October 21st, 1963

Surficial Geology Saanich, Additional Notes
October, 1961

On October 17th to 20th, 1961, Dr. J. Armstrong and Stan Leeming of the G.S.C., Vancouver, were in the Victoria area. Three short excursions were made in the field by the writer with Armstrong and Leeming to go over some of the geologic features of the area. There is essential agreement between the writer and Dr. Armstrong on the overall picture but Armstrong hesitates to correlate the section here with that of the mainland.

In the section at Cowichan Head, Armstrong is not willing to call the bouldery material below the middle stony clay a till although he says that it is till-like and that the presence of the overlying stony clay fits in with a till or ice associated material. He says that a Semiamu stony clay has not been observed on the mainland and that one should hesitate to correlate this combination with the Semiamu. He says that he will get a radio-carbon age determination on the shells in this clay after checking with Fyles to make sure that this has not already been done.

The pit on Mills Cross Road showing a section of sand overlain by clay with shells, shell gravels with till at the top is unique as far as Armstrong is concerned. The possibility that this might be a midden was discussed at length but was pretty well ruled out because of dissimilarity with other middens, location, and the bedded character of the shell deposit. The presence of clay containing whole shells below this also is against a midden origin. He Armstrong, also suggests an age determination along with collections for identification. Exposure by digging of the relation between the sand and overlying (?) clay and shells would also be helpful.

At the pit at Mt. Tolmie, Armstrong thinks that the buried soil is a result of either man's activities or solifluction following a forest fire and not by ice, change of climate as suggested by the writer. The till here Armstrong thinks is definitely not till although it may have an origin associated with ice. The very intricate bedding of the sediment in the pit is thought by Armstrong to be ice contact against the rock core of Mt. Tolmie.

At the gravel pits at Keating and Cordova Bay the problems of source and the abrupt change upward from fine sand to gravel were discussed at some length. An ice origin is almost certain as a source although this does not explain the size change unless the sand and gravel are of different ages. The contrast in size can be explained by difference in distance from the ice source which Armstrong believes was probably quite great and could be as much as 50 miles. An advance Vashon age is quite likely although this poses the serious problem of the origin of the great erosional unconformity between the gravels and the overlying Vashon till which is so well shown in the gravel pits at Cordova Bay and Keating Cross Road. This distribution of the gravels around buried rock hills is kame-like and is probably significant. Dips away from the rock, are commonly found in Kames but this is not essential depending on the position and thickness of the ice along which the kame was formed.

Armstrong thinks that a discontinuous distribution of till under stony clay poses serious problems if one considers the ice to have been thick (7000') typical of continental glaciation. He thinks that non-deposition over rock surfaces can be explained by ice scouring but that this is not a valid explanation when the ice over-rode gravel as is the case in much of the Saanich area. Obviously an erosional interval cannot be proposed between till and stony clay.

Mr. Easterbrook working the Bellingham area proposes that the Vashon ice (or the last ice) was thin and that this can explain non-deposition of till beneath stony clay. This idea also cuts down on the depth of the water necessary to float the ice which deposits stony clay.

On October 18th, the afternoon was spent on James Island looking at the section along the bluffs at the south end of the island. Here the sand section is at least 200' thick and from information from old water wells it may be as much as 400' thick. It is overlain by sandy compact till like mixture which contains shell fragments and is therefore not normal till. This varies in thickness from 0 to about 20' thick and is overlain especially at lower elevations by normal stony

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clay. These glacial deposits are unconformably over the sand and conform to the present day topography. A beach layer varies from 0' to 15' thick, the thicker part apparently over the places where the stony clay is thin or absent. This may be explained by the resistance of the clay to marine erosion. The sandy till-like material may be prone to erosion and may be the source of the beach.

The middle stony clay at Cowichan Head was studied by John Fyles as part of a study (G. S. C.) of pre-Vashon deposits of Vancouver Island. He collected shells for radio-carbon age determination and also some wood. These ages are listed in the catalogue of ages put out by the American Journal of Science. The wood gave an age of 38,000 yrs. BP and shells about 42,000 which is pre-vashon and could be Semiamu.

The marine section at Mills Cross Road was apparently unknown to Fyles and Armstrong is sending in shells for age from there which probably will be run in Ottawa within a year. A collection was made here for purposes of identification also.

Fyles is supposed to publish something on this within the next year or two.

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ADDENDUM

James Island - An afternoon was spent with Dr. Armstrong of the G.S.C. on James Island mostly looking at the well-exposed section in the bluffs at the south end of the Island. This section consists of drift overlying sand with a lag of beach gravel at the top. The sand, which is at least 175' thick (and probably quote a bit thicker) is typical of the pre-Vashon (Cordova) sand seen on the mainland, cross-bedded with only minor gravelly layers. The drift looks like typical Vashon till but contains shell fragments and is therefore all marine drift. Toward the west end of this section, there is a layer up to about 10' thick of typical stony clay over the till-like drift indicating that there are two distinct types of marine drift at this locality.

The beach gravel at the top of the section is up to about 15' thick which is unusually thick according to Armstrong. The small gravel pits near the middle of the Island are probably in this material.

A number of wells were drilled on the island without success. These were drilled near the middle of the island down into rock which is quite a distance below sea level at this locality. The premise on which this drilling was based was the idea that rock (which is granite) might convey water from the mainland - a most unlikely condition. Apparently no attempt was made to develop water from a floating fresh water body which is quite likely to exist under this island. Records of these wells do not seem to be available.

The water system consists of a number of springs which are located on the southeast part of the island and which feed into lagoons or reservoirs on the stony clay. Apparently artesian conditions exist here but the artesian water is brackish. This has been used in times of shortage.