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NORANDA-KERR LIMITED

PROJECT NO. 1688 - PRYSOR-GAMALLT, N. WALES

Application for Financial Assistance : APPENDIX 1

Geology of Area : (See maps 1688/71/1 and 2). The area is on the north-eastern and eastern part of the Harlech Dome structure. Sediments of upper Cambrian age dip at various angles away from the dome, with structual complexities due to strike and cross faulting and to the presence of "greenstones". The latter rocks have been identified in the past as dolerite intrusions, but they may in part be altered volcanic rocks of extrusive origin. (See ¼" = 1 mile index map)

Mineralisation known to date is related to faulting in greenstone areas. The best-known former mines, all small copper and lead producers, were Gamallt (SH 732432), Prince Edward (SH 740383) and Prysor (SH 730350).

Exploration Targets are low grade copper disseminations associated with fault structures in the greenstones.

Geochemical Anomalies NW 7, NW 9 (maps 1688/71/3 to 5) were located by 1970 stream reconnaissance survey. Other less marked anomalies NW 21, NW 22, NW 23, and NW 37 are included in the area and may be followed up, at a later date.

Prysor South - Project 1688

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Prysor South - Project 1688

Introduction

This report, together with the reports on the localised areas of Cwm Cynval and Prince Edward completes the accumulation of all the prospecting data for the project 1688.

Prospecting rights were taken on five farms, four of which form on large block (See Fig 1), the fifth is broken into three separate units. These farms adjoin the upland area known as the Llechwedd Gain common which was partially reconnaisance soil surveyed, although it was not under licence to Noranda.

The area consists of lightly wooded farm land in the lower vallies, which rapidly give way to low bare, gently undulating hills which continue shouthwards across the Llecwedd Gain. The western boundary is a little more rugged due to a series of low scarps and crags fromed by a doleritic intrusions. The upland areas as well as some of the arable land is given over to sheep farming.

Mineral Rights

Plas Capten (116/48) Owner. William R. Williams	160 Acres.
Ysgwern (116/47) Gerald Robert Williams	186 Acres.
Bod-y-fuddau (116/10) Robert Gareth Williams	500 Acres?
Bronysgellog. (Fronsgellog)	550 Acres?
Nant fudr (116/11)	600 Acres?

The acreages of the last three farms are in doubt since some of the owners included their share of the Gain common which is not partioned and therefore has non-definable boundaries.

Adjacent owners of rights, not subject to agreements at present are the Forestery Commission and the Llechwedd Gain Consortion (Farmers Union of Wales-Dolgellau).

Previous Work

The area was subject to a detailed stream sediment survey by R. Rastall of Noranda in late 1969 which was designed to locate the source of anomalous copper, lead and zinc detected in the Huntings reconnaisance stream survey carried out earlier in the year.

In early 1970, four lines of I.P. measurements were carried out over farms of Bod-y-fuddau and Bronysgellog which were the two most westerly farms under agreement at that time.

The results of the I.P. Survey indicated that high chargeabilities and low resistivities did exist but information was insufficient to locate the nature or control of the I.P. anomalies.

Present Work

In July and September 1971 reconnaisance soil sampling was carried out on lines 1000ft apart and at 100ft seperation, over several thousand acres of this area. See Figs 2,3,and 4. The five farms previously mentioned were sampled together with the farms between Bod-y-fuddau and Bronysgellog as well as much of the Llechwedd Gain Common.

In late September, the unexpected arrival of an I.P. crew resulted in an I.P. grid being laid out in the upper Gain River area. See Fig 5. At the time this area was the only anomalous area that had emerged.

As more results became available, it became apparent that Bod-y-fuddau farm was the source of much of the anomalous copper and an I.P. grid was set out over this farm. Detail soil sampling was carried out over the same grid as well as a geomagnetic survey. Magnetic anomalies were located on the north west and south east extremities of the grid. The south west anomalous area on the borders of Plas Capten and Ysgwern farm was investigated by further I.P. and magnetic work since this area also showed sporadic high copper values. The I.P. and magnetic anomalies did not appear to be coincident.

