for the very wide deviation of the hydrogen chlorine combination from the Einstein photochemical equivalence law. Nernst postulated that the primary action of the light was to split up the chlorine into atoms, and that these were able to react with hydrogen molecules according to the equation

$$Cl + H_2 = HCl + H,$$

and that the atomic hydrogen formed again reacted with chlorine

$$H + Cl_2 = HCl + Cl,$$

and that this cycle was repeated over and over. Hence 1 quantum of light energy was able to cause a very great amount of combination. He showed that all these reactions proceeded with a free energy decrease and hence were possible reactions.

We are attempting to put this theory to a direct test. In our experiments atomic hydrogen, generated by Wood's method (Trans. Roy. Soc., 102-A, 1, 1922), is led into a mixture of hydrogen and chlorine, and if the theory is correct an excessively large amount of hydrogen chloride should be formed. To determine the amount of atomic hydrogen at the moment of reaction the same procedure is used substituting bromine for chlorine. It is known that the hydrogen bromine reaction does not give excessive yields of hydrogen bromide and Nernst has shown that the reaction

$$Br + H_2 = HBr + H$$

will not take place spontaneously. The hydrogen and chlorine are at a partial pressure of about 1 mm. each, and care is taken to prevent illumination of the gas mixture from the discharge tube. It has been shown so far that atomic hydrogen will travel a distance of 15 cm. from the discharge tube when the pressure is 1 mm. If chlorine be permitted to meet the hydrogen stream at this point direct combination takes place at room temperature; in one experiment the yield of hydrogen chloride was 10 per cent. of the hydrogen used. This amount would seem to exceed greatly that due to the atomic hydrogen present, although so far no direct determination has been made of this quantity.

A. L. MARSHALL.
H. S. TAYLOR.
Princeton University, Princeton, New Jersey,
November 7.

Remarkable Ascending Currents at Melbourne.

REMARKABLE ascending currents were observed during a pilot balloon ascent at Melbourne at 11.00 hours on Friday, October 26, 1923. Heights were determined by means of range-finder readings, and should have no error of consequence. The following table gives the results of the ascent:

Time.		Normal Height.	Observed Height.	Wind.	
				Direction.	Velocity.
min.	sec.	m.	m.	°	m./sec.
	45	90		335	6·8
1	30	180	176	332	10·6
2	15	270	351	325	11·3
3	00	360	801	323	10·9
3	45	450	1202	282	8·3
5	15	630	1580	272	8·8

At the first reading the balloon was too near to be observed with the range-finder. The rate of ascent should have been 100 metres in 45 seconds according to J. S. Dines's formula, but for the particular type of balloon used, range-finder observations indicate that the actual rate is about 90 metres. Shortly after the fifth observation the balloon entered thin cloud, but could be seen for some time longer.

Between the second and last reading the air in which the balloon was travelling ascended at the rate of 4 metres per second, while between the third and fourth the ascending velocity was 8 metres per second. On a number of occasions when cumulus cloud was forming, ascending rates of 2 metres per second over considerable ranges have been observed at Melbourne, but nothing approaching the velocities shown above had been encountered previously. It will be noted that the upward current was at times such that no raindrop could descend through it. A remarkable feature was that the cumulus cloud which was forming rapidly at the time was doing so, not in isolated masses, but in an almost continuous sheet. No cumulonimbus was present. Above the cumulus layer alto-cumulus was moving from 252°.

As regards the general situation, an anticyclone was passing to the northwards, moving rapidly. During its passage across the continent the anticyclone had decreased in intensity. Melbourne was coming under the influence of the succeeding low-pressure trough. The recent weather had been characterised by these fast-moving anticyclones, the intervening depressions being very poorly developed. This weather is one of the pronounced drought types.

EDWARD KIDSON.
Meteorological Bureau,
Melbourne,
October 29.

Long Range α-Particles.

IN a letter to NATURE of September 22, p. 435, we stated that, in addition to the α-rays of range 6·97 cm., radium active deposit emits particles of ranges 9·3, 11·2, and 13·3 cm. respectively. It has since been found that, in addition to the α-rays of ranges 4·8 and 8·6 cm., thorium active deposit emits particles of ranges 11·5 (previously recorded by Rutherford), 15·0 and 18·4 cm. respectively, and that the emission of every 10^6 α-rays of range 8·6 cm. is accompanied by the emission of 220, 47, and 55 particles of the above ranges. In the case of actinium active deposit evidence of particles of range greater than 6·5 cm. was found, but the sources available were not sufficiently intense to allow their range to be determined with accuracy.

By a method devised by Sir Ernest Rutherford we have satisfied ourselves that the long range particles from radium active deposit are α-rays.

Polonium has also been examined and found to emit small numbers of particles of ranges 6·1±0·1, 10·0±0·1 and 13·1±0·2 cm. respectively, in addition to the main group of α-rays of range 3·93 cm. The relative numbers in these new groups are at present being determined; from the brightness of the scintillations it is considered that they are α-rays.

L. F. BATES.
J. STANLEY ROGERS.
Cavendish Laboratory, Cambridge,
December 15.

Continental Drift and the Stressing of Africa.

IN reply to Dr. Evans's letter under the above title in NATURE of September 22, p. 438, may I say that I too shall be surprised, indeed extremely surprised, if further work in Uganda does not "disclose the existence of at least some normal faulting with a north and south strike, showing the former existence of east and west tension." Compression in one area seems to imply tension in another; and it is not very