the wild carrot (*Daucus carota* L.), goldenrod and aster. Like *nigricornis* the eggs are deposited in rows, but the insect seems to prefer stems and stalks of five millimeters or less in which to place them.

PRESIDENT W. D. HUNTER: Any discussion on this paper?

MR. W. E. BRITTON: Which species lays eggs in rows on the peach trees?

MR. P. J. PARROTT: That is *Oecanthus nigricornis*.

A MEMBER: Do you know of a species which lays three or four eggs deposited on either side of a wound?

MR. P. J. PARROTT: This is the work of another species which we hope to study. It is apparently a southern species.

PRESIDENT W. D. HUNTER: The next paper is by Mr. R. L. Webster on, "The Arrangement of the Material for an Entomological Bulletin."

THE ARRANGEMENT OF MATERIAL IN AN ENTOMOLOGICAL BULLETIN

By R. L. WEBSTER

Several years ago, when preparing an outline for a bulletin, it struck me that the usual order of arrangement of matter in entomological bulletins in general was not that demanded by an economic treatment. It seemed to me that it was quite unnecessary to thrust on the farmer and fruit-grower a detailed account of the past history, the synonymy, the stages and the habits of an insect, before giving him a word concerning the control measures; the thing in which, presumably, he is most vitally interested. And I had heard the complaint that "we can't find things in the bulletins," for which there must have been a reason.

With this idea in mind I attempted to work out an arrangement by which an insect could be treated of in a more logical manner, from an economic standpoint; an order that would throw the popular treatment and the control measures in the fore part of the bulletin, where they may be seen easily, and place all the more technical matter in the latter part.

Most of the entomological bulletins published in this country have been concerned with individual species of insects although bulletins which consider insects in economic or systematic groups have not been uncommon. Of these last I am not so directly concerned in this paper, which will refer, for the most part, to a bulletin considering a single insect; in other words, to a monographic bulletin.

The usual order in a bulletin of this kind is an historical one, which first treats of the insect's past history, its destructiveness, and the

synonymy, which is followed by an account of the generations and the stages, and which concludes with a discussion of the natural enemies and the control measures. In using such an arrangement the entomologists in this country seem to have followed the custom of Fitch, Riley and Lintner. Both Riley and Fitch used this general arrangement to a considerable extent but it was most used by Lintner, whose entomological articles were almost entirely written up in this historical order.

Now this is a logical order from the standpoint of pure science. It is perfectly intelligible to the entomologist and in consequence it seems proper to use. It is quite natural to lead up to the control measures for an insect after a full discussion of its habits and life history, upon which the control measures depend.

But an entomologist should write not only for his fellow-entomologists, but for all his readers, and especially for the man to whom his writings ought to be of most use, the man whose crops are damaged by insect pests. Our bulletins are sent to a very large number of people, of whom only a very few know much about insects. The whole mailing list at the Iowa Experiment Station amounts to something like 20,000, of which not more than 400 at the most are entomologists. So it seems to me that it is my business to write my bulletins, if I am able to do it, for the whole 20,000, rather than only for the 400.

You cannot expect the average farmer to become an entomologist; the best educated farmer will have difficulty in wading through an entomological bulletin containing any great amount of technical matter. It appears to me that it is the place of an entomologist to become a farmer, so far as he is able, when he attempts to write an article which he expects the farmer to understand. It certainly is not beneath his dignity to attempt such a thing, in fact it is quite possible that he might become a better entomologist and be more appreciated by those who read his bulletins if he should do something of this kind.

In this connection I may well refer to a portion of the presidential address given before this association in 1893, by Dr. S. A. Forbes. Dr. Forbes said " . . . I am inclined to think that we are very likely to forget, when we prepare our reports, that we are writing largely for men to whom entomology is a perplexing, obscure and displeasing subject, of which they know little or nothing, and especially nothing good; but on the other hand, they are frequently experts in crop inspection, far quicker, as a rule, to observe injuries to their crops than we are, and more likely to discriminate them nicely. If we had always borne this fact in mind, I think that our economic articles would usually have taken quite a different form. The crop injury, and

its characteristic appearances would have led in our discussions, and remedial and preventive measures would have followed thereupon as immediately as practicable, the insect itself being brought in, if at all, in a strictly subordinate way, as an aid to the recognition and classification of the injury, and as a guide to the selection of an economic method."

