Early Triassic Ammonoids from Beaumont Station, Wairaki Survey District

By R. A. S. Browne
With an Appendix by J. Marwick

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The ammonoids described in this paper have been collected from several localities along Beaumont Stream, in Wairaki Survey District, near Ohai, Southland. The first discovery was made by Mr. Martin Te Punga, Victoria University College, then on the staff of the Geological Survey. The fossiliferous beds extend along Beaumont Stream for about two miles with comparatively little change in fauna so far as collecting has shown, and fossils have been found at five places.

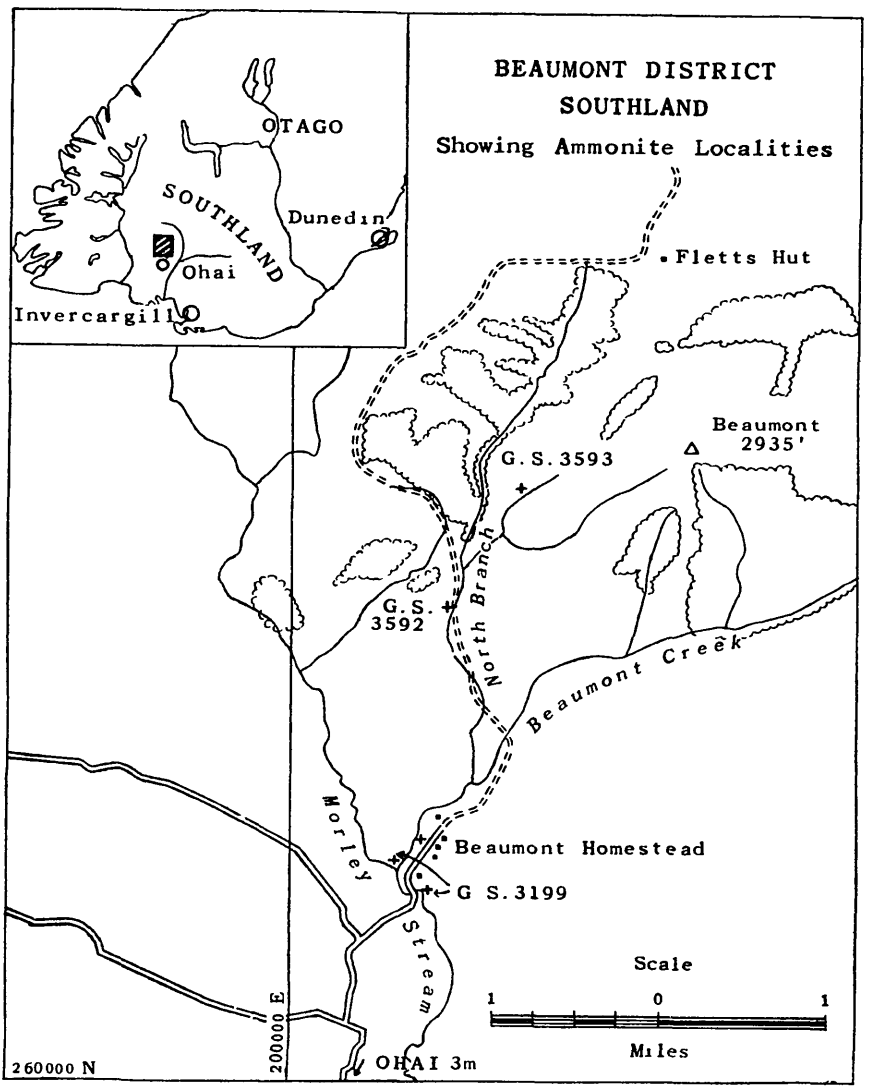
The most southerly locality (No. 1 = G.S. 3199) consists of a quarry face or small cliff immediately opposite the ford and bridge at the entrance gate to Beaumont Station, owned by Messrs. Fraser Brothers. (See Text Fig. 1.) A few chains to the west, and immediately above the junction of Beaumont and Morley streams, is another collecting locality (No. 2 also = G.S. 3199) on the right bank of Beaumont Stream. Some 150 yards further upstream on the left bank is a cliff 50–60 feet high (No. 3). Here the indurated mudstone has scattered concretions, some of which are fossiliferous. About 1½ miles up the North Branch where it crosses Cabbage Tree Flat were collected numbers of *Beaumontites frazeri* and a single *Spiriferina* valve (No. 4 = G.S. 3592). Another mile still further upstream, on the right bank, Mr. M. V. Rout, then of the Geological Survey, found the richest locality in a coarse, weathered tuff, just above stream level (No. 5 = G.S. 3593). The writer missed this outcrop in 1946, but later in the same year, a very rich continuation of this bed was collected by Mr. J. Fraser, who kindly forwarded the specimens (G.S. 5199). In January, 1947, the writer again visited Beaumont and spent half a day extracting many ammonoids from loose, weathered blocks littering the summit of a ridge and extending over an area probably 10 by 2 chains (also G.S. 5199).

