

THE SKULL OF THE DOMESTIC FOWL.

BY C. FEW SEISS.

Bones constitute the foundation and framework of all the vertebrated animals; and yet how few persons know, or desire to know, anything about them. I have known ornithologists (?) who could determine the correct species of a bird at one glance, and yet were ignorant of the name and position of almost every bone in a bird's body. This is learning zoölogy before having studied its A B C. An ornithologist who has slaughtered thousands of our birds, simply for their "dry skins," says he "can see nothing in dry bones." I think it would be more beneficial to him and others, and most certainly so to the birds, if he would cease this wholesale slaughter, kill as few birds as possible, and these study thoroughly, both interiorly and exteriorly.

For the first step into the osteology of the aves, I give drawings of the skulls of three varieties of the domestic fowl (*Gallus domesticus*). A poultry fancier presented me with the head of a prize "McClellan game cock," and of a "white Polish hen." On examining the skull of the latter I found the frontal region extremely gibbous, and with twelve holes entering into the brain chamber, two of which were two eighths of an inch in length. I do not know whether all individuals of this breed have the skull thus perforated, that is to such a degree as this, but if they have, it were better this white Polish deformity were rapidly and for ever exterminated. The premaxillaries running up between the nasals are weak and thread-like, and indeed the whole skull is weakly put together. We often see among poultry fanciers the most deformed and unnatural breeds the most prized. I would suggest this: Let some popular poultryman work up a fancy breed—something new and interesting—a breed without eyes, and without feet, and give it some good but short name, say, for instance "E-pluribus-unum-sic-sempertyrannis" fowls. It would be a success. A breed of this description would have many recommendations. It would eat little, never scratch, never suffer from blindness after a combat, and best of all, would be an everlasting "sitter." Poultry fancier, what would'st thou have more?

The skull of the game cock is more of the typical or natural order. The brain case is thick, solid, firm and heavy; the premaxillæ, running toward and between the nasals, are strong, broad, and arched; the *os quadratum* and the maxillæ are strongly made, and the whole skull is substantially put together. It belongs to a breed of chickens which should be encouraged.

I regret the smallness of my collection of fancy chicken crania, for I should like, if able to study out the good or bad points appearing in the various varieties.

Fig. 1 is a lateral view of the skull of the McClellan game cock, and Fig. 2 that of the white Polish hen. Fig. 3 is the under view of the skull of a common chicken, with the nasals, frontals, and lachrymals removed; PMX, the premaxillæ, including the bill and the two narrow bones running up from its center; MXP, the maxillo-palatine process; PL, the palatine bone, with the vomer, VO, between or in the center; PT, the pterygoid; MX, the maxilla (the upper jaw proper); QU, the *os quadratum*, quadrate or anvil bone, with or upon which the mandible or inferior maxillary articulates. Fig. 4 is the upper view of the skull of the

cockerel, showing the sutures, the bones not yet anchylosed. The sutures are undistinguishable in adult fowls. FR is the frontal; PA, the parietal; SOC, the supra occipital. The foramen magnum is of the usual size, and, as with all birds, there is but one occipital condyle.

Effect of Green Vitriol and Carbolic Acid upon the Growth of Plants.

Both sulphate of iron and carbolic acid are employed to disinfect fecal matter, which is afterwards employed as fertilizer. Nessler has therefore been experimenting upon the effects of these disinfectants upon the germination of seeds and the growth of plants. If the soil was kept quite dry the

small, tapered to the base, but scarcely stalked, the upper ones adnate, and the uppermost decurrently confluent. Below the small basal pinnae each edge of the stipes is set with a row of abortive ones reduced to wart-like excrescences or callosities. The color of the sterile fronds is a dark green on the upper surface, and a paler green beneath. No fertile fronds have yet been produced.

The plants to which the above description applies have been recently imported from South Africa, and are therefore to be classed as greenhouse ferns. As such they are a valuable acquisition, since they prove to be of free-growing habit, not indicating the tendency of other allied forms to dwindle away; but on the contrary, pushing their fronds with remarkable vigor.

Separation of Vanadic Acid from the Alkalies.

The interest which is beginning to be felt in this rare element, vanadium, since it has found such a valuable application in the arts, in dyeing, printing, etc., induces us to insert an abstract of Gerland's paper, on the separation of vanadic acid from the alkalies in the form of ammonium vanadate.

In the first experiment pure pentoxide of vanadium was fused with 3 molecules of sodium and potassium carbonate; the mass was dissolved and precipitated hot with a hot saturated solution of sal ammoniac, and when cold filtered and washed until the filtrate left no residue upon evaporation, then washed with weak alcohol until the chlorine reaction ceased. The salt was pressed and dried over sulphuric acid. An analysis of 1 grain of this salt showed the presence of 2.11 per cent potassium.

In the next experiment ammonium vanadate was prepared from potassium ortho-vanadate, and was found to contain 2.42 per cent of potassium.

