Taratu Series.—Quartz conglomerate at many places rests on the schist; at Molyneux mouth, Mount Misery, Waronui, and Saddle Hill indistinguishable quartz conglomerate rests on Kaitangata conglomerate. At Brighton the quartz conglomerate below the Brighton fossiliferous beds is 100 ft. thick. At Boulder Hill the quartz conglomerate below the Boulder Hill fossiliferous beds (Wangaloan) is 400 ft. thick, no Brighton fossils are found, so there the 400 ft. quartz conglomerate is classed as Taratu. At Coal Point and Tokomairiro mouth quartz conglomerate below Wangaloa fossils is 1,000 ft. thick, and no Brighton fossils are found, so the 1,000 ft. of quartz conglomerate is included in the Taratu. It is likely enough that, during the sea transgression in which the marine beds at Brighton were deposited, the quartz conglomerate at other places was also eroded and redeposited without leaving any evidence. Concealed breaks are well known to be prevalent in thick quartz conglomerate formations of this kind; but where no fossils or erosion breaks are found the quartz conglomerate cannot be divided. The Taratu Series accordingly includes the quartz conglomerate at Taratu, Castle Point, Waronui, Saddle Hill, Green Island, and Boulder Hill up to the first recognizable marine bed. Evidence that the Taratu conglomerate unconformably overlies the Kaitangata conglomerate is given in the report on the Dominion Mining Conference, 1926, pages 84–85. It is clearly a series of fluvial conglomerates torrent-bedded, scoured, and filled, with lenses of clay, carbonaceous lumps, films, streaks, and coal-seams. No marine fossils occur in it, and all we know of its age is that at least parts of it are post-Kaitangatan and pre-Brighton. Probably the Taratu Series as mapped contains more than one formation; and it must correspond in age to some part of the Cretaceous. It forms homoclines on the back slopes of tilted blocks dipping into the fault angles. At Kaitangata and south of Milton it is preserved on both flanks of the block and is anticlinal.

Brighton Series.—The formation that contains the fossiliferous beds at Brighton, being distinct from any other beds, is separated as the Brighton Series. The beds are best described by Grange in Vol. 53, pages 162–64, of the Transactions of the New Zealand Institute. The section exposed at Brighton shows 30 ft. of shell limestone with an eroded upper surface, overlying 80 ft. quartz conglomerate resting unconformably on schist. There is a 12 ft. coal-seam 50 ft. from the base. The shell limestone with its eroded top and everywhere less than 100 ft. thick is the Brighton Series, the current-bedded beds below being placed in the Taratu Series. The shell limestone consists of shell fragments broken too small to be identified, except for an occasional piece of oyster-shell and worn Belemnites. It is evenly bedded in contrast with the cross-bedded quartz conglomerate below, and represents a marine transgression unrecorded elsewhere. It is of Cretaceous age.

Wangaloa Series.—In spite of some confusion in nomenclature the fossiliferous beds of Measly Beach are taken as the type of the Wangaloa Series. This is limited to the marine sorted and bedded top part of the quartz conglomerate and the overlying fossiliferous sandstone, and extends from Mitchell Point four miles to the north across the Tokomairiro River. The same bed was found by Fyfe at Boulder Hill thirty miles to the north, but it was only 1 ft. thick and 3 ft. long and 6 ft. wide. The same fossils were seen as casts in quartzite at the same level farther west on the hill.

From Measly Beach to Tokomairiro the Wangaloa conglomerate and sandstone dip continuously at 3° for a mile across the strike, and are accordingly 200 ft. thick. In Measly Beach sea-cliff and at Boulder Hill the rusty sandstone is 50 ft. thick. At Boulder Hill the sandstone grades upward into glauconitic sandstone and mudstone 300 ft. thick, above which lies the basal conglomerates of the overlying series. South of Scrogg's Hill, too, the quartz conglomerate grades upward into quartz sandstone, this into grey micaceous sandstone, and this into glauconitic sandstone and mudstone.

The relation of the glauconitic sandstone and mudstone is puzzling. It directly overlies the fossiliferous shell-bed at Brighton from which it was described by Grange as being separated by a small erosion interval. It overlies the fossiliferous beds at Boulder Hill which are not present in the Brighton section. Again the quartz conglomerate at Brighton below the Brighton fauna is but 80 ft. thick, and at Boulder Hill below the Wangaloa 400 ft. thick, and at Measly Beach 1,000 ft. thick. This suggests that the quartz conglomerate is not contemporaneous throughout. The evidence available is not sufficient to prove the details. For want of better evidence, the Wangaloa Series is taken to include the overlying glauconitic mudstone 800 ft. thick into which the fossiliferous sandstone appears to grade up.

Dr. Marwick is working on the fauna, and reports that it is of youngest Cretaceous age.

Burnside Series.—The Burnside Series is a new series proposed to include the fine mudstone known as the " Burnside Marl " and the underlying coarse white quartz sandstone that rests on the glauconitic mudstone of the Wangaloa Series. The sandstone at Kaikorai mouth is 200 ft. thick and the mudstone 150 ft. The top of the Burnside beds is marked by the bed of phosphatized pebbly greensand exposed in the Burnside quarry and in Kaikorai Stream 15 chains to the south-east. The change from the glauconitic mudstone of the Wangaloa Series to the pebbly coarse current-bedded sandstone of the basal Burnside indicates elevation and probably erosion between the two sets.

The series is of Ototaran age.

Caversham Series.—Burnside mudstone is broken by a 6 ft. bed of greensand containing pieces of the underbed and phosphatized pebbles, shark-teeth, &c., which is taken as the base of the Caversham Series. The complete succession is not exposed, but the pebbly greensand is overlain by glauconitic mudstone that grades into greensand, and greensand is seen grading up into the Caversham sandstone. The Caversham sandstone is 300 ft. thick, and has an eroded top covered with volcanic rock. The beds at Milburn and Clarendon are classed in the Caversham Series. These include in upward sequence 5 ft. of quartz conglomerate and sandstone, 10 ft. of glauconitic sandstone, 120 ft. limestone, and 150 ft. of brown sandstone.

Thomson considered that the brachiopods from the Waikouaiti sandstone indicated that the Caversham sandstone should be classed as Awamoan, and Finlay and McDowell regarded it as basal Awamoan.