A small section of the magnetic anomaly was profile soil sampled by means of 16 shallow pits to bedrock See Fig. 11.

Results of the Geochemical Survey. See Figs 2,3,& 4.

Copper

One,area of the anomalous copper is concentrated in the zone between the three faults (Fig 8) which run approximately north south across Bronysgellog. Some anomalous copper is due to the small trial at SH 729-345 as well as waste quartz/ chalcopyrite material being used in the walls. Southwards there is some indication of a slight increase in copper mineralisation towards the fault junction on the Llechwedd Gain. The size and extent of the anomalous copper does not presuppose extensive disseminated mineralisation. The other anomalous copper area lies on Plas Capten farm and seems to be closely related the magnetic anomaly. The profile sampling see Fig 11, shows a downwards increase in copper levels only in Pit 4. It is likely that the magnetic anomaly is due to an increase in pyrrhotite in the dolerites. The copper mineralisation is possibly a weak dissemination marginal to the dolerites, as has been found in other areas in this region.

Lead

The lead is mainly confined to the Upper Gain river area to the south of a base metal trial. This area is rather boggy and since detail soil sampling has not been carried out it is difficult to detect the true trend of this zone. The I.P. (Fig 6) picks out an interesting lineation - Line 16S/10E, Line 24S/5E, Line 32S/00 and line 40S/7W. This high chargeability peak merges into the back ground chargeability to the north and south, but the lineation does appear to head for the trial with rich zinc and minor galena ore at SH.781-351 (See Fig 5) The adit appears to be driven south east though. It is now flooded and the evidence is that it is driven along the margin of a dolerite.

Zinc

Zinc is suprisingly low in the region of the lead anomaly, (See Above), especially in view of the fact that the soils are very organic rich.

The zinc anomalies appear to be sporadic and isolated and do not follow the other metals at all closely. There appears to be some co-relation between the dolerites and the anomalous zinc but better mapping of this poorly mapped area is required before this could be certain.

Results of the Geophysical Work

Induced Potential Measurement

The high chargeability zones can usually be related to the lithology. The Clogau shales, being pyritic, give a very strong I.P. effect other pyritics horizons exist throughout the sucession and these can be identified by a study of the I.P. curves. It is generally impossible to pick out narrow veins, even if some disseminated mineralisation exists, in this environment. Some lineations do however show through - see above under Geochem (lead).

The area between the faults showed a poor response except in the region of Ysgwern farm. This I.P. anomaly is likely to be due to a pyritic horizon in the Vigra flags although the area could be a little more interesting since copper is also anomalous.

It appears that the Wenner array is as useful as the Gradient array, but without more detailed geological information it is difficult to locate significant factors. Some mapping and drilling of the Afon Gain Uchaf (Upper Gain River) area could provide data for a far more detailed analysis of results.

Geomagnetic Survey

The magnetic work shows that a number of thin near surface, magnetic bodies exist in the Plas Capten farm area. Although few exposures exist no mineralisation to account for them was seen in hand specimens. It is thought that pyrrhotite in the dolerites could be the cause, although marginal hydrothermal magnetite is not to be ruled out. The bodies are clearly discontinous as is typical of hydro-thermal mineralisation in this region. There is a possibility that slight copper mineralisation could be associated with the magnetic bodies. A few

short drill holes could provide valuable data from this area.

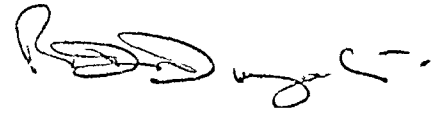
In general it is found that the dolerites give a slight rise in back ground of about 200 gamma after the magnetic anomalies were located and seen to be mainly confined to the Clogau shales, some traverses were carried out in order to investigate this apparent relationship. The position of the traverses are shown on Fig 9 and the profiles are shown plotted on Fig 10. The traverses show that the Clogau shows more anomalies than other horizons but the anomalies are not confined to it. This horizon has always been known to control the gold mineralisation and the anomalies could be significant from this respect.