It was soon plain that most of the fossils found in the other and more closely examined localities were here present, although in different proportions. There was no time to do more than scratch the surface along the extent of the outcrop, and as would be expected, most of the material is considerably weathered. The ammonoids here are in great numbers; no doubt better specimens will be obtained when pick-axe and crowbar expose fresher material.

Age of the Beds

This was no easy matter to decide, but with increasing material as collecting proceeded, a more definite idea was obtained. All along, it

was patent that while septa are in an advanced stage of the ceratitic type, ornamentation lags, and a more or less completely involute type prevails.



TEXT-FIGURE 1

Ussuria cultrata is an important find, and it is not the only species of this genus represented, for fragments of a form with a wider venter were early found. *Ussuria cultrata* is limited to one particular horizon, that is, the cliff quarry at the bridge and ford, loc. 1, at about one third the height of the cliff face

However, it must be pointed out that until the latest visit ***Beaumontites tepungai*** was restricted to the same locality. It was then found in the tuff beds two miles further north.

Fragments of *Leiophyllites marshalli* were found at all outcrops, often as external casts or moulds, until at last identifiable specimens were secured in the tuff beds.

Summing up impressions to date, the Beaumont beds are regarded as near the top of the Lower Triassic and older than the main Ceratite development of the Middle Trias.

List of Beaumont Ammonoid Faunule

Beaumontites fraseri Browne n.gen., n.sp.
Beaumontites bartrumi Browne n.sp.
Beaumontites routi Browne n.sp.
Beaumontites tepungai Browne n.sp.
Leiophyllites marshalli Browne n.sp.
Ussuria cultrata Browne n.sp.
Ussuria sp.

Genus BEAUMONTITES Browne nov.

Type species: *Beaumontites fraseri* Browne n.sp.

