

RJ Adie 1950

R/MIN/GEO/1#3

REPORT

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Notes

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on a GRAG LIMESTONE from

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PORT PLEASANT, FITZROY AREA, FALKLAND ISLANDS.

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CONFIDENTIAL.

Notes

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on a CRAG LIMESTONE from

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Copy No 3.

1) INTRODUCTION.

While touring East Falkland, it was intended to investigate three reported occurrences of lime-bearing rocks.

a) The first of these, in Salvador Waters, proved to be an extensive storm beach containing a high percentage of shell fragments. The sample obtained has unfortunately been lost, but it is doubtful if the CaCO_3 content is as high as 50%. Small quantities of this bed have been removed by the Schooner "Porvenir" for sale in Port Stanley as grit for poultry.

b) The second occurrence was reported by Niddrie (ex-Naval Met. Officer H.M.S. Pursuivant) in a verbal communication. He described this bed as being a magnesian limestone near the base of the Lafonian in the Black Rock Area. He had only seen a hand specimen and not the rock in situ. This rock was not found, but as only half a day was spent in the locality it would be quite easy to miss the occurrence, which, from Niddrie's information, is only a few feet thick. It may prove to be a possible source of lime.

c) The third source of lime is that at Shell Point, Port Pleasant, Fitzroy Area. This occurrence has apparently been known for some time as the name suggests. On the shore-line debris from and not the beds themselves is seen. The crag limestone lies further inland on a raised beach.

It must be stressed that an hour was all that could be spared for this examination, and that these notes merely indicate the nature and possibilities of the deposit and suggest further lines of investigation. Until this has been done NO ACTION should be based on this report, but it does seem possible that here is a useful source of agricultural lime.

2) PREVIOUS WORK ON RECENT DEPOSITS.

Recent Deposits from the Falkland Islands are very inadequately described. Halle's description of the West Point Island Forest Bed being the only complete one. Excavations of any depth are limited to a few quarries in the vicinity of Port Stanley and to "peat bogs". Exposures of recent/other than peat, are consequently rare.

beds,

a) Andersson (Geog. Journ., Vol 21 1903 p150) says "Raised beaches (terraces and shingle covered-plains) prove that these islands in a post glacial period have been submerged at least 210 feet below present sea level!" He also points out that care is necessary in discriminating between raised beaches and terraces formed by solid rock outcrops.

b) Halle (Bull. Geol. Inst. Uppsala Vol. 11 pp. 220, 221) did not find any certain evidence of recent uplift, but stresses the obliterating effects of peat growth and "waste-flow". He concludes, "The complete absence - as far as my observations go - of such deposits is indeed quite a striking feature of the islands!"

c) Baker (Final report on Geological Investigations in the Falkland Islands 1920 - 1922) makes no mention of Recent and Superficial Deposits beyond noting the presence of "raised

/beaches

beaches and beach debris" (p.32) in connection with his remarks on recent changes of level. He apparently did not investigate the composition of the raised beaches.

3) RAISED-BEACHES.

As far as was possible raised beaches were examined. In only three localities were undoubted formations of this nature seen.

- a) At York Bay, Port William a shingle raised beach has been partly obliterated by shifting sand dunes.
- b) At the head of the bay between Muddy Creek and Bold Point, Salvador Waters, a wave-cut platform in the marine Devonian has a shingle and sand covered raised-beach extending for some distance behind the present strand-line
- c) At Shell Point, Port Pleasant a wave-cut platform has a definite succession of more recent deposits lying unconformably on it. The location of this latter deposit is shown on the attached sketch map, and it is in these beds that the crag limestone occurs.

These three occurrences, although widely spaced, appear to be at the same level of 20' - 25' above present sea level. At other points on the coast-line visited raised beaches at this or other levels were not seen.

4) THE RECENT BEDS AT SHELL POINT.

On the beach at Shell Point shell debris was strewn about in such a manner as to suggest "hill-creep" and not "storm-beach" formation. Further some of the fragments consisted of cemented broken shell material, and, in a few cases, more or less complete tests had this cemented material adhering to them. On searching further from the beach, blocks of crag limestone were found on a wave-cut platform some 20' - 25' above sea level. The beds are poorly exposed, being well grassed over, but it was possible to make out the following succession.

- | | | |
|------------------------|-------|---------------|
| a) Unconsolidated Sand | up to | 3 feet |
| b) Crag limestone | | <u>8 feet</u> |
| c) Clay | | <u>4 feet</u> |

Unconformity

Lower Lafonian Series Shale.

