If so, the meteorologist will have to seek the lady outside—though she may sometimes be aided by hail, as Faraday was able, by means of compressed ordinary air, carrying water-drops in suspension, to excite a positive charge on ice! HENRY E. ARMSTRONG.

The Formation of Cumulus Cloud above Bush-fires.

THE formation of a cumulus cloud above a column of smoke rising from a bush-fire was observed on two occasions during a recent visit to Australia. Though I scarcely think that this phenomenon can have escaped observation before, it may be of value to put upon record a few details of its occurrence.

On April 30, 1922, while motoring along the shores of St. Vincent's Gulf, South Australia, on a hot autumn day, shade temperature about 85° F., we observed the smoke from a bush-fire about seven miles away rising to a considerable height in still air; though not very dense, the smoke looked black against a background of blue sky, but it appeared

FIG. 1.

capped by a white cumulus mass. To make sure that it was not an illusion produced by a distant cloud behind it, we motored at 45° to the line of sight for about two miles, but there was no parallactic displacement between the smoke column and the cloud.

On the following day, which was characterised by a hot dust-laden north wind, the smoke from another bush-fire near the coast of Encounter Bay was being swept inland by a local sea breeze against the general northerly current. The southerly breeze died out as greater altitudes were reached, until the smoke rose almost vertically; at this point it became capped by a gleaming white cumulus cloud. On this occasion the smoke was seen both before and after the cloud formed upon its summit, so there was no doubt about the reality of the phenomenon; first one peak of the smoke developed a white and billowy crest and then another. So far as could be judged, the cloud, once formed, developed vertically more rapidly than the smoke was rising. The level at which the cloud originated appeared to be sharply defined.

The sketch reproduced in Fig. 1 was made from photographs taken on May 1, which were, unfortunately, not good enough for direct reproduction. It looks towards the west from an indentation in the south coast. The sketch is somewhat at fault in suggesting

that the sky was overcast; it was in fact clear of other cloud. But the shapes of the rising smoke and of the cloud cap are shown faithfully, though the contrast between the brightness of the latter and the smoke is scarcely sufficiently emphasised. It represents the stage of development of the cloud about 15 minutes after it first began to form above the rising smoke. W. G. DUFFIELD.

University College, Reading,
November 28.

The Pancreas and Diabetic Metabolism.

THE renewed interest in the nature and metabolism of diabetes mellitus under the influence of the discovery of insulin, prompts me to the following brief communication. A more detailed discussion of the subject will necessarily appear elsewhere.

1. The belief that insulin is a secretion of the islands of Langerhans and that it is directly concerned with the burning of blood sugar stands on an insecure and, as I believe, erroneous basis. The morphological and functional position of these islands is still so uncertain that it is at present not possible to bring them into any definite relation to functions of the pancreas. All the older evidence obtained by tying of the main duct, by special staining methods, their apparent independence in Elasmobranch and Teleostean fishes, together with observations in pathological cases, are open to serious question and different interpretations. (See L. S. Milne and H. L. Peters, *Jour. Med. Research*, Boston, xxvi. 3, 1912, p. 405.)

For these reasons, a number of pathologists, including myself, have come to abandon the strict belief in island independence and function and put the relations of the pancreas to diabetes into the gland as a whole. Moreover, the pancreas is even normally a very fluid organ, presenting constant evolutionary changes. My own studies in relation to these have led me, with others, to believe that the islands are a morphological phase in this phenomenon and that they are interchangeable with parenchyma and ducts. Thus, they may disappear during regressive pathological lesions by this transformation, and no evidences of degeneration or other destructive loss are left behind (Oertel, *Jour. Med. Research*, Boston, xl. 3, 1919; and Oertel and Anderson, *Scientific Reports*, Royal Victoria Hospital, 1916, B. 1, p. 155).

2. Milne and Peters obtained in my laboratory years ago results (*Jour. Med. Research*, xxvi. 3, 1912, p. 405) which indicated that the tissues in diabetes can utilise dextrose, while the blood of depancreatized animals possessed a marked diastatic action on glycogen, converting it into sugar; and this was increased, sometimes markedly, above the normal. They concluded from this and other evidence that the disease would seem to depend upon an excessive production of glucose from glycogen, and they interpreted the activity of the pancreas in sugar metabolism as a regulator in this conversion. When, therefore, pancreatic insufficiency occurred, increased conversion of glycogen into sugar takes place. The ability to form glycogen, however, remains.

These conclusions did not attract at that time the attention which I think they deserved, evidently because they did not harmonise with prevailing views of sugar metabolism in diabetes, and also because certain evidence like respiratory quotient differences were regarded as against them. Recently, however,