

Fig. 3—*Megalapteryx Huttoni* (Owen) after Rothschild

parts of the Middle Island not, or scantily, inhabited by Maoris" ("Extinct Birds," p. 186).

Moas belong to the family *Dinornithidae*; a very remarkable genus of that family has been named *Dinornis*—immense and long extinct birds, of which about seven species have been described. More or less perfect skeletons of these, and a few feathers, are in some of the museums of England. They all occurred in New Zealand, and a fine example of the genus is reproduced in Figure 4, *Dinornis ingens*, of Owen. It was about eleven feet high, and one of the birds exterminated by the Maoris. Tring Museum has an almost perfect skeleton of it. Other genera of the *Dinornithidae* are *Megalapteryx* and *Anomalopteryx*.

Ponderous, as well as flightless birds, after the ostrich order, also compose the family *Aepyornithidae*, of which there are at least three genera and a number of species; these all came from Madagascar and have long been extinct.

Emu-like birds of large size, belonging to the genus *Dromaius*, also extinct, have been recognized through their remains, which explorers have found on the islands of Tasmania—that is, King Island, Flinders and Kangaroo Islands. As an example of these, we have, in Figure 5, *Dromaius peroni*, which formerly inhabited Kangaroo Island. There is a stuffed specimen of this bird in Paris (type), and there are bones of it in other museums. The sides of its neck were featherless and blue, while the plumage was chiefly dark brown and black. Peron brought three of the birds alive to Paris, but these were the last of their race. *D. minor*, also extinct, occurred on King Island, Bass Strait.

It is more than likely that a number of other extinct forms of ostrich birds will come to light through the discovery of their remains in various quarters of the globe as time passes. In the United States there also existed, during geologic time, great struthionine forms of enormous proportions, that probably were quite as flightless as ostriches. These belonged to the genus *Diatryma* of Cope, a second species of which has recently been described by me, and which was a bird of enormous proportions, at least three or four times as big as an African ostrich.

Returning to the existing ostrich types which, as stated above, are all flightless, and have direct ancestors which are extinct and found in fossil condition, there are to be noticed the Rheas (*Rheidae*) of South America. There are three species of these, and they occur in different regions from northern Brazil to Patagonia. All of the birds are large forms, and very much resemble the ostriches of Africa—indeed, they are quite generally known as South American ostriches, while, in the matter of their anatomy, they stand higher in the scale. Rheas possess three toes instead of only two, as in the ostrich; the former likewise has the head and neck feathered; its wings are larger, and the tail much better developed. In the chase, they exhibit enormous endurance, tiring out both dogs and horses, unless they happen to be of the very best stock and in excellent form. On the pampas of Argentina



Fig. 4—*Dinornis Ingens*, after Rothschild

the natives hunt them on horseback with the "bolas." The young are striped, and the egg of this species is very large and of a cream color. Only one fossil species of Rhea has been described, while two other extinct forms are related to them. As in the case of most species of ostriches, it is only the male Rhea that performs the duty of incubation; and several females lay in the same nest.

There are four known species of existing ostriches, all belonging to the genus *Struthio*. One of these occurs in Soudan and southern Palestine, while the three remaining ones are found in different parts of Africa. They are the biggest of all living birds, as an old male may attain a weight of 300 pounds. It has been stated that they can, in running, make 26 miles an hour, outstripping any ordinary horse. Their legs have, in time,

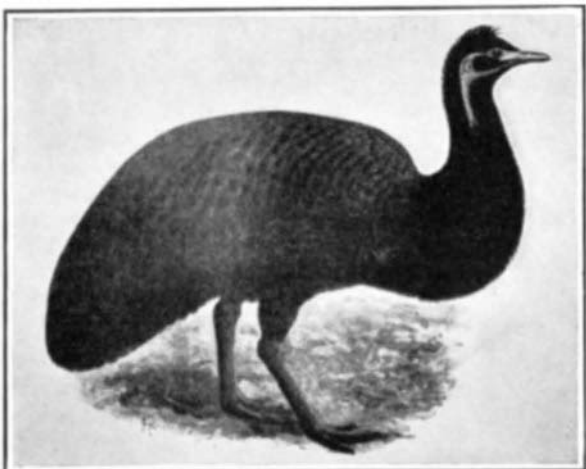


Fig. 5—*Dromaius Peroni*, after Rothschild

become strongly adapted to this power of marvelous locomotion and speed, while, if they remain long enough in the wild state—which is to be very much doubted—they will have but a single toe remaining on each foot,—the third of the avian *pes*. The male assists the female in incubation, and through their alternate sitting, the clutch is never deserted until the fifteen

