pleted, especially as our knowledge of the changes is too limited to permit of the use of Ross's observations. Further it is desirable to have actual verification of Gauss's extension by theory of the magnetic elements at places where they are known to places where they are unknown. The position of the south magnetic pole is still undetermined, and magnetic observations are wanted from 40° S. to the geographical pole. For the carrying out of these views, Melbourne Observatory, being furnished with the necessary instruments, would serve admirably as a base station, with subsidiary bases at the Cape, and at Sandy Point, Magellan Strait, for the use of portable absolute instruments. Much of the survey could be done on board ship at sea, observations having now become so trustworthy by the process of "swinging ship." Portable instruments could also be used on ice, where their readings would be specially free from sources of error. The great effect of the ship's iron in high latitudes can be got rid of by experience, as proved in the voyage of the *Challenger*, an important matter being a proper position on board for the instruments. This position could be chosen immediately after the selection of the ship. The error in the vertical component varies with the "heel" of the ship; the horizontal error can be eliminated by the process of "swinging."

NOTES FROM THE OTAGO UNIVERSITY MUSEUM

VIII.—On the Claspers of *Callorhynchus*

IN my friend Mr. Patrick Geddes' able article, "Reproduction," published in the recently issued twentieth volume of the "Encyclopædia Britannica" (ninth edition), the following note occurs (p. 410):—

"In the curious Holocephalous fish, *Callorhynchus*, Jeffery Parker has recently adduced arguments for regarding the claspers as the surviving rudiments of a third pair of limbs."

As this passage was written under the mistaken impression that a somewhat wild theory, hitherto only communicated privately to one or two friends, had been published, I think it will be advisable to state exactly the grounds on which I am disposed, provisionally, to consider the Holocephali as the only existing hexapodous vertebrates.

In the Elasmobranchii (Plagiostomi) the male is well known to possess a single pair of so-called claspers, each having the form of a plate rolled longitudinally upon itself so as to produce an incomplete tube, and supported by a more or less complicated cartilaginous skeleton continuous with the basipterygial cartilages of the pelvic fin.

In *Callorhynchus*, on the other hand—and I believe the same applies to *Chimera*, of which I have no specimen—the male has two pairs of organs, which may be called respectively the anterior and the posterior claspers. The posterior claspers are evidently homologous with the claspers of the Elasmobranchs: they occur in the same position, have the form of a plate rolled longitudinally into a tube, and are supported by a prolongation of the basipterygium. No doubt, like the corresponding organs in sharks and rays, they have an intermittent function.

The structures I call anterior claspers are situated a short distance cephalad of the vent, inclosed, in the position of repose, in a pouch of skin having a somewhat contracted slit-like aperture, so that the clasper is ordinarily hidden from view. The aperture of the sac is erroneously marked "peritoneal aperture" in Günther's figure of *Chimera coliei* ("Study of Fishes," p. 184). In connection with the sac is a gland secreting a lubricating fluid, and closely resembling the well-known gland of the Elasmobranch clasper.

In the female, although the clasper itself is absent, a small glandular sac occurs in the corresponding position.

The anterior clasper itself is a somewhat complicated organ, consisting of three chief parts supported by cartilage. The largest of these, which forms the main support of the whole structure, is a strong irregular cartilaginous plate, articulated by an elongated surface with the anterior border of the pubic portion of the pelvic girdle in such a way that when in its ordinary position of retraction, the whole apparatus is folded back in the hollow furnished by the outer surface of the pubic cartilage. To this principal cartilage of the anterior clasper are attached two others: one a thin delicate plate, shaped like the human external ear, the use of which is not obvious; the other a somewhat thicker plate, rolled upon itself to form a tube, in much the same way as the posterior clasper, and evidently serving as a duct for the passage of the above-mentioned secretion. The whole apparatus is covered with soft mucous membrane,

except the free portion of the principal cartilage which is studded with minute sharp denticles.