In the discussion of teaching methods of entomology, at the Minneapolis meeting of this association, this same point was brought out. That teaching which reasoned from the injury to the insect was more effective than with that method reversed, was the meat of the discussion. In other words the matter was better considered from effect to cause, rather than from cause to effect, as Prof. J. G. Sanders then put it.

Where an economic group of insects has been concerned, the consideration of the whole subject according to the injury to the plant often has been used. Saunder's "Insects Injurious to Fruits" and Forbes monograph of corn insects (18th and 23d reports) will remain classic examples of this kind. Insects are there considered as attacking leaves, or branches, or roots, etc., as the case may be, the order of their consideration depending on an economic, rather than on a systematic relationship.

Certainly it is the injury to a crop that the farmer notices before anything else. Many a time he does not see the insect which has caused an injury, sometimes he sees the wrong insect, but he does see the damage. Then it is the damage of an insect to a plant that is the logical thing with which to start an entomological article of economic importance. Now it seems to me that, having attracted the reader by a description of the injury, something with which he may be more or less acquainted, his attention may be held for a few succeeding paragraphs, in which the insect may be very briefly described, and the life history in its essential details given. At this point only the bare essentials need be given, just enough to give a clear idea, nothing more. The weak points in the life history, where the insect may be reached by control measures, should be brought out quite distinctly at this point. This part of the text, also, is the place for illustrations of injury, and the insect as well, which tell more than pages of text.

Now the control measures may be discussed, for that is the point we have been trying to reach all the while. This is likely to be more in detail, if much experimental work has been done, but there is no reason why it cannot be put in popular language. In concluding the discussion of the control measures definite steps may be advised for the insect. This completes the popular portion of the bulletin, and so far the reader may go without encountering a single technical word,

unless it be the words larva, pupa or adult, and the meaning of these the average reader ought to know. I think it is best to explain these common terms the first time they are used in the text, afterward using them without further explanation. If a popular edition of the bulletin is to be issued, the first part of the regular edition, including the discussion of the control measures, may be printed as a separate bulletin.

Having concluded that part relating to the measures for control, we are now ready for the more technical treatment, such as the past history, the synonymy, the stages in detail and the natural enemies of the insect. In this part of the bulletin we are writing more for entomologists; few others will pay very much attention to the technical portion. Order is less important here, since the entomologist will look for those things in which he is interested, and on account of his training he is able to pick out more easily the essential points. But we must have some order, and the chronological order such as indicated appears to serve as well as any other. The position for the bibliography is, of course, at the end.

Summaries are frequently placed at the end of a bulletin; a rather natural position. Personally, however, I like to see them at the front, where they may be encountered as soon as a bulletin is opened, and boiled down to a single page, giving the real essentials of the bulletin.

Such an arrangement of material as has been here indicated the writer has been using in entomological bulletins of the Iowa Experiment Station during the past four years and it has proved to be very satisfactory.

In order to bring out the arrangement here considered a little more clearly, there is given below an outline on which a bulletin of this kind may be built up. This refers to a monographic bulletin, concerning one insect.

1. Summary.
2. Recent injury.
3. Appearance of the injury.
4. The insect's appearance (brief descriptions)
5. Time of appearance of the generations (briefly).
6. Control measures.
7. Steps advised.
8. Past history.
9. Destructiveness.
10. Distribution.
11. Food plants.
12. Classification.
13. Life history.
 - a. Generations (in detail).
 - b. Stages (detailed descriptions).
14. Natural enemies.
15. Bibliography.

