suggest explanations or interpretations for what he has seen.

After sufficient time has been allowed for the students to make independent observations they are called together and the observations on the assigned area summarized. On the first field trips some individuals will not only have more to report than others, but their findings will be more correct because of the wide range in the natural ability of students to observe critically.

The class is next asked to justify the summarized observations by the geological evidence at hand and by the previous study in the course. Such a procedure provides a discussion in which the students are the active participants, while the instructor serves to keep the subject open until all the evidence is weighed and conclusions reached.

If the previous experience of the class and the evidence at hand are sufficient to justify sound conclusions the problem may be followed through to a complete solution at this time.

If, however, an adequate solution of some of the field problems lies beyond the present state of the students' learning, such problems may well be left open for the present, to be taken up later in the classroom or in the field, when the course work has progressed to the required stage.

One incompletely solved problem may lead to other related ones. It may be used to stimulate student interest in these problems and to challenge their ability to solve them.

The procedure in each case will be such that the instructor serves to direct the students' attention to the problem for study, to stimulate more accurate observation and to see that the discussion comes to sound conclusions. This process of solving a problem is a cooperative venture wherein the observations of all are pooled and evaluated. The thinking of the students is sharpened and their faculties for critical observation and judgment are developed. The field trip becomes a period of discovery for the group as a whole and of development for the individual.

As students are thus given an opportunity to share in the responsibility of solving field problems the trip becomes increasingly purposeful to them and there is marked advance in the attainment of the desired objectives set up for this part of the geological program.

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AGRONOMIC SCIENCE, 1838–1938

ALONG with other scientific contributions of which 1938 marks the centenary, agronomists should not let pass unnoticed those of the Frenchman Boussingault. Just a century has passed since Jean Baptiste Boussingault, adventurer, traveler, chemist and "farmer of Bechelbronn," made his first fundamental contribution toward the solution of the problem of nitrogen assimilation by plants. In two papers published in 1838 in volumes 47 and 49 of *Annales de Chimie et de Physique* he reported results of carefully conducted experiments which showed that certain legumes grown in sterile soil "acquired a very appreciable quantity of nitrogen" and that "wheat and oats (non-legumes) grown in the same circumstances . . . showed no increase in nitrogen after their maturity." A little later Boussingault conducted field experiments with crop rotations, some of which contained legumes. The harvested crops were carefully weighed and analyzed. Boussingault stated, "it was with the purpose of substituting positive facts for mere guesses" that he undertook the work. His experiments virtually mark the beginning of agronomic science.

A. B. BEAUMONT

REPORTS

THE DEPARTMENT OF AGRICULTURE APPROPRIATION ACT, 1939[1]

APPROPRIATIONS made in the act for the support of the Federal Department of Agriculture for the fiscal year ending June 30, 1939, as signed by President Franklin D. Roosevelt on June 16, 1938, aggregated $742,040,279, plus $187,105,000 of reappropriated funds. If to this are added $152,023,958 for the so-called "permanent" appropriations, which automatically become available, $825,000 carried in the Second Deficiency Act, $7,000,000 transferred from the War Department for flood control surveys and $387,000,000 available under the Work Relief and Public Works Appropriation Act of 1938, the total for the year becomes $1,475,994,237. The comparable aggregate for the preceding year, including deficiency appropriations, was $984,005,456, of which $850,794,177 was derived from the appropriation act.

By far the largest allotment is that for the conservation and use of agricultural land resources. The act itself appropriates $345,000,000 and reappropriates $155,000,000, while $356,024,893 additional will be available from other sources for parity payments to producers of wheat, corn, cotton, rice and tobacco and for other price adjustments. Second in size only to these appropriations are the grants for roads. The Bureau of Public Roads receives $187,500,000, an increase of $20,000,000, mainly for more rapid elimi-

[1] From the *Experiment Station Record.*