normal way by gaining an electron from an inner orbit) so that the reaction may go

$$A_2 + B \longrightarrow A_2^+ + B^- \longrightarrow A_2B,$$

or $A_2 \longrightarrow A + A$, followed by $A + B \longrightarrow AB$;

the active form of the catalysing atom then reverts to the passive, either spontaneously or as a result of either final reaction. In other words, my view is that the reaction takes place because the passage of an electron from A_2 to B activates both, and that the catalysing atom is the conductor of this electron.

An example will illustrate. When metallic cadmium is shaken with dilute sulphuric acid, some of its atoms expel electrons to form ions, and in so doing discharge hydrogen ions to form atoms of hydrogen on the metallic surface. The chemical activity of these atoms is a simple function of the reactivity of the cadmium. These atoms are known to combine very slowly with each other, and this is expressed by saying that cadmium has a high hydrogen overvoltage. If a little platinum, tungsten or molybdenum be deposited on the cadmium, combination of the atomic hydrogen proceeds rapidly, and these metals are said to have a very low overvoltage. The view expressed in (*d*) shows how this occurs, and explains why the metals which exhibit passivity alone have very low overvoltages. In this case the reactions are

$$H + H \longrightarrow H^+ + H^- \longrightarrow H_2.$$

This is in accord with recent work by J. Heyrovský on the dropping mercury electrode, who shows that the passage from atomic to molecular hydrogen is better represented by the changes $2H \longrightarrow H^+ + H^- \longrightarrow H_2$ than by the change $2H \longrightarrow H_2$.

These views also carry those of H. S. Taylor, E. F. Armstrong and T. P. Hilditch on one hand, and those of I. Langmuir on the other, a definite step further. The former think that in a hydrogenation process at the surface of nickel, both reactants are attached to a single atom of nickel; the latter thinks that the reactants are adsorbed on adjacent atoms. In both cases the adsorption of the reactants is explained by the fact that nickel is not electrically neutral in the same sense as is zinc, and, in the first case, the subsequent reaction is explained by the mechanism given in (*d*) above, namely,

$$A_2 + B \longrightarrow A_2^+ + B^- \longrightarrow A_2B.$$

Since the passage from the passive to the active form involves the expulsion of an electron from an inner orbit, it is possible that when this change occurs in the presence of an adsorbed molecule, this molecule will be split into atoms, $A_2 \longrightarrow A + A$. This suggests an explanation for the well-known but unexplained observation that gases adsorbed on nickel, platinum, palladium, etc., are sometimes in the atomic condition. When a second molecule B comes sufficiently near to this atom and is capable of reacting with it, the reaction $A + B \longrightarrow AB$ occurs as I. Langmuir thinks.

A. S. RUSSELL.

Christ Church, Oxford,
December 8.

Weather Prediction from Observations of Cloudlets.

MAY I refer to the first letter of Sir G. Archdall Reid? (NATURE, November 7, p. 676). He says: "If then the behaviour of the smallest and thinnest fragment of cloud that can be clearly isolated be watched, it is usually possible to predict very quickly and with fair confidence the state of the weather for the next few hours. If the cloudlet waxes visibly, rain is almost certain; if it wanes, fine weather is equally probable; if it neither waxes nor wanes, existing conditions are likely to continue." It seems to me that the method of forecasting is falsified on every day on which clouds form and when rain does not follow, and there are very many such days in the year; for the cumulus of a fine day, which is common in spring, summer, and autumn, and occurs sometimes in winter, begins its life as a cloudlet, whether the ordinary man gets up early enough to see it or not. Certainly, too, cirro-cumulus often begins its life as cloudlets, but I have never seen cumuli "wane into cirro-cumuli" and rather doubt whether any one has ever observed such a phenomenon.

I do not think that Sir Archdall Reid quite appreciates my point about cirro-cumulus: we often see cloudlets of this variety waxing in one place and simultaneously waning in another; are we to predict rain from the waxing, or fine weather from the waning cloudlets, when both prognostics are occurring at one and the same time? Lenticular cirro-cumulus is composed of cloudlets that are born on the windward side and die in the leeward side of the cloud mass; in his first letter Sir Archdall Reid gives two possible explanations of this phenomenon; I should like to mention that it was these explanations to which I referred, and not any explanation of his main thesis, for as he says he gave none.

I quite agree that the waxing of cloudlets is often followed by rain, for we cannot have rain without cloud, but I think that it is just as often not followed by rain, and I certainly cannot think that if cloudlets wax visibly "rain is almost certain," for if this were the case we should have scarcely any rainless summer days. But Sir Archdall Reid seems less certain about the method in his second letter (December 12, p. 864) than he was in his first. I may be mistaken, but it seems to me that the method is scarcely of more use than the tossing of a coin; but, on the other hand, I am not sure that I understand the second of Sir Archdall Reid's definitions of cloudlets—"small and diaphanous clouds which can be seen at the same time in every part," and it is possible that our disagreement is based on our definitions of cloudlets. It would be interesting to know what those who are more familiar with forecasting than I am think of the question.

C. J. P. CAVE.

Stoner Hill, Petersfield,
December 22.

THE correspondence on this subject in recent issues of NATURE has been of particular interest to me, because the observation of the waxing and waning of cloudlets has been made by me for the last four months in trying to forecast for the next few hours the probability of clear or cloudy weather. I may add that these observations have always been made about half-an-hour or so before sunset, for the following reason:

I have set myself the task of photographing the spectrum of a certain star on every fine night for a period of about 130 days, and I began this work on the night of September 9. The most convenient time for photographing this star is as soon after sunset as possible, when it is sufficiently dark.

As I have to go down 400 feet to get home, I prefer not to leave the observatory if the early evening is going to be fine.

On doubtful afternoons, therefore, I have studied the cloudlets, picking out the smallest and watching its behaviour. I have found that, in nearly every case, the waning cloudlet has given me for the next few hours clear weather. On the other hand, when the cloudlet increased in size I was nearly always doomed to a cloudy evening.