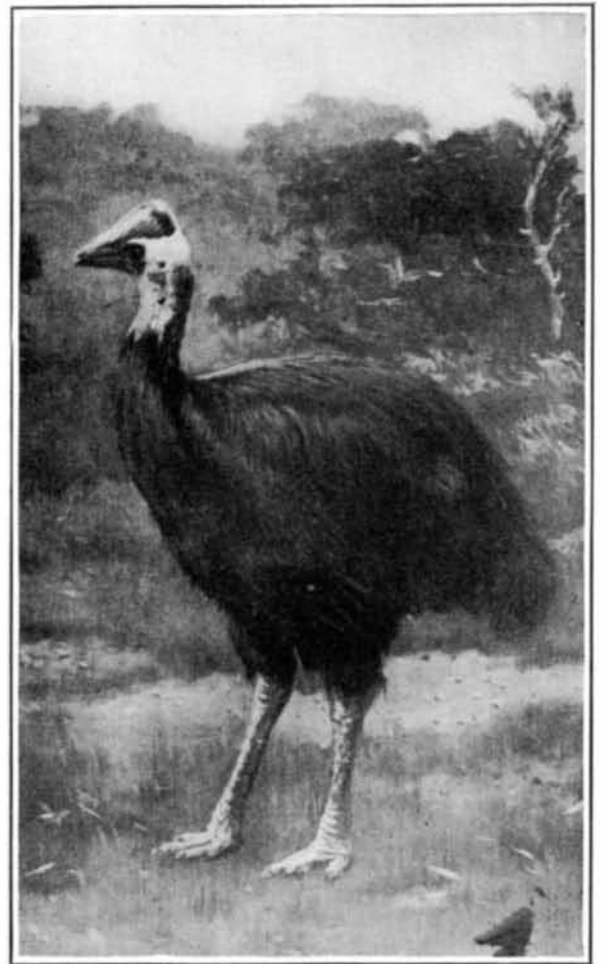


Fig. 6—Cassowary. By the author after a colored plate of S. C. Payne & Co.

eggs are hatched out. A life history of this bird would furnish ample material for a sizable volume, and it would surely be a most interesting book.

From the ostriches and rheas we pass to the cassowaries and emus, two other genera of the existing flightless birds of the ostrich group. Most of their plumage is made up of *double* feathers, and they all lay dark green, rough-shelled eggs, the young being conspicuously striped longitudinally with black and white for some time after they are hatched out. There are some fourteen species of cassowaries still found in the existing avifauna of the world, and these are distributed over the various islands of the East Indies (Ceram, Aru, New Guinea, etc.), New Zealand, and Australia. The appearance of one of these birds is given in Figure 6, which I copied photographically from a painting of the common species. They are most brilliantly colored birds, and this gay coloration is found in both sexes. In addition to this brilliant plumage there is, in some species, a richly tinted casque or helmet on the head, which gives the species a most striking appearance, and this is enhanced by the highly colored bare skin and wattles below it. In the wings there are a series of long, black, shiny spines not found in any other kind of ostrich bird, and in these they have an excellent weapon during their conflicts. The males are very pugnacious, and in their fights dangerous wounds are inflicted by the immense nail growing on the inner toe. With this weapon they can cut a man most severely, and it is by no means a safe procedure to approach a wounded cassowary. They are forest-loving birds, and the handsome species found in Australia is now being exterminated very rapidly by man for its skin, of which rugs are made. These slayers of the Australian cassowary are as greedy and as merciless as the plume hunters of Florida, or the Japanese murderers of the sea-fowl of Laysan. Fossil remains of cassowaries are rare, and but few have been found.

[ TO BE CONTINUED. ]

#### Differential Dilatometer

THIS apparatus, which is of the recording type, traces a curve automatically, whose ordinate represents the expansion of the metal under study, with reference to a standard piece made of a special alloy known as "baros," or nickel 90 per cent and chromium 10 per cent. The expansion is thus indicated as the difference between the tested metal and the standard bar. The present apparatus is simple in construction and quite sensitive, and because of its differential method it gives excellent indications. Using ferro-nickel containing 59.2 per cent nickel and also electrolytic iron, the instrument will indicate the contractions which accompany the magnetic effects.