The disposition is better seen in the attached idealised section, which also shows how the beds have been eroded by the small rivulet to the north of the deposit. Although time did not permit of a visit "flats" were seen in other parts of Port Pleasant at the same level, and these appear to be part of the same raised beach system.

5) PALAEONTOLOGY.

Samples 26A and 26B were submitted to Dr. L.R. Cox of the Geology Department of the Natural History Museum, South Kensington with a view to obtaining from him an opinion as to the

age of the deposit. Unfortunately all the molluscs in the specimens are modern forms. He pointed out that little is known even of living forms in the Falkland Islands. Should the deposit prove to be workable, it is important that as many fossils as possible are collected, since statistical methods are often useful in dealing with these fossils.

So little material is at present available that the only opinion he could express is that the beds are of recent geological age, but that they may also be considerably older since the forms seen have a wide geological range.

6) DESCRIPTION AND CHEMISTRY.

Specimen 26A is from the top of the bed while 26B is from the centre. 26A has a much greater proportion of unbroken tests than the other. It is also much more porous, and has a curious red staining which may be of organic origin. 26B is more compact and also harder but still not too hard for easy working. It has the appearance of having been phosphatised, but a qualitative test gave a negative result.

Mr. Warren writes:- "I enclose the results of analyses of two samples of limestone which you sent me this week. You will see from the figures that the Mg and P_2O_5 contents are negligible. In addition to the Ca combined as carbonate there is a further amount in each sample combined in some other form probably as silicate, but only the $CaCO_3$ is officially recognised as having neutralising value.

Analyses of Crag limestone from Falkland Islands. Results are expressed as percentages in samples as received.

	Sample 26A	Sample 26B
$CaCO_3$	82.9	87.5
CaO combined in forms other than carbonate	1.1	3.1
MgO	< .05	< .05
P_2O_5	0.1	0.1
H_2O given off at $100^\circ C.$	0.8	0.7
undetermined matter (SiO_2 , Al_2O_3 , Fe_2O_3 etc.)	15.1	8.6
	<u>100.0</u>	<u>100.0</u>

7) POSSIBLE EXTENT.

The limestone is only expected to occur in scattered areas of little extent near the coast-line of Lafonia. No signs of suitable raised beaches were seen in the remainder of East Falkland; West Falkland was not visited. The Port Pleasant deposit occurs, as pointed out, on a 20' raised beach, and it is on these raised beaches that further search should be made. On the Port Pleasant site an estimate of the quantity available was made, but it felt that it is better not to quote this as time was not available for a thorough examination.

On the raised beaches themselves indications will be the presence of shells and shell fragments, which are cemented together (para. 4 refers). It should be noted that the name Shell Point in Port Pleasant is an entirely local one, which does not appear on the Admiralty Chart. It is not known how many of these "Shell Points" have been named locally, but the Admiralty Chart shows both a SHELL POINT and a SHELL ISLAND in ADVENTURE SOUND. This suggests that there might be there a second locality worth searching.

8) ECONOMIC CONSIDERATIONS.

Whether or not these limestone deposits can properly be regarded as mineral under para. 2) Definition of Mineral of the Mining Ordinance 1918 must remain undecided until further geological information is available. Certainly a "prima facie" case for regarding the Port Pleasant deposit as mineral could be made out. The Black Rock beds if found are certainly mineral from Niddrie's description, and it would be improper to regard the Salvador Waters beds as such.

What, however, should be kept in mind is that, taking a long term view, the reserves of lime available will be limited. The main agricultural use of this lime should be to increase the pH value and calcium supply in the soil.

With the present development of drainage in the Falkland Islands it would be extremely prodigal of a limited resource to allow it to be used indiscriminately on undrained land where there is little hope that it would attain the desired results. Assurances should therefore be sought that its use be restricted to a) arable land b) improved pasture and c) drained land in that order of priority. To really ensure the optimum use it should be placed under the direct control of the appropriate Government Officer.

The beds at Port Pleasant are situated in a position admirably suited for sea transport, and from the mode of occurrence, any other beds which may be discovered, will also be in easy access of the sea. The deposit, which is sufficiently soft to be worked with hand tools, should be crushed to - 40 mesh as Rothamstead advise this is sufficiently fine for the purpose. This could be easily done in sufficient quantity with a portable diesel-operated crushing plant.

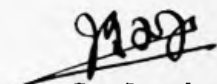
9) ACKNOWLEDGMENTS ETC.

Acknowledgments are due the Dr. Cox for kindly examining the fossil material, and especially to Mr. Warren of Rothamstead Agricultural Institute for the chemical analyses.

