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*The Author of each Article is responsible for the facts
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A

NATURAL ORDER.	GENUS AND SPECIES.
Rutaceæ ...	<i>Boronia pinnata</i> ; <i>B. serrulata</i> . <i>Philotheca Australis</i> . <i>Eriostemon lanceolatus</i> .
Leguminosæ ...	<i>Dillwynia ericifolia</i> .
Myrtaceæ ...	<i>Darwinia fascicularis</i> .
Umbelliferæ ...	<i>Actinotus Helianthi</i> .
Proteaceæ ...	<i>Isopogon anethifolius</i> . <i>Lambertia formosa</i> . <i>Telopea speciosissima</i> .
Labiatae ...	<i>Hemigenia purpurea</i> .
Epacridæ ...	<i>Lysinema pungens</i> . <i>Styphelia daphnoides</i> ; <i>S. microphylla</i> .
Amaryllideæ ...	<i>Doryanthes excelsa</i> .
Liliaceæ ...	<i>Sowerbæa juncea</i> .

Among the principal exhibitors of birds were Mr. D. Le Souëf, who exhibited specimens of the white-eyed crow, *Corvus Australis* ; the allied kite, *Milvus affinus* ; Leach's kingfisher, *Dacelo Leachii*, from N.W. Australia; and the tawny-shouldered podargus, *Podargus strigoides*. Mr. T. A. Forbes-Leith showed a pair of grey-headed parrakeets, *Agapornis cana*, from Madagascar, and a pair of the little sulphur-crested cockatoos, *Plissolophus citrino-cristatus*, from Timor or adjacent islands. Mr. C. French exhibited a fine pair of the Fiji masked parrot, *Platycercus personatus*, also Pennant's parrakeet, *Platycercus Pennantii*, the rose cockatoo, *Cacatua roseicapilla*, and the Rosehill parrakeet, *Platycercus eximius*. Several other birds were shown, but particulars were not handed in.

After a most interesting *conversazione* the meeting closed.

NOTES ON SOME FOSSIL CRABS FROM THE MIOCENE ROCKS OF CORIO BAY.

BY REV. A. W. CRESSWELL, M.A.

(Read before Field Naturalists' Club of Victoria, 9th August, 1886.)

BEFORE speaking about the particular fossil crab found in the miocene rocks of Corio Bay, let me say a few words about crabs in general. Crabs, somehow or other, seem to have got a bad name, but why I know not ; whether it is because they have the faculty of giving a nasty nip to anyone who may handle them incautiously, or because of their crooked-looking limbs, or because of their queer habit of walking sideways instead of straightforward, I am ignorant, but somehow or other the word "crab" has come to be a

synonyme in our language for anything that is cross-grained, crooked, and disagreeable—*e.g.*, we hear of “*crab-apples*,” which are anything but agreeable to the taste, and of “*crab-sticks*,” as people with an unpleasant infirmity of temper are called. Again, we are all aware of that humiliating *faux pas* in rowing, technically called “catching a crab,” and what disgust it occasions to the oarsman; whilst the Latin word “Cancer”—a crab—has given the name to a very agonising and fatal disease which, unhappily, is far too prevalent in this colony. Talking, however, about “Cancer” reminds me that that is also the name of an astronomical constellation, and one of the signs of the Zodiac, so that it would seem that the ancients had a much higher opinion of our crustacean hero than we have, in that they have exalted him to the stars; but even in this there is an element of disagreeableness, for to a large proportion of the human race when the sun is in “Cancer” it is fiery hot, whilst to those who, like ourselves, live in this southern latitude it is “biting” cold. To descend, however, to sublunary matters, to speak of him from a gastronomic point of view, the importance of Mr. Crab as an article of diet has been fully recognised by both ancients and moderns, and though on our own immediate sea coast they do not attain to such a size as to be in much demand for the table, a very *much larger* species than we have here is caught at Portland, and often finds its way to the Melbourne market, and is esteemed a delicacy that is unmixed with anything that is disagreeable, unless it be the thickness of the shell and the difficulty of getting at the inside.

But, to proceed with the natural history of crabs, I have often been impressed with the desire for more simplicity in zoological descriptions, and for the avoidance, as much as possible, of hard technical terms, and my feeling in the matter was very much strengthened by a lecture that I had the pleasure of listening to some time ago at Ormond College, and which was given by a prominent member of the Field Naturalists’ Club. So, in speaking of crabs to-night, I shall use as popular language as I can, and, where it is absolutely necessary to use a few long words, will explain them as I go on for the benefit of the junior members of the Club.