It may be seen that the matter is easily divided between the numbers 7 and 8. Before this division is considered only the broader aspects of the problem, after it comes the detailed account.

This arrangement of a bulletin, which I have taken up at some length, is not a change of the matter treated, but only a change in the order. It is an arrangement which may not fit any and every bulletin, but it may be adapted to a great number of them, and especially to those concerning a single insect. This order in a bulletin, based as it is on the economic treatment of an insect, is, it seems to me, an order that is more readable, more interesting and more intelligible to the average farmer or fruit-grower than the order generally followed.

PRESIDENT W. D. HUNTER: This interesting paper is now open for discussion.

MR. F. L. WASHBURN: I think the summary should be at the beginning of the paper so that the farmer on opening the publication can see in a brief way what results have been secured. The summary should be in the beginning or at the end in bold type. We have to consider not only the farmer but also other entomologists who may criticize if we omit the technical part. The latter can be published separate from the economic part.

MR. W. E. BRITTON: I agree with Mr. Webster, and yet there are some of us who are not able to publish as we should like to on account of certain methods having been adopted by the directors of the stations. I think that perhaps the best place for the summary is in the beginning. The back page on the outside is also a good place, where it may be seen without opening the bulletin. Many times the subject matter must determine the form in which it is written. It is perhaps better to put in one place all the most important facts, provided this part is separated so that the farmer can readily see it.

MR. E. P. FELT: I think this subject is one of importance. It is a study in the psychology of presentation. I have been wondering how many men know the actual efficiency of the bulletins sent out from their offices. Sometimes it is just as well to write one paragraph and have it read by 10,000 as to write 10,000 paragraphs and have them read by one. We should use the local press at the time insects are causing damage. I go into many homes and it is only once in a while that I find a man who keeps entomological publications. There are only a few who keep them and I do not know of one man who could place his hands on the desired book. I have been wondering if a group of interested men could make some studies of this and report to us.

PRESIDENT W. D. HUNTER: Dr. Felt has made a suggestion that is

worth our consideration. I would like to ask if he wishes to place it in the form of a motion.

MR. E. P. FELT: I think the information might be useful to some of our men and I move that the chairman appoint a committee of three to investigate the use to which our publications are put and report at the next meeting.

MR. T. B. SYMONS: I believe the press bulletin and such forms of matter that are gotten out from week to week are very useful supplements to the general station bulletins. I second Mr. Felt's motion. I have been wondering if we should not have a press committee whose business it would be to see that our meetings are advertised in a general way throughout the country.

By vote of the Association the motion was carried.

PRESIDENT W. D. HUNTER: The next paper will be by Mr. A. W. Morrill on "Entomological Pioneering in Arizona."

ENTOMOLOGICAL PIONEERING IN ARIZONA

By A. W. MORRILL, *Phoenix, Ariz.*

In the selection of my title for this paper I do not wish to intimate that my field of action during the past three years has been one heretofore completely ignored by entomologists. It is a fact, nevertheless, that Arizona is entomologically in a pioneer stage of development. One by one the last few remaining states and territories have been yielding to the necessities for the organization and maintenance of an entomological service, and, not to be last, Arizona gave recognition to these necessities in 1909. Until that year Arizona was, in the words of Director R. H. Forbes of the State Experiment Station, "Entomologically lawless," and I may add entomologically needy of exploration and investigation. The state was, and is, a field for entomological work uniquely varied in itself, attractively different from other sections in its native insect fauna and above all affording excellent, if not unexcelled, opportunities for accomplishment in the exclusion of undesired pests as well as in insect investigations. Before dealing with the more recent entomological records and events, I will briefly review the "lawless" era prior to 1909 and as a further introduction I will outline our peculiar climatic and agricultural conditions upon which our entomological status, particularly from an economic standpoint, is dependent.

HISTORICAL. An examination of the indices of the Experiment Station Record, "Insect Life" and of other publications of the United States Department of Agriculture shows that in economic literature published prior to 1909, references to Arizona insects rarely occur. A