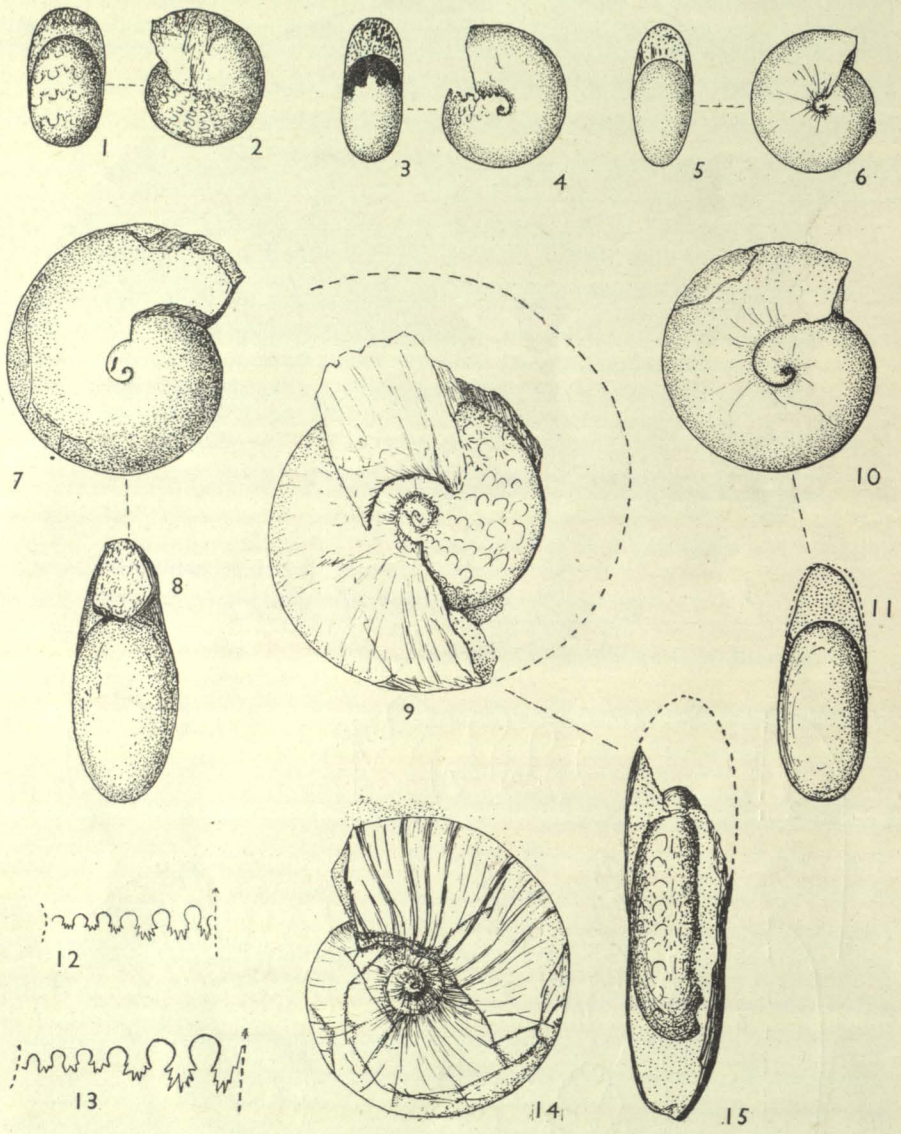
Shell involute, whorls almost orbicular in early stages, gradually increasing in height, venter always rounded, when narrowed never actually keeled; the sides more or less convex, gently merging into the ventral and umbilical areas. Umbilicus extremely small to closed, wall steep. Surface of shell smooth. Suture line ceratitic, a small triangular bifid ventral saddle separates the wide ventral lobes, the two lateral and four auxiliary saddles are all entire, with lightly narrowed stems, decreasing gradually and regularly across the whorl.

The name is derived from Beaumont Stream, along which the ammonites occur in four separate localities in two miles.

Beaumontites fraseri Browne n.sp. Plate 102, figs. 1, 2, 7, 8, 12

Ventral area narrowly rounded in adult, laterally always gently convex until merging suddenly into the umbilical wall. Saddle bases toothed. The second and third earliest whorls, of seven exposed in vertical section, at a diameter of 1 5 mm., show a simple goniatitic suture line similar to *Triainoceras* (Eastman's *Zittel*, 1913: 633, fig. 1185). There is no saddle in the shallow ventral lobe. As far as can be observed, this is followed by two simple, wide, and shallow lobes and two rounded simple saddles. The first whorl seen, as is to be expected, is globose and the succeeding whorls show broadly rounded ventral regions. The body whorl alone shows a narrowed venter which, however, is still rounded and there is no sign of a keel at any stage. The lateral area is always gently convex, gradually merging into the rounded ventral and umbilical regions. The umbilicus is always extremely shallow. In only one specimen among thirty examined at various stages is there a definite furrow behind the aperture; otherwise the surface is smooth.

Sutures: Following the embryonic and the goniatitic stage referred to above, at a surprisingly early stage of adolescent development (as early as 3 mm. diam.) all lobes are ceratitic; a small bifid saddle separ-



J.M. del.