Crabs, then, belong to that great sub-kingdom of the animal world called “*articulata*,” or jointed animals, and to that particular class of it called the crustacea. The crustacea, the name of which is derived from the Latin word “*crusta*,” a crust or hard covering, are so called because their outer skin is hardened by the deposition in it of a substance which is partly calcareous like the shells of ordinary shell-fish, and partly chitinous like the hard covering of beetles. This covering, popularly called the shell, envelopes the

whole body and limbs like a suit of armour, and so it is called, in scientific parlance, an exo, or outside skeleton, although it is true also that it is found to send certain processes of its substance into the interior of the body for the support of the soft parts within. The crustacea nearly all inhabit either the sea or fresh water, and breathe by gills, or else in the lower forms and in the embryonic stages of the higher ones by the thin membranous sides of the body.

The special order of crustacea under which crabs are ranged is the "Decapoda," so called from the Greek δεκα=10, and πους, ποδος—a foot, because the ambulatory or walking feet are in 5 pairs, and crabs belong to that section of the order called the "Brachyura," or short-tailed crustaceans, because they have the abdomen, or what is popularly termed the "tail," short and rudimentary, a mere hard, thin, flat-jointed appendage, which is kept folded tight under the body so that you can scarcely see it, very much in the same way as our humorous Professor used to say that a frightened poodle carries his tail when under chase by a larger dog; whereas the "*Macrura*," or long-tailed crustaceans, such as lobsters, crayfish, prawns, and shrimps have the tail large and extended, and with terminal flaps for use in swimming, and the "*Anomura*," or irregular-tailed crustaceans, such as hermit or soldier crabs, have the abdomen soft and furnished with a sucker or a forceps at the end, by which to adhere to the interior of cast-off whelk or spindle shells in which they live. Although crabs carry their tails in a somewhat undignified way, they are by far the most highly-organised and thoroughbred group of the crustacea—in fact, they are the aristocrats of their class, who are getting advanced beyond such vulgar things as tails, hence, no doubt, they hide them out of sight as though they were ashamed of them. The body of crabs, like those of lobsters and crayfish, consists of 21 joints, or somites, as they are called—7 for the head, 7 for the thorax, and 7 for the post-abdomen or tail. Huxley adopts a somewhat different arrangement, viz., 6 for the head, 8 for the thorax, and 6 for the tail—20 in all, probably a more accurate view as far as the segments of the head and thorax are concerned, but I follow the opinion of older naturalists in counting 7 segments in the tail, *i.e.*, including the telson or end piece as a distinct segment, for the simple reason that it is pierced as the others by the intestinal canal. The joints of the head and thorax, however, are united more or less into a single mass, called the "cephalo-thorax," by a dorsal shield or covering, called the "carapace," which in crabs is very large and depressed, the line of division between the head and thorax being only slightly marked on the carapace by the neck suture, but all the joints being perfectly distinct on the under

surface of the body. The 1st segment bears the compound eyes (with quadrangular facets, not hexagonal as in insects), which in all Decapoda, and some others, are surmounted on movable two-jointed footstalks, then follow 2 pairs of antennæ, horns, or feelers, and then comes the mouth, which is a most complicated apparatus, consisting not only of a pair of hard-biting jaws, called "mandibles," which work horizontally instead of vertically, but also of 2 pairs of jaws of slenderer make called "maxillæ," and 3 pairs of what are called "foot-jaws," all being concerned in the office of mastication. Then follow, under the cephalo-thorax, the 5 pairs of large limbs, the first pair of which in the crab consist of the "chelæ" or pincers, and the remaining 4 pairs are "ambulatory" or walking-legs, the hinder pair in some crabs, however, being modified into terminal fins for swimming. All these 5 pairs of limbs have 7 joints. (Here the viscera were briefly described, also the "Zoæa," and "Megalopa" stages of the immature crab; also difference between ♂ and ♀ tail, &c., &c.)

There are a great many kinds of crabs that differ in size, shape, and habits, as well as in habitats. There are *Shore Crabs*, with which we are all familiar; and *Swimming Crabs*, with their hinder limbs, as I have just said, modified into paddles; and *Spider Crabs*, so called because of their long, thin, spider-like legs; and *Sponge Crabs*, that live in sponges, or else carry one about with them on their backs; and *Racer Crabs*, that run so fast that a man on horseback can hardly catch them; and *Beckoning or Calling Crabs*, so named because of the peculiar beckoning manner in which they hold their claws; and there are *Cocoanut Crabs*, that crack cocoanuts and feed on the contents, and that have a very sweet, nutty flavour in consequence; and *Land Crabs*, that burrow in the ground far inland and are said to migrate annually to the sea; and Mr. Wilson, of the Geelong Grammar School, tells us he has found a peculiar kind of crab that adorns itself with bits of seaweed that it plants on its own back—so I suppose it ought to be called the "*Jackdaw Crab*"—but the particular family of crabs whose fossil remains I have got to speak of to-night, from the miocene rocks of Corio Bay, don't *boast* of a *popular* name that I am aware of, not being generally known to the public, as they, for the most part, hide their light under the mud at the bottom of the deep sea, and are only known to the curious and the scientific under the rather alarming name of "*Gonoplacidæ*." I think, however, we will call them "*Deep-sea Mud Crabs*." It is just possible there are some recent representatives of the family down in the bottom of the "vasty deep" of our own seas if anyone were to take the trouble to dredge for them, but—as far, at least, as I know—they may at present be

regarded as an extinct family in this quarter of the globe, their only living representatives being found in other waters.