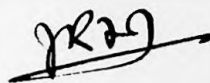
** Specimens 26A and 26B have been deposited with the Mineralogy Department of the Natural History Museum, South Kensington, and have been given Museum registered numbers and . Duplicates of the specimens were deposited with the Agriculture Department Port Stanley and Dr. Hamilton the Government Naturalist.

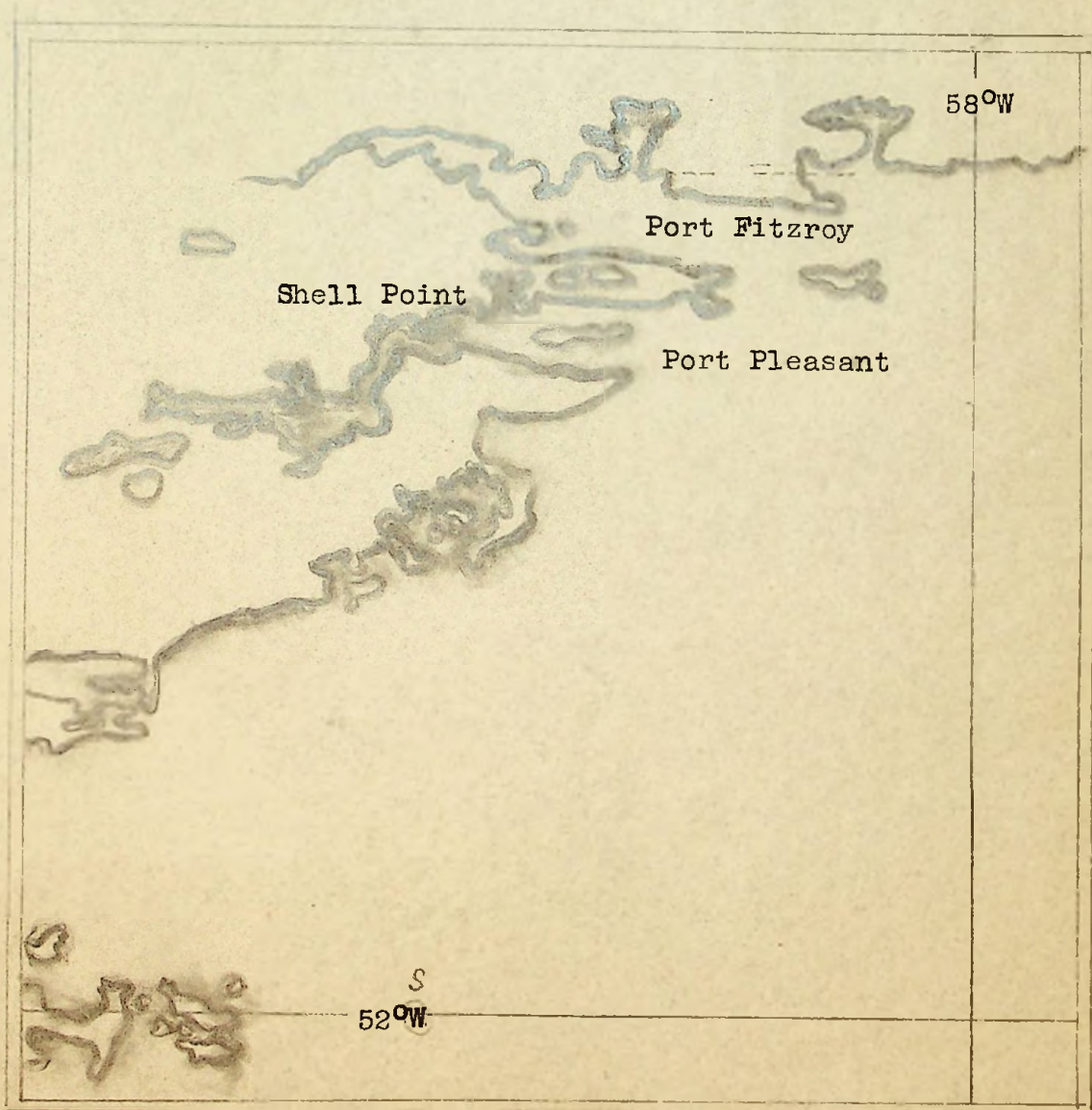
At a later stage the writer would appreciate the opportunity to publish a more academic note on this deposit since it adds to the recent geological history of the Falkland Islands.

Hartford Cottage,
Stokenchurch
GS/PR/JRW/32


Geologist.

** Material deposited with the Museum takes some time to acquire a registered number and the registered no. will be forwarded for insertion in this report when it becomes available.





Sketch Map showing location of SHELL POINT.

(after Admiralty Chart No.1354 B)

North

Rivulet

Wave cut platform

Present eroded land surface

Sea level

South.