FIGS. 1, 2—*Beaumontites fraseri* Browne n.sp. Paratype × 1.
FIGS. 3, 4—*Beaumontites bartrumi* Browne n.sp. Paratype × 1.
FIGS. 5, 6—*Beaumontites routi* Browne n.sp. Paratype × 1.
FIGS. 7, 8—*Beaumontites fraseri* Browne n.sp. Holotype × 1.
FIGS. 9, 15—*Beaumontites routi* Browne n.sp. Holotype × 1.
FIGS. 10, 11—*Beaumontites bartrumi* Browne n.sp. Holotype × 1.
FIG. 12—*Beaumontites fraseri*, suture of Fig. 1, × 2.
FIG. 13—*Beaumontites routi*, suture of holotype, × 2.
FIG. 14—*Beaumontites tepungai* Browne n.sp. Holotype × 1.

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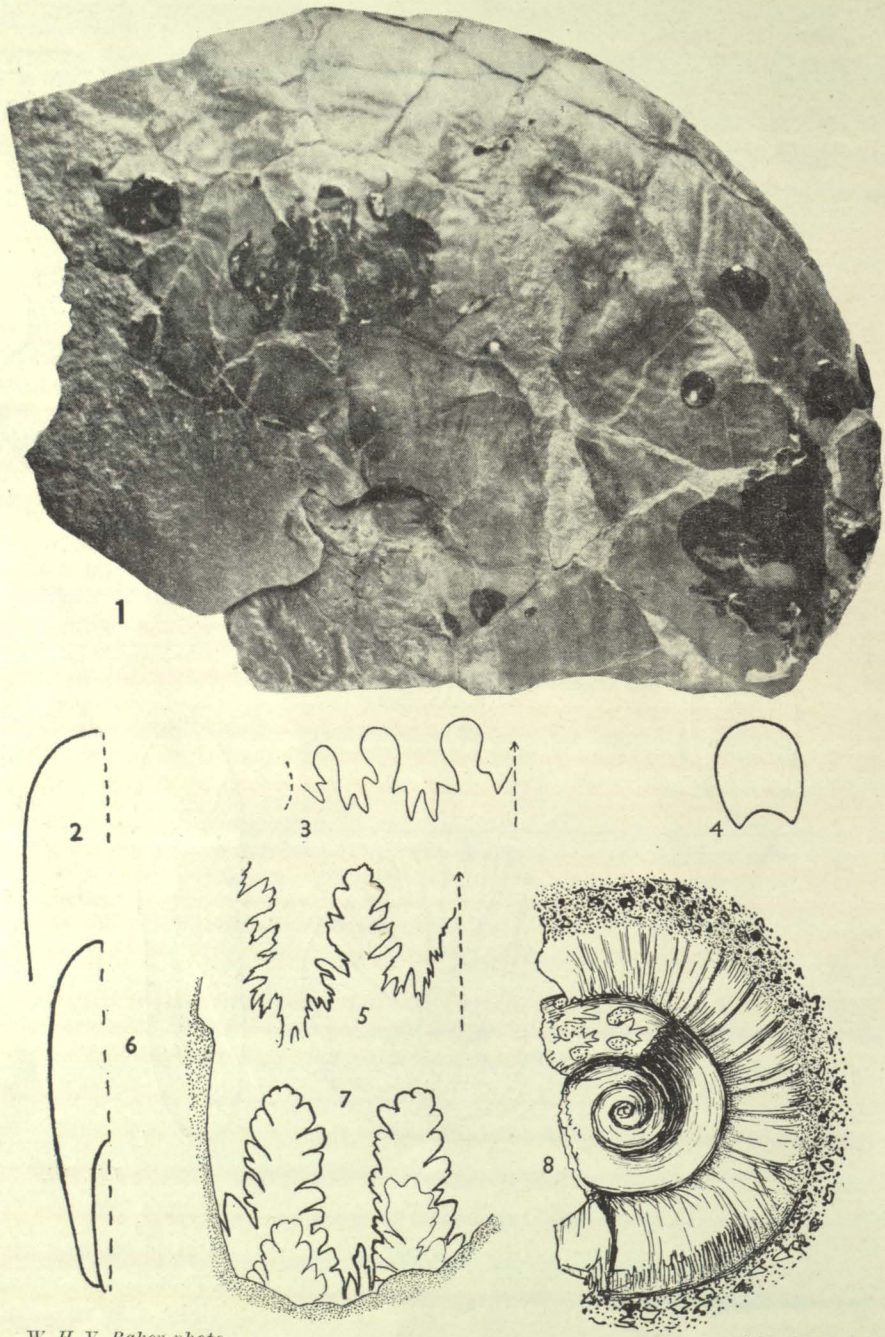