The following are the salient points of the *Gonoplacidae*, as given by Milne-Edwards, the great authority on the crustacea:—The carapace is either square or rhomboidal and much wider than long, the posterior border measured between the base of the fifth pair of legs equals nearly the half of its transverse diameter, internal antennæ always horizontal, the peduncles of the eyes are long, the fronto-orbital border occupies nearly the whole transverse diameter of the carapace, abdomen of the male more than usually narrow, and instead of extending to the basilar joint of the posterior feet, it leaves exposed a considerable portion of the sternal plastron between its outer edge and the base of those feet; the length of the anterior feet varies—it is sometimes very considerable—and those of third or fourth pair are always the longest. The genus “Gonoplax,” in addition to the general characters of the family, is distinguished by the fact that the fourth joint of the external “jaw-feet” is inserted at the internal angle of the third joint.

And now to come at last to the particular *species* of “Gonoplax” found at Corio Bay. As I have given specimens of it to Prof. M’Coy, and understand that he intends publishing a proper scientific description of the crab in a future number of the *Decades*—it being altogether a new species—I shall not attempt to do anything more to-night than to give such a rough and ready description of it as will enable any young member of the F.N.C., with a turn for paleontological research to identify it. Briefly, then, the carapace is about 2 inches wide by 1 inch long, and the anterior corners of it are produced into a spinous termination on each side; the upper surface is rather convex, showing a slightly prominent ridge right across it, and parallel with the general outline of the front border, and about a third of the length of the whole carapace from it, and *another* parallel ridge half-way between the last ridge and the *hinder* border of the carapace, but prominent only in the middle or just in front of the cardiac region. The front (or rostrum) is squared or truncated and lamellar or plate-like. The eye-stalks are comparatively short. The chelæ or claw-limbs are very large, and very strong, and the hands and fingers themselves are also very large, strong, and much compressed, and, of the four pairs of walking-legs, which are of considerable size, the second pair, or the next but one to the chelæ, are the largest, the two front pairs of these walking-legs being rather rounded like the legs of the genus “Phlyxia,” and the two hinder pairs are more compressed; all the four pairs of walking-legs are terminated by a pointed toe. I should mention that the front and the side borders of the carapace are marked by minute granulations, and so are the upper sides of the chelæ and walking-legs.

Let this rough, popular description of the fossil crab do for the present, in which hard words have been eschewed as much as possible, and I will leave the more scientific description of it for more competent hands. I may mention that I obtained my first specimens of it about two years ago, in company with Mr. Curlewis, in some smooth calcareous nodules that occur in great abundance in the miocene rocks on the south side of Corio Bay, a few miles beyond Point Henry, and that I have since found them in the rocks on the other side of the bay at North Geelong, but though similar nodules are also to be found at Cheltenham, and I have often broken them open there, I have not as yet succeeded in finding any specimens there, nor indeed anywhere else than in Corio Bay. As, therefore, the fossils are so thoroughly "Geelongese," I would suggest "Corioensis" as the specific name for them, although that has already done duty in the same way for several other fossils.

Hugh Miller, in his well-known book called the "Story of My Education," when speaking of his geological researches amongst the lias rocks of Cromarty Bay, tells us how his heart leaped up with joy as he laid open a nodule with the blow of his hammer, and saw that it contained the glittering scales and spines of his first discovered ganoid fish—and although crabs are not so high in the scale of animal life as fish, and though we were not such celebrated individuals as Hugh Miller, I think my friend Mr. C. will bear me out in saying that the sudden disclosure of the relics of our first fossil crab in the rocks of Corio Bay gave us a joy that was not one whit less than his, and when we took the fragments home, and putting them together, puzzled them out as belonging to the genus "Gonoplax," I think I may add that we learnt to enter somewhat into the experience of another saying, as I think it is of Hugh Miller's, that he who *reconstructs* enjoys a bliss second only to that of *creating*.

I have just to draw your attention to the fact that some of the specimens exhibited have been crushed, showing, as I take it, that the animals themselves met their death in a violent manner, perhaps by a sudden volcanic ejection of mud or other matter from below the sea.

(N.B.—Since reading this paper I have been told that the same crab has been found fossil at Cheltenham, but I have never seen it myself.)

EXCHANGES.

MR. E. CORNWALL, 55 Chapel-street, South Yarra, will be glad to exchange Queensland Lepidoptera for Australian birds' eggs.

F. R. offers back numbers of "Science Gossip" for Australian plants (Phanerogams or Cryptogams) *not* occurring in Victoria.