

3. What is a tissue? Describe the following forms of vegetable tissue: *Epidermis, parenchyma, sclerenchyma, sieve-tubes, spiral vessels.*

4. State what you know concerning chlorophyll.

5. Describe the principal different kinds of ovary.

6. Does a plant respire? If so, how and why?

7. State what you know concerning transpiration.

8. Name and classify the principal forms assumed by foliage leaves. Distinguish between a leaf, a phyllode, and a phylloclade.

Shorthand (Senior).—For Senior Civil Service. Time allowed: 3 hours.

INSTRUCTIONS TO SUPERVISORS.

1. Inform candidates before the time for taking up this subject that they may use pen or pencil as they please for taking notes, which should be written on ruled paper, but that they must transcribe those notes into longhand with pen and ink.

2. Inform candidates that when once you have commenced to dictate you cannot stop until the passage is finished.

3. Dictate the passages at the following rates of speed:—

(a.) 80 words per minute.

(b.) 120 " "

(c.) 150 " "

N.B.—It will be well to practise reading these aloud some time beforehand, looking at a watch or clock, so as to accustom yourself to reading at the exact rate indicated. The matter to be read is marked off into sections, each of which is to occupy a minute. The Supervisor will perhaps find it advisable to mark it off into smaller sections, each containing the number of words to be read in fifteen seconds, and to read one section in every quarter of a minute. As the candidates hear the passage read only once, the reader's articulation ought to be very clear, and the candidates ought to be so placed as to be able to hear well.

4. Candidates are at liberty to take down one, two, or three passages, as they choose. All the passages required by candidates are to be dictated before any one begins to transcribe; and there should be as little delay as possible between the readings.

5. Inform candidates that rapidity in transcribing notes into longhand is essential, and note carefully on the transcribed copy the exact time taken in transcription. Candidates must not look at their notes while a passage that does not concern them is being read.

6. Inform them also that the clearness and accuracy of the shorthand notes (which must in every case be sent in attached to the transcript) will be taken account of by the examiner; and that they must not alter the shorthand notes after the dictation is finished.

(a.) At the rate of 80 words per minute, takes 10 minutes.

Another piece of work which belongs peculiarly to a central department is the collection and preparation of national statistics. Statistics of acreage under different crops, with the annual and average produce per acre, and the number of live-stock in the United Kingdom, are collected and published by the present Board. The Board that we desire would go much further in this direction. We have at the present time no accurate idea of what is the

- 1 average composition of any | portion of our agricultural produce, for the simple reason that the collection of the scattered analyses, the rejection of imperfect work, and the averaging of the remainder is so large an undertaking that no private individual has had the courage to attempt the task. The results of this present lack of national information are not unimportant. We are obliged at the present time to employ German averages for all purposes of teaching or
- 2 calculation. These averages are in the main | prepared from German analyses, and relate to crops and foods grown in a different climate and under different conditions to our own. In the United States the want of national statistics respecting the composition of foods and crops has been supplied by their Department of Agriculture, which has published in one volume more than 3,000 analyses of American-grown foods, all properly classified and averaged. In the
- 3 same way the results of American digestion experiments, made exclusively | with American foods and American animals, have been collected and published, thus again obviating the necessity for relying solely on German figures. An efficient Department of Agriculture should be provided with a staff of officers representing all the sciences connected with agriculture; these offices should be furnished with suitable laboratories, and all the machinery required for carrying out investigations and making reports. Thus equipped, the department would be able to
- 4 attempt the solution of agricultural problems of pressing importance. The | work done at this Government institution would also serve as a model for the investigations carried on at the smaller experiment stations. The investigations thus conducted with public money should be of a thoroughly practical character, the results of which would have a direct bearing on the farmer's work. Let me venture on a single illustration. Persian barley has lately been imported into England in considerable quantity; its price has been lower
- 5 than that of any other kind of barley | in the market. A question at once arises in the mind of the cattle-feeder: Is it really cheap? Will a sovereign expended on these thin, shrivelled grains purchase a greater weight of food substance, and fatten an animal better, than the same money spent on English barley? The farmer can neither make a chemical analysis nor carry out an accurate feeding experiment, but a properly equipped Department of Agriculture could
- 6 do both, and in a few weeks issue a | report which would be of substantial benefit to the farmers of this country. Turning to the work done in this country by local authorities, he emphasized the point that all educational machinery requires inspection, and urged that County