The clasper is exerted by the action of a strong muscle arising from the inner face of the pubic cartilage and passing over its anterior border to be inserted into the principal cartilage of the clasper. The plane of movement of the organ is nearly horizontal.

That a serial homology (homoplasia) exists between the anterior and the posterior claspers is suggested by the following facts:—(a) The general similarity of their structure; (b) they both articulate, mediately or immediately, with the pelvic cartilage; (c) they both lie in the line of Balfour's lateral ridge, i.e. of the hypothetical lateral fin; (d) the blood from both appears to be poured into a vein which is clearly the representative of the lateral vein of Elasmobranchii, which latter I have adduced reasons for considering as the vein of the proto-vertebrate lateral fin (*Trans. N.Z. Inst.*, vol. xiii. p. 413, and vol. xv. p. 222; *Proc. Roy. Soc.*, June 1886).

I regret that all my efforts to obtain earlier embryos of *Callorhynchus* than those I described three years ago in *NATURE* (vol. xxix. p. 46) have failed. It must therefore remain for future investigations to decide whether the anterior clasper of Holocephali is developed from a portion of the lateral ridge which usually atrophies, and whether its skeleton is formed by the concrescence of pterygiophores (radial fin-cartilages).

At present, therefore, the hypothesis that the anterior claspers of the Holocephali represent a middle pair of limbs is nothing more than a deduction from an unproved theory. I should not have ventured to publish it without further evidence if my friend had not, quite inadvertently, forced my hand.

Dunedin, N.Z., August 16

T. JEFFERY PARKER

SOCIETIES AND ACADEMIES

SYDNEY

Linnean Society of New South Wales, July 28.—Prof. W. J. Stephens, M.A., F.G.S., President, in the chair.—The following papers were read:—On some new or rare fishes from the Australian region, by E. P. Ramsay, F.R.S.E., and J. Douglas-Ogilby. A few notes are given on the curious Blennoid genus *Xiphasia* of Swainson, and a description is given of a species—*Xiphasia setifer*, Swainson—now for the first time taken in Australian waters. *Arrhamphus sclerolepis* and *Gastrosteus biaculeatus* are recorded as fishes not previously seen on the New South Wales coast.—Catalogue of the Australian Coleoptera, part 5, by George Masters. The present part contains the large family of the Curculionidae, numbering over 1200 species, and bringing the total number now catalogued up to 5625. It was stated that probably two more parts would complete the order Coleoptera.—Miscellanea Entomologica, No. 2: the genus *Liparetrus*, by William Macleay, F.L.S. This is a complete monograph of the genus *Liparetrus*. All the old species are redescribed, many new ones added, and the genus is subdivided into several sections and sub-sections. Altogether about 100 species are characterised.—Revision of the Australian Lepidoptera, No. 1, by E. Meyrick, B.A., F.E.S. Five families of the Macro-Lepidoptera, or Lesiadae, Arctiadae, Hypsiadae, Syntomididae, and Zygaenidae, are monographed, numbering about 150 species, about half that number being new to science.—Notes on synonymy of Australian Micro-Lepidoptera, by E. Meyrick, B.A., F.E.S. The synonymy of fifteen species of Micro-Lepidoptera is corrected, from an examination of specimens in the British Museum.

PARIS

Academy of Sciences, October 18.—M. Jurien de la Gravière, President, in the chair.—A theory of the unequal flow of gases, by M. Haton de la Goupillière. Although geometers have already solved a few questions relating to the unequal movement of fluids, no general theory appears to have yet been applied to the subject so far as regards the gases. The object of the present paper is to make good this want, and to present a complete solution of the problem in connection with the receptacles of compressed air for locomotives or tramways filled from reservoirs maintained by the compressing engines at a constant tension.—Researches on the tension of the dry bicarbonate of ammonia, by MM. Berthelot and André. The authors here discuss the important and complex problem, whether the tension of ammonia in the air, the ground, and natural waters, and its movements between these various mediums, is to be assimilated