W. H. V. Baker photo. *J.M. del.*

FIG. 1—*Ussuria cultrata* Browne n.sp. Holotype × 1.
FIGS. 2, 5—*Ussuria* sp. × 1.
FIG. 3—*Leiophyllites marshalli* Browne n.sp. Suture of holotype × 2.
FIG. 4—*Leiophyllites marshalli*. × 1.
FIGS. 6, 7—*Ussuria cultrata*. Paratype × 1.
FIG, 8—*Leiophyllites marshalli* Browne n.sp. Holotype × 1,

ates the two portions of the wide shallow ventral lobe, each ceratitic, with at least two denticulations. The first lateral lobe is wide and deep, the base having two denticulations and three strong points. The second lateral lobe is narrower and shorter, and, like all the auxiliaries seen, usually is strongly ceratitic. The first lateral and all succeeding saddles are rounded brachyphyllic anteriorly, the narrowed shanks are all finely toothed. The anterior portions of the sutures take a straight course across the flanks until the umbilical wall is reached, the auxiliaries gradually decreasing in size.

The umbilical walls are steep, as is plainly seen in the earlier septate stages. The body chamber occupies 1½ whorls.

Holotype in collection of New Zealand Geological Survey (J. Fraser coll.).

Localities: G.S. 5199 (type), 3593, 3592, 3199, Beaumont, Southland.

Diameter, 31 mm. Height of last whorl, 15 mm. Width, 13 mm. Umbilicus, 6 mm.

This species is the commonest ammonoid at Beaumont, occurring at all the localities examined. Although often badly weathered internally, it is particularly plentiful in the tuff deposits at localities 3592, 3593, and 5199, the most northerly deposits so far collected from.

The species is named in honour of my friend Mr. J. Fraser, who collected the holotype in addition to many other specimens. To Mrs. Fraser and to him the writer is indebted for generous hospitality.

Beaumontites bartrumi Browne n.sp. Plate 102, figs. 3, 4, 10, 11

Umbilical and lower lateral area more or less depressed; umbilicus covered or minute. Venter more broadly rounded in outer and penultimate whorls. Saddles smooth.

This species differs from *B. fraseri* in the more or less depressed umbilical region, as against the gentle but nevertheless noticeable convexity of that region in *B. fraseri*.

Again the venter is more rounded at maturity. This is less noticeable in the earlier stages of growth. It is the less inflated inner whorls that give the depressed umbilical region, the sections being ovoid instead of rounded. The sutures are similar to those of *B. fraseri* in having all lobes ceratitic, and all saddles rounded brachyphyllic anteriorly. The points and indentations at the bases of the lobes are not so strongly developed as in *B. fraseri*. Both cast and shell are smooth in all specimens examined.

The umbilicus is minute or covered.

Holotype in collection of New Zealand Geological Survey.

Diameter, 30 mm. Height of last whorl, 12 mm. Width, 11 mm. Umbilicus, 8 mm.

Locality: G.S. 5199, tuffs with concretions, North Branch, Beaumont Stream

Beaumontites routi Browne n.sp. Plate 102, figs. 5, 6, 9, 13, 15

Smooth, discoidal, more or less evolute or egredient; gently convex from the shallow umbilicus to the narrow but distinctly rounded venter.