The first of these salts, when purified by dissolving in boiling water and pouring into a boiling solution of sal ammoniac, still held on to 0.23 per cent of potassium chloride, while the second contained 0.25 per cent of potassium after re-crystallization and purification.

In a third experiment the pentoxide was converted into sodium orthovanadate by fusing with sodium carbonate; the solution was precipitated by ammonium chloride and purified asbestos. Analysis showed the ammonium salt to be perfectly pure and free from sodium.

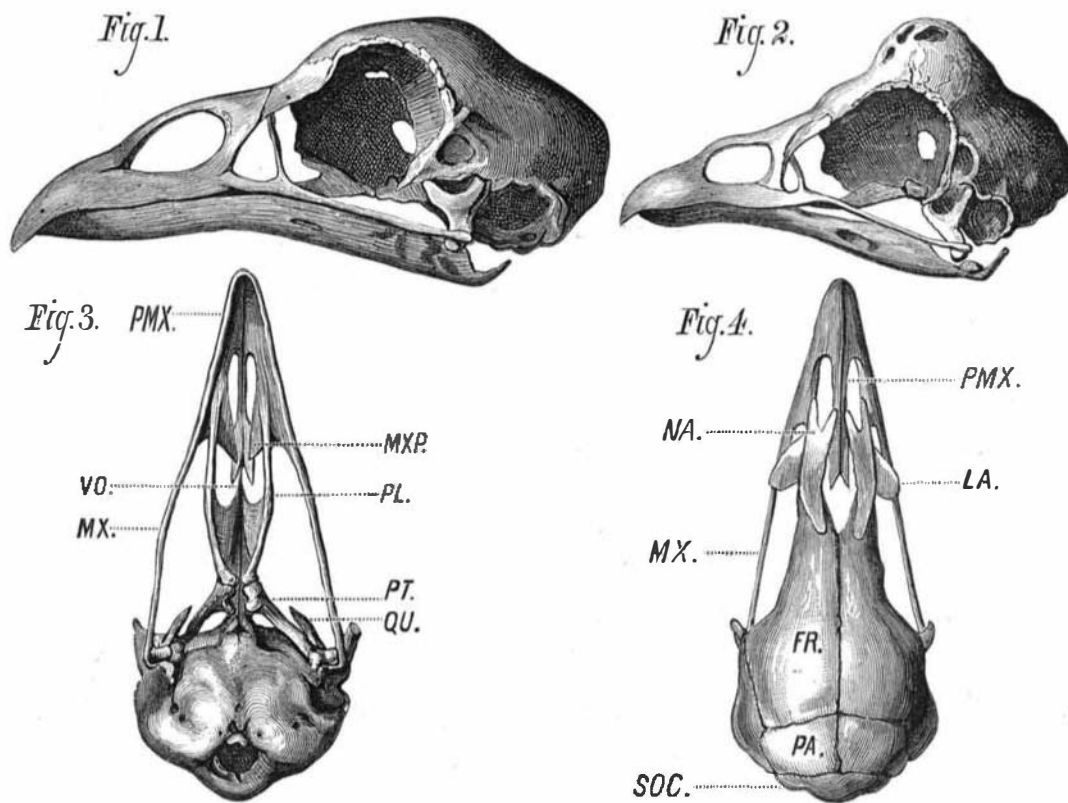
These experiments prove that ammonium vanadate cannot be prepared free from potash if the solution contained any potash, while sodium does not adhere to it in this way, hence in analysis the introduction of any potassium salt must be carefully avoided.

Gerland states that several other salts of vanadium also possess this property of carrying down small quantities of potassium which they stubbornly retain. Among these are the neutral and acid vanadid sulphates, vanadyl-sulphate and vanadylid-sulphate.

To a certain extent ammonium acts like potassium, so that metavanadic acid (VHO₂) holds on firmly to a small quantity of ammonium, which cannot be removed by digestion with acid. Copper ortho-vanadate cannot be obtained pure if ammonia were present when it was precipitated.

Prussic Acid to Absorb Carbonic Oxide.

C. Böttinger states that in studying the subject of glyoxylic acid he passed pure carbonic oxide gas through pure hydrocyanic acid



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plants died when 25 parts of sulphate of iron or 10 parts of carbolic acid were added to 170,000 parts of earth. If the soil was moist the plants would stand 200 parts of sulphate of iron and 50 parts of carbolic acid to 170,000 of earth, without injury. When the manure is evenly distributed, as it should be for other reasons too, these disinfectants are un-injurious to husbandry.

LOMARIA DALGAIKNSIÆ.

This plant is a very fine greenhouse fern of arborescent character, with something the aspect of another arborescent form of the same species known to cultivators as *L. zamboides*. It has a blackish trunk, which is shaggy at the apex, with long subulate dark brown scales. The fronds are but subcoriaceous in texture, pinnate in the lower part, and pinnatifid above; the pinnae lanceolate, acute, the lower ones



LOMARIA DALGAIKNSIÆ.