

revive the trade demand, and to discuss such questions as to whether portraits may be re-touched or not, and whether the printing of a photograph from a half-dozen negatives, more or less, is to be regarded as a work of design or not.

It is not sufficient to put the names of two or three well-known men of science on the council of a society if the society show no care for science; and if the Photographic Society can do nothing more to merit the nominal position which it holds (without filling it), it is time that it should retire and give place to another. Photography has now become one of the most important aids to research in many fields of Science; every new discovery which shall develop this assistance and make its efficiency more complete is of importance to the whole world—of an importance which makes it almost incredible that the Photographic Society should not only take no part in the investigations which would lead to discovery, but should never even take recognition of them even when made, while the petty jealousies of the dominant clique have driven out of the society most of the really capable and successful investigators who have ever been in it. If the efforts at reform now being made should lead to success and the society become what it should be, a scientific body, so much the better; but if not, it is time that some new organisation should be formed to take in hand seriously the exploration of the still untried fields of chemical research, and make Photography a real branch of Science, and not deal with it merely as an amusement or a trade.

ASTRONOMY IN THE ARGENTINE CONFEDERACY

DR. GOULD, the director of the new Observatory in the Argentine Confederacy, continues to send encouraging accounts of the progress of the great astronomical works that he has there undertaken. Having laboured to determine accurately the relative brightness of all the stars in the southern heavens visible to the naked eye, he announces that a few weeks will enable him to begin the preparation of this work for publication. Great care has been taken to make a thorough and accurate comparison of the results of the four assistants, and the rule has been to determine the brightness of all the stars down to the 7.3 magnitude, in order to make sure of losing none as bright as the seventh.

The labour of the Uranometry was undertaken before the arrival of the large meridian instrument, and as soon as the latter was established (namely, on Sept. 9, 1872), the observations of the zones of all stars as bright as the ninth magnitude were commenced in earnest. Each night three zones are observed whose lengths average about one hundred minutes, the entire observations for the year occupying at least eight hours. The weather is described as having been exceedingly unfavourable for astronomical work during the winter and early spring, until March, April, and May of the present year, when magnificent opportunities were enjoyed. Dr. Gould states that he has observed in all during the past year about fifty thousand stars, and considers that somewhat more than half of the work of observing is already finished.

Astronomers, however, know how great a labour of computation still awaits Dr. Gould and his assistants before his results can be put into that form which is most convenient for use. The photographic work undertaken by him at his own private expense has been prosecuted with all the success that could be expected with a broken lens. Finally, however, he concluded to bespeak another object-glass, which will be purchased for the use of the observatory; and the new lens having arrived in perfect order, he hopes before long to be able to resume his labours under better auspices.

The Cordoba Meteorological Bureau, established by his urgent representation by the national Government,

has been organised and brought into working condition as rapidly as was practicable; but as the instruments were necessarily ordered from foreign countries, not more than half of them had arrived at the latest advices. Dr. Gould has, however, had the gratification of finding two gentlemen who have each carried on an uninterrupted series of observations for some dozen years past—one in Buenos Ayres, and the other near the Patagonian frontier—and he has secured the co-operation of about fifteen correspondents. The programme issued for the instruction of his observers differs apparently but little from that of the Smithsonian Institution, the hours of observation being seven, two, and nine, local time.

THE COMMON FROG* IX.

THE muscles connected with the human lingual apparatus are sufficiently complex. One such muscle—the *stylohyoid*—passes downwards on each side, from a process of the base of the skull to the corniculum of the os-hyoides

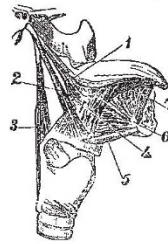


FIG. 63.



FIG. 64.

FIG. 63.—Muscles of the Right Side of the Tongue. 1, stylo-glossus; 2, stylo-hyoid; 3, stylo-pharyngeus; 4, hyo-glossus; 5, genio-hyoid; 6, genio-glossus; 7, lingualis.
FIG. 64.—Head of the Frog *Phyllomedusa*, showing the tongue fixed in front, but free posteriorly.

or tongue-bone. The tongue-bone of the frog is, as we have seen, relatively far greater than is that of man, and the same may be said for the muscles attached to it, since we have no less than four muscles descending from the skull, and implanted into it, on each side.

This fact might well be supposed to bear direct relation to the size and mobility of the frog's tongue. This organ in the frog and toad is singularly different from the tongues of most familiar animals, in that it is not free and moveable in front, but *behind*. These Batrachians take their food by suddenly throwing forwards, out of the mouth, the free hinder end of the tongue. The insect or other small animal struck by it, adheres to it, on account of a viscid saliva with which it is coated. The prey is then suddenly drawn into the mouth and swallowed.

Here then is a ready explanation of the development of the *os-hyoides* and its muscles. There is a difficulty however in that two toads already described, the Pipa and the African form *Dacylellura* (Figs. 11 and 12), have no tongue whatever.

Moreover, there is another toad (*Rhinophrynus*) which is even more exceptional in its order than these two; in that its tongue is not free behind, but, like that of ordinary vertebrates, in front (Fig. 13.)

The fact is, that the large tongue-bone of these animals serves, with the muscles attached to it, as much to facilitate respiration as nutrition.

It has already been said that the frog has no ribs by the elevation and depression of which it may alternately fill and empty its lungs. Neither does it possess that transverse muscular partition, the diaphragm, or midriff, which in man's class is the main agent in carrying on that function.

The lungs of the frog are inflated as follows:—The

* Continued from p. 189.