Adult umbilical area gently concave, more so than in *bartrumi*. Early whorls involute, globular, gradual increase in relative height and narrowing of venter with growth. No true or fully developed ribs present at any stage and no true constrictions, but incipient radial to posteriorly convex rib-like markings are numerous on the body chamber, but not on the septate portion visible. Body chamber occupies at least 1¼ whorls.

Septa: A flask-shaped siphonal saddle shortly bifid anteriorly (i.e., with a minor siphonal lobelet) dividing a deep and very strongly denticulate siphonal lobe, apically fully as far as the first lateral lobe, and strongly trident. The first and second laterals are similarly strongly trident as is the first auxiliary. Succeeding auxiliaries are ceratitic. At least six and possibly seven lobes excluding the siphonal. Saddles all smooth and rounded anteriorly.

Holotype in collection of New Zealand Geological Survey.

	Holotype	Paratypes
Diameter	58 mm. (estimated)	43 mm. 30.5 mm.
Height of last whorl	22 mm.	20 mm. 11 mm.
Width	13 mm.	12 mm. 9 mm.
Umbilicus	15 mm.	10 mm. 9 mm.

Locality: G.S. 5199, tuffs with concretions, North Branch, Beaumont Stream.

Beaumontites tepungai Browne n.sp. Plate 102, fig. 14

Slightly evolute, discoidal, outer whorl much compressed, inner ones somewhat inflated. Whorls deeply embracing and very deeply indented by the preceding whorl; greatest width at about ⅓ of height, very gently convex until nearing the venter, which is very narrowly rounded in the body whorl. Septa ceratitic at least 6 lobes and saddles, septa crowded. Body whorl at least 1⅓ volutions. Ornamentation variable, never strong, of shallowly sigmoid growth striae and low folds rather irregularly developed, scarcely observable before the last half whorl.

Holotype: New Zealand Geological Survey (R.A.S.B. coll.).

	Holotype	Paratype (1)	Paratype (2)
Diameter	39 mm.	42 mm.	37 mm
Height	15 mm.	25 mm.	22 mm.
Width	—	5 mm.	—
Umbilicus	10 mm.	—	—

Locality: Beaumont No. 1, G.S. 3199, indurated mudstone, cliff at entrance gate to Beaumont Homestead.

This is easily the most common form at Beaumont No. 1. A very large number of fragments were found here and further search will undoubtedly disclose many more.

The species is named in honour of Mr. Martin T. Te Punga, who first located Ammonoids in the Beaumont beds.

Genus Leiophyllites Diener

1915. *Fossilium Catalogus*, 8, p. 205

Type species: *Monophyllites suessi* Mojsisovics

"Evolute, generally smooth, serpenticone Monophyllitidae with rounded or compressed whorl-section, arched venter and three monophyllic saddles in their simple suture lines.

"Distribution: Lower Middle Trias, Anisian Alps; Bosnia; Hungary; Albania; Greece; Roumania; Anatolia; Himalayas; Tonkin; Japan" (Spath, 1934).

Leiophyllites marshalli Browne n.sp. Plate 103, figs. 3, 4, 8

Gently convex laterally, with well-rounded venter and with strong, rounded sigmoid ribs, becoming much closer anteriorly on body whorl. Umbilical slopes steep in that portion of the penultimate whorl retained, but on body whorl showing an easier slope. No sign of ribbing on the inner whorls.

Dimensions estimated as shell imperfect. Diameter, 53 mm. Height, 14 mm. Width, 12 mm. Umbilicus, 27 mm.

Holotype: New Zealand Geological Survey (R.A.S.B. coll.)

Localities: G.S. 5199, tuffs, Beaumont Stream, North Branch. G.S. 3199, top of middle layer, cliff at Homestead Gate, R.A.S.B.

[The suture line is somewhat simpler than that of the Anisian genotype and so *marshalli* may belong to the group of *L. indoaustralicus* (Welter) (Anisian, Timor) that Spath thought may be systematically separable from *Leiophyllites*. J. M.]

