My observations were based only on entomophilous flowers, 493 native and 61 introduced.

If we assume that the earliest, least specialized, and primitive plants form the earliest maxima and succeed in regular order, we shall have for indigenous plants the following results according to the time of the maxima:

Trees	April 27–May 8
Woody climbers	June 13–15
Shrubs	June 21–23
Perennial herbs	August 2–6
Annuals and biennials	August 30–September 6

And this seems to be the probable order of their development. The original plants having the most freedom developed large size and occupied the most favorable positions. The less favored could become reduced to shrubs and finally to herbaceous perennials, and occupy many positions which were unfavorable for trees or with which trees did not interfere. The habits of perennial herbs are better understood if we suppose that they had to compete with trees, or rather avoid competition with them, from the first. The annuals developing later were able to find many temporary situations unfavorable for woody plants or perennial herbs. The primitive Angiosperms were probably trees, like Magnoliaceæ, Anonaceæ and Lauraceæ.

Another general characteristic of blooming seasons is that the earliest, most generalized, most primitive plants have the shortest seasons, while the most specialized, most recent, and latest arrivals have the longest seasons. Arranging the vegetative forms according to their average blooming seasons, we have the following order:

	Days
Woody climbers	36.5
Trees	39.4
Shrubs	42.7
Perennial herbs	57.1
Annuals or biennials	75.1
Cosmopolitan	80.4
Introduced	117.3

Except for trees and woody climbers, the order is the same as for the maxima.

Charles Robertson

Carlinville, Ill.,
September 6, 1916

HORSE FLESH AND THE DIET OF EARLY MAN

To the Editor of Science: In Science, for September 22, is published a letter on the "Animal Diet of Early Man," which discusses the subject with reference to possible evidence drawn from tapeworms and their hosts. In this connection, the writer of the letter speaks of the horse as food, as follows:

There is nothing to show that horses were not eaten, unless the rather widespread abhorrence of eating horse flesh at the present time can be con-

strued that man never adapted himself to that diet as he did to beef.

It is worth recalling that any such prejudice in European races is only a thing of yesterday, when discussing such a question as this, since horse flesh was eaten in parts of Europe at least for an apparently unlimited time. It went out of use when it was declared "unclean" by Pope Gregory III., who died in 741. This is discussed in a paper by Esser, on horse flesh, which appeared in the *Journal für Landwirtschaft*, 43 (1895), No. 3, pp. 349–358. The prohibition was so effective that horse flesh did not assume importance in Europe again until after 1870.

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ANOTHER TYPICAL CASE

TO THE EDITOR OF SCIENCE: About a year ago a short article by Professor Pickering appeared in SCIENCE under the heading "A Typical Case." The point of the discussion was that a man who had been trained to a high technical efficiency in research had been obliged to take a position in which he was overworked and underpaid to such an extent that he had been forced to give up research because of lack of time and funds, particularly the latter. Thus the world at large loses the benefit of his experience and training.

I am personally interested in a closely related problem which I would like to have considered. I can illustrate it best, probably, by some account of my own experience and I am going to put it on a frankly personal basis, so that due allowance may be made for my own feeling in the matter. My first acquaintance with research was in some preliminary work on a problem in morphology. At that time I was on a fellowship stipend. Marriage at the end of the year made it impossible to continue on such a condition. In connection with high school teaching the line of study was shifted to a rough biological survey of the locality. This was interrupted by a shift in location and the next opportunity for advanced study happened to be in the line of history. A little later the unfortunate acceptance of a position with a bankrupt college caused me to be stranded in the middle of the year and I again took up my original problem in morphology. This study was advanced sufficiently by the end of the year to enable publication of a paper which received favorable comment from workers in that line, especially abroad. Overload in teaching for the next few years prevented any systematic research being done. Finally an opportunity came for attendance at another university, expenses being partly met by acting as half-time assistant. The results of research of that year were covered by a paper on regeneration. Since that time I have not been able to command sufficient funds to enable me to attend regular sessions of a university and support my family. I have had some summer-school study but not of a sort to give residence credit, I am informed.

For three and one half years now I have been working on a local plankton problem under the advice and direction of a university authority on that subject. For more than two years of that time I have averaged more than fifteen sixty-minute periods per week through fifty-two weeks of the year in study of quantitative and qualitative features of the problem. The value of half of that time has been at least trebled through the aid given by my wife in computing and recording. I am hoping to get my own paper into press this year. I have not been able to obtain any university credit for this work because it could not be counted "in residence." I would like to have a Ph.D. degree, because it seems that that is regarded as a necessary factor in finding a position which would enable me to support my family and still carry on the research in which I am so much interested. Since my efforts have almost exhausted my scanty resources, such a point is of very great interest to me.

I feel quite certain that my case is fairly typical in much the same way as the one mentioned by Professor Pickering. It may be that I have actually done more research than some of similar experience but there are individuals who have done more than I have. There are also a good many who could do acceptable research but who get off in small communities