naturally concluded that they must be. One speaker confidently told me in the discussion that I was wrong, and that in the common toad the rugosities *are* on the palmar surface! To show how the hands are placed I send a photograph (Fig. 1) of a pair of *Rana agilis* killed and preserved while coupled. The lower digits of the male's hands are the thumbs.

Clearly the rugosities, to be effective, must be on the backs and radial sides of the digits, round the base of the thumb, as in our common frog, on the inner sides of the forearms, or in certain other positions, but not on the palms of the hands. There are, of course, minor variations, in correspondence with which the positions of the rugosities differ. The clasp of Alytes, for example, is first inguinal and afterwards round the base of the head (Boulenger). Minute thorns may be formed on the back of Bombinator and perhaps in other places on the skins of Batrachians, where they cannot serve as *Brunftschwielen*; but on the palm of Alytes they would be as unexpected as a growth of hair on the palm of a man.

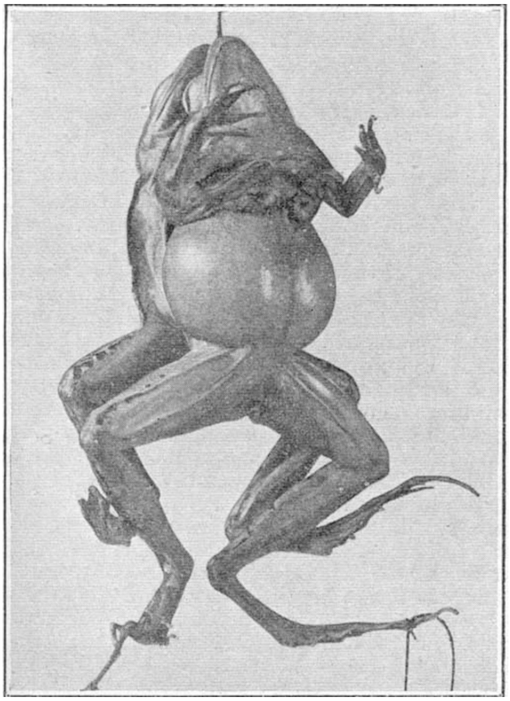

FIG. 1.

Dr. Kammerer's own reply was on different lines from that of the speaker I have mentioned, but curious and, as I thought, significant. He asked us to note that in his lecture he had refrained from using the word "Adaptation"—a defence sound perhaps, though surely disquieting to his disciples.

The discoveries claimed by Dr. Kammerer are many and extensive. To geneticists that regarding heredity and segregation in Alytes (*Verh. naturf. Ver.* Brünn, 1911) which I called in question at the Linnean meeting is the most astounding. But what I then heard and saw strengthens me in the opinion expressed in 1913, that until his alleged observations of *Brunftschwielen* in Alytes have been clearly demonstrated and confirmed, we are absolved from basing broad conclusions on his testimony.

W. BATESON.

May 16.

The Light Elements and the Whole Number Rule.

I HAVE recently developed a method of generating anode rays of high velocity which is much more suitable to mass-spectrum analysis than the hot anode method previously applied. By means of this device it is possible to obtain the mass-lines of the metals of the lithium and beryllium groups at the same time as those of such elements as carbon and chlorine, the masses of which are known.

The masses of Li^6, Li^7, Be^9, Na^{23}, Mg^{24}, K^{39}, K^{41}, Ca^{40} have all been determined, and the divergence from whole numbers is in no case so great as one-tenth per cent. of the mass measured. The masses of the isotopes of lithium are most probably about 0·005 of a unit high, but naturally this figure does not have much significance with the present apparatus.

The effects with magnesium and calcium are too weak to show their fainter components, but the integral relations between these and the principal lines have already been demonstrated by Dempster. (Phys. Rev. xviii, xx.)

This work completes the determinations of the masses of the more important isotopes of all the first twenty elements on the mass-spectrograph, and, with the obvious exception of hydrogen, each obeys the whole number rule to the accuracy of experiment, one part in a thousand.

It is of particular interest that no difference in mass is detectable between the isobaric atoms Ca^{40} and A^{40}, for general considerations might lead one to expect a radical difference in their nuclear structure owing to the presence of the two additional nuclear electrons in the latter.

F. W. ASTON.

Cavendish Laboratory,
Cambridge, May 17.

Microphonic Flames.

[A FEW weeks ago it was reported in the daily Press that Dr. Lee de Forest had used a flame for the direct production of telephonic currents by sound waves. In response to a request for details of his device, Dr. de Forest writes as follows.—ED. NATURE.]

I have as yet prepared no paper on the subject of the "microphonic flame." For a long time I had puzzled over the problem of turning sound waves *directly* into electric telephonic currents. I recognised that sound waves passed through flames in the air; also that a flame was, to a certain degree, conducting electrically. Hence, I reasoned that if one passed a current through a flame, its conductivity *must* vary, more or less, with the alternate waves of compression and rarefaction, which constitute sound.

Setting out to verify my deductions, I succeeded almost at once. I employed first a "bat-wing" gas-flame, enriched this with potassium salts, used two platinum wire electrodes across a dry cell battery of 100 to 200 volts, in series with a high-resistance (radio) telephone receiver. By carefully adjusting the electrodes in the flame (especially the *cathode*—the position of the anode is not important; it can even be located a short distance *outside* the flame) I obtained in the telephone receiver a faint but *very perfect* reproduction of the music of a gramophone played 3 ft. from the flame. The adjustment of the gas pressure, using this type of flame, is critical. If too strong, the flame roars in the telephone receiver. If too low, the conductivity and sensitiveness of the flame falls off.

I next employed a type of Welsbach burner and mantle, using as electrodes platinum gauze "imbedded" in the mantle and directly inside the mantle. Also, an oxy-acetylene flame, employing