Genus USSURIA Diener

1895. *Trudai Geol. Kom., St. Petersburg,* (14) (3), p. 22

Type species: *Ussuria schamarae* Diener

Ussuria cultrata Browne n.sp. Plate 103, figs. 1, 6, 7

Shell fairly large, involute, narrowly umbilicate, laterally compressed, sides flattened, curved steeply in to the narrow umbilicus, but very gently to the narrow venter. Surface with very weak, rather irregular, well spaced, sigmoid, radial folds and four to six still weaker riblets between, more regularly developed ventrally but still weak.

Holotype: New Zealand Geological Survey.

Diameter, 120 mm. Height, 62 mm. Width, 13 mm. Umbilicus, 10 mm.

Locality: G.S. 3199, indurated mudstone, one third way up cliff at bridge and entrance gate, Beaumont Homestead.

[The holotype has been very greatly crushed and compressed so that its exact shape cannot be ascertained; but the body chamber fragment figured on Plate 103, figures 6, 7, showing parts of the last two sutures does not appear to be distorted. Although it is broken just short of the medial line, the venter appears to have been very narrowly rounded but not keeled. J.M.]

Ussuria sp. Plate 103, figs. 2, 5

The venter is much more broadly rounded than in *A. cultrata.*

Locality: G.S. 5199, tuffs, North Branch, Beaumont Stream.

APPENDIX

By J. MARWICK, N.Z. Geological Survey

THE death of R. A. S. Browne on 26th June, 1947, deprived New Zealand of its only active worker on ammonites. As a young man, Browne was interested in these fossils, and specimens collected by

him were described by the late P. Marshall as early as 1909. Incidentally, *Aulacosphinctoides brownei* (Marsh.) from the upper Jurassic of Kawhia bears his name. He did not take up their serious study, however, until more leisure came his way thirty-five years later. In March, 1944, Mr. M. T. Te Punga discovered ammonites at Beaumont Stream, near Ohai, in Southland, and his specimens were forwarded to Mr. Browne early in 1945.

Subsequent collections were made by Mr. J. Fraser, of Beaumont Station, and by members of the Geological Survey, chiefly by Mr. M. V. Rout, but also by Dr. A. R. Lillie, Mr. H. J. Harrington, and Mr. R. W. Willett.

Ammonites were recorded by Hector (1869: vi) from Morley Stream, but the only ammonite remaining in G.S. coll. 144 is unidentifiable and the precise locality is unknown.

The paper had not been completed at Browne's death, but the names and formal descriptions as they appear above had been written out by him, also some introductory notes. Some additional species and another two new genera had been recognized, but the writer has exercised the normal duties of an editor in collating manuscript, and has included only such manuscript descriptions as could be found to be supported by specimens.

One modification that may be mentioned is in the generic placing of *Leiophyllites marshalli*. This had been described by Browne under *Monophyllites*. Unfortunately, he had not come across L. F. Spath's (1934) invaluable revision of the Triassic Cephalopods in the British Museum. This work would have given him enormous pleasure. On the information set out by Spath, the writer has modified Browne's classification and used *Leiophyllites*.

According to Spath's work, the age significance of the genera identified is as follows:

Leiophyllites, Anisian.
Ussuria, ? lower Eo-Trias.

The two species placed in *Ussuria* have sutures by no means typical of the genus, leaving *Leiophyllites* as the best guide. The Beaumont *L. marshalli* is somewhat more primitive than the Anisian type species and so could be a little older. The new genus *Beaumontites* is closely related to a group of Spitzbergen species, *Parapopanoceras hyatti, torelli,* and *malmgreni,* all Mojsisovics species. These were placed by Haug (1911: 899) in the upper Virglorian (= Anisian), and Spath (1934: 35) listed the Parapopanoceras beds of California at the base of the Anisian.

The evidence now available thus favours an Anisian age and probably early Anisian.

References

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HECTOR, J, 1869. Progress Report, *N.Z.G.S. Rep. Geol. Explor. during 1868–69*, no. 5.

SPATH, L. F., 1934. *Catalogue of the Fossil Cephalopoda in the British Museum*, Part 4, The Ammonoidea of the Trias.