Fig. 15. *Pullenia sphæroides.* D'Orb.

Also belonging to the family Globigerinida. I have two small specimens coming near to *Pullenia sphæroides*, D'Orb. It is very rare here, equally rare in miocene, Yarra Yarra, Victoria. Recent. Very rare in North Atlantic. Rather common on the Norwegian coast; 20–200 fathoms.

DESCRIPTION OF PLATE.

1-2. Biloculina ringens, *Lamarck.*
3-4. „ elongata, *D'Orb.*
5-7. Quinqueloculina triangularis, *D'Orb.*
8. Spiroloculina planulata, *Lamarck.*
9. Cristellaria crepidula, *F. et M.*
10. Texularia agglutinans, *D'Orb.*
11. Bigenerina nodosaria, *D'Orb.*
12. Rotalia craticulata, *P. et J.*
13. Truncatulina lobatula, *W. et J.*
14. Nonionina umbilicatula, *Montague.*
15. Pullenia sphæroides, *D'Orb.*
16. Carbonia ——?

Art. LVII.—*On the Genus* Rhynchonella. By Alex. McKay.

[*Read before the Wellingtou Philosophical Society, 10th October*, 1880.]

It is by the permission of the Director of the Geological Survey that I have the pleasure of placing this paper before the Society.

Of the mollusca *Rhynchonella*, although it is represented by but two living species, is, if the fossil species be taken into consideration, numerically the most important genus belonging to the Brachiopoda.

In Woodward's "Manual of the Mollusca," the genus is said to include 332 fossil species; some 60 species obtained in New Zealand have to be added, thus bringing the total to something like 400 species.

At the present time *R. nigricans* alone survives in the southern seas, and is found on the New Zealand coast.

This species is the only one found in our upper and middle tertiary strata. In the upper Eocene rocks of New Zealand, represented by the Mount Brown and Hutchinson quarry beds, another form appears, but this with its close ally *R. nigricans* is the only species yet known from our tertiary strata.

From our upper secondary rocks two more species are added to the list, *Rhynchonella Squamosa*, Hutton, and a species not yet described, which is found in cretaceous rocks of the East Coast of Auckland.

Fossils belonging to this genus abound in the cretaceous rocks of England, and most other countries in the Northern Hemisphere. About twenty species have been described from the English deposits of this age. The contrasting scarcity of Rhynchonellidæ in the New Zealand cretaceous rocks appears something like evidence in favour of the opinion, that the decline of the genus commenced earlier in the southern than in the northern hemisphere. Whether or not this speculation has the importance which I would thus attach to it, curiously enough, it finds partial confirmation in the fact that the molluscous fauna of our cretaceous seas assumed a tertiary type of character considerably prior to the period of such change in the Northern Hemisphere, within the European area.

In the middle and lower-secondary rocks of this country *Rhynchonella* is represented by a great increase of the number of species, and in many strata the rocks are crowded with such shells. With this increase in number there appears to be a restriction of the vertical range of the different species, and a consequent increase of their value for determining different geological horizons. *Rhynchonella nigricuns* can only tell us that we are dealing with tertiary strata, and its presence indicates no particular division or group of strata—as eocene, miocene, or pliocene; and *R. squamosa* does not do more for our cretaceous strata; but in our oolitic, liassic, triassic, and permian rocks, the case is different, and each particular fossiliferous horizon may generally be determined by the presence of a peculiar species of *Rhynchonella*.

Hence the increased importance of the genus in these formations, and the necessity for studying those characters by which it may be identified. Some of the species from these older rocks appear as if considerably different from the ordinary types of the genus *Rhychonella* in outline and other external characters, and one or two species are readily mistaken for Terebratulidæ, more especially if the specimens are found as casts, thereby loosing the means for determining such forms by the impunctate structure of the shell.

Specimens thus liable to be mistaken are abundant in the triassic strata of the Kaihiku Range, Otago; and not until the discovery of testiferous specimens was it apparent that these did not belong to the genus *Terebratula*, which they closely resemble.

On making the discovery that the shell-structure of this species was impunctate, I at the same time observed that the hinge-teeth were minutely crenulated, or more properly denticulate, a character not seen in *Terebratula*. Further examinations showed that specimens, which without doubt belonged to *Rhynchonella*, had teeth marked in the same manner.

This discovery led to an examination of other and distinct species of *Rhynchonella*, in which this character was also seen.

When sufficiently well preserved to show it, this character proved present in every form of *Rhynchonellæ* which has been collected from the Secondary and Palæozoic rocks of New Zealand.

The recent forms *R. nigricans*, and *R. psittacea*, also show this character, and it has been detected in an English specimen from the lower greensand, at the base of the cretaceous system.

From the constancy of this character, I think there is sufficient grounds for regarding it as of generic value; as it has been found in all the species which afford the means of detecting it, and is seen in at least two of the living types of the genus.

I am not aware that hitherto attention has been called to the presence of this character as distinguishing the genus *Rhynchenella*.

From "Woodward's Manual of the Mollusca," p. 376, I take the following description of the genus:

"Shell trigonal, acutely beaked, usually plaited; dorsal valve elevated in front, depressed at the sides, ventral valve flattened, or hollowed along the centre, hinge-plate supporting two slender curved lamellæ, dental-plates diverging." and I add teeth crenulated or minutely denticulated.

Art. LVIII.—*On some Indications of Changes in the Level of the Coast Line in the Northern Part of the North Island.*

By S. Percy Smith.

[*Read before the Auckland Institute, 15th November*, 1880.]

Incidental reference to this matter is to be found in various works on New Zealand, more especially in "Hochstetter," the 12 vols. of "Transactions of the New Zealand Institute," and the annual reports of the Geological Survey; but nowhere, as far as I can learn, has the evidence ever been gathered into one point of view, or dealt with comprehensively. It has been thought therefore, if the information extant is put together, it will be more convenient for reference in the future, and will also perhaps interest the Members of this Institute. With this view I have, in the following notes, collated and summarised from different authorities all that can be found, and propose to supplement it by my own observations, extending over several years, as far as relates to this Northern part of the Island; though it will be necessary to adduce evidence bearing on the question as affecting the whole of the North Island. I have excluded from consideration the evidence relating to the South Island, although it is more voluminous and clear, the reason of which is in a great measure accounted for by the fact of