It is seen that some slight magnetic disturbance exists in the region of the fault junction (traverse 3). The fault junction against the dolerite was traversed by five short lines and the slight rise that was detected could be due to a broader deep feature.

Conclusion

It is felt that this are is unlikely to yield high tonnages of ore but it is possible that some small rich deposits could be found marginal to dolerites in the Upper S.Gain river area. (Lead/Zinc), the Bod-y-fuddau farm area or southwards on the faults, or lastly on the Plas Capten area. Any base metals detected are likely to be controlled by the Clogau as well as fault structures, and will probably have a useful precious metal content.

P. D. Dungate September 1972.



PROJECT 1688 -

CWM CYNFAL AND PRINCE EDWARD

Summary

Soil sampling in these areas is shown and discussed. The results indicate that the only mineralisation present is likely to be due to fault controlled deposits which have already been trialed on a small scale.

This area is part of the South Prysor Project -

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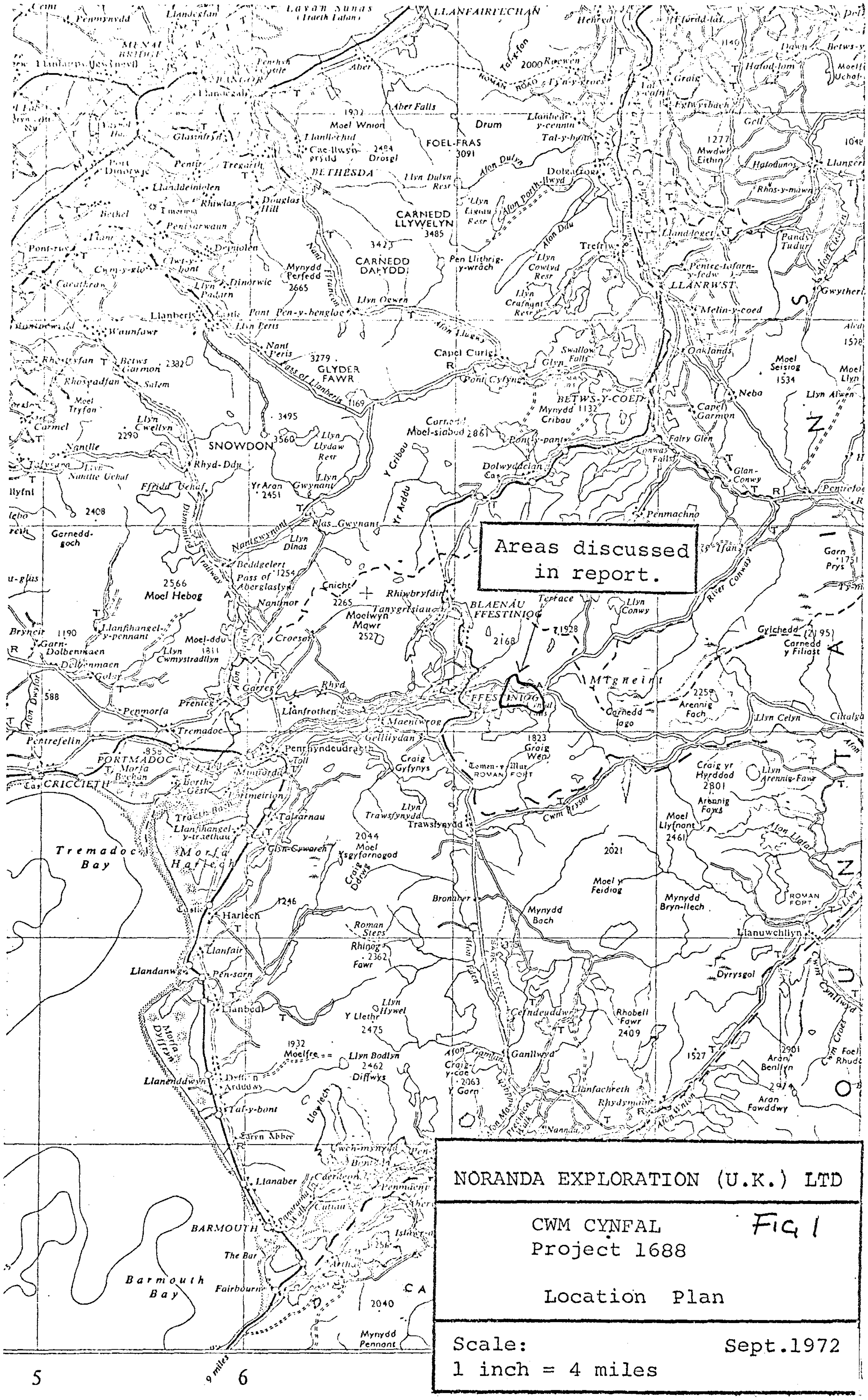

NORANDA EXPLORATION (U.K.) LTD

CWM CYNFAL
Project 1688

Fig 1

Location Plan

Scale:
1 inch = 4 miles

Sept. 1972

PROJECT 1688 - CWM CYNFAL

1. Introduction

See Fig. 1.

This area lies in and around the gorge of Cwm Cynfal, two miles east of Ffestiniog in Merionethshire. The area is mainly rough sheep grazing but a few fields near the river are cultivated. The property south of the Cynfal river is mainly very rough heather moor bounded to the north and west by precipitous rock faces.

Mineral Rights

107/3	Hafod Afferiad and Sofl-y-Mynydd (J.Roberts, Cwm Cynfal)	190 acres
107/4	Bryn Cyfergyd (G.W. Evans, Cwm Cynfal)	140 acres
107/36	Cwm Farm (G. Davies, Cwm Cynfal)	210 acres

2. Geology

Most of the area is underlain by the Ffestiniog Flags, an Upper Cambrian sequence of blue grey shales with interbedded fine grained grey andstones. To the south of the Afon Cynfal, volcanic rocks, rhyolites and small dolerites, outcrop on the upland of Cwm Farm.

3. Old Workings

Numerous small trials exist in this area both for base and precious metals and for slate but with one exception all trial workings on the properties investigated were for slate. At SH 736 416 a quartz vein has been mined for copper at the Cwm Cynfal mine. The lode is generally narrow, about 18 inches wide, and carries chalcopyrite and pyrite in small quantities. A number of levels have been driven from the gorge onto the lode and numerous surface workings have been made. A small output has come mainly from one large pocket of richer ore. The vein trends east north east and a branch lode is reputed to strike north east.

4. Previous Work

(See Report UK/12/1971)

A reconnaissance stream sediment survey was carried out by by Huntings on behalf of Noranda in 1970. This showed a few moderately high copper values, a somewhat larger number of above background lead values and a few very high zinc values.

A programme of detail stream sampling was now carried out to check the anomalous values. A small number of anomalous lead values and a large number of anomalous zinc values were revealed.

A number of short soil sample traverses were now carried out over the locations of some of the stream anomalies. A few high copper values were found near Cwm Cynfal Mine. Generally low zinc values found in the soil and re-examination of the sites of anomalous samples led to the conclusion that high values were caused by a highly organic environment aided sometimes by cultural contamination. Further information on work carried out up to this stage is contained in Noranda-Kerr Report UK/12/1971, Ffestiniog-Trawsfynydd area.

5. Present Work See Fig. 2

Three small properties were retained in this area for further investigation. In view of the limited number of interesting soil and stream values, this area was not thought to be of outstanding interest. A pattern of soil sampling which allowed very rapid coverage of the area simultaneous with examination of old workings and geological reconnaissance (to overcome the lack of any recent mapping of the area) was adopted. The results are shown in Fig.2, together with two short lines of soil sampling carried out earlier which had yielded anomalous values.

No mineralisation outside quartz veins was noticed during this recent work and this is brought out by the results of the soil sample analysis. Samples were sieved -80 mesh and analysed by atomic absorbsion spectrometer for copper, lead and zinc. A small number of anomalous copper values in the area of this Cwm Cynfal mine can be related to the copper lode and tip from old workings. A single isolated high copper value south west of Llyn Monynion (SH 7442) is thought to be caused by a branch of the Cwm Cynfal main lode, which trends in this direction. Several high zinc values close to the rhyolite/sediment contact to a maximum of 451 ppm.(SH 737 411) are probably caused by the very poor material available for sampling - peat in seepage channels on a rock face. No mineralisation was seen in the volcanics in this area. A slight rise in background lead values to the south west is not thought to be significant.

6. Conclusion

Mineralisation in this area appears to be restricted to narrow veins. Many anomalous values found in stream samples have now been shown to be due to secondary envirnoment effects and cultural contamination. It is extremely unlikely that any significant mineral deposit exists on these properties and therefore no further interest should be taken in them.

PAUL DUNGATE / IAN WALLACE

AUGUST 1972

PROJECT 1688 - PRINCE EDWARD MINE

1. This area lies on the headwaters of the Afon Llafar, about two miles north east of Trawsfynydd (SH 740 385).

The area lies between the Prysor and Cynfal rivers and is desolate moorland used only for grazing sheep. This report deals only with a single small area which was the subject of work in 1972.

Mineral Rights Crown Estate Commissioners

(About 1 sq. kilometer of a larger holding has been covered in this Survey). Mineral rights over a number of farms to the north and south were formerly held but the agreements have now been allowed to lapse. See Report UK/12/1971 for details of previous work on this and the surrounding areas.

2. Geology

The small area with which this report is concerned lies on the north eastern side of the Harlech Dome. The rocks underlaying most of the area are Penrhos Shales of Upper Cambrian age. These shales have often been described as Clogau Shales of Middle Cambrian age but this is believed to be incorrect. The shales are moderately finely cleaved medium grey to dark blue pyritous mudstones. It is believed that the occurrence of gold veins and some similarities of appearance led to their misidentification as Clogau Shales which are the host rock for most gold mineralisation in North Wales. A number of dolerite sills occur in this area and one intrusion forms the hanging wall of the gold vein. The shales in the vicinity of the quartz veins are often impregnated with base metal sulphides. In places the shales are very pyritious, and crystals up to ¼" square are common. Disseminated pyrite has also been noticed in surface outcrops of dolerite.

3. Old Workings

This small area is centred around the Prince Edward Gold Mine. This mine worked a series of quartz veins which carried arsenopyrite, pyrite, chalcopyrite, galena, blende and pyrrhottite as well as native gold. Slight traces of cobalt minerals have been seen on the tip. The mine finally ceased operations in 1935 but gold output was never large, not exceeding a few thousand ounces and probably being considerably less. The underground workings and tips are quite extensive.

A number of small trials for base and precious metals occur within several miles of this mine but all are on a much smaller scale even than Prince Edward Mine

4. Previous Work (See Report UK/12/1971)

In 1970 a stream sediment survey was carried out by Huntings on behalf of Noranda. This revealed strongly anomalous copper, lead and zinc values in the headwaters of the Afon Llafar. These high values were confirmed by detail sampling but their origin is considered to be the slimes of the Prince Edward Mine which are gradually washing into the stream.

In 1970 and 1971 stream anomalies in this area were checked by short soil sampling lines and most were found to be due to cultural contamination or a secondary environment effect in highly organic conditions. The limited number of samples taken over Prince Edward Mine showed a few high values.

A very limited amount of I.P. was carried out over this property and two very short lines were run. These showed chargeabilities of up to 34 milliseconds with corresponding low resistance, down to 250 ohm meters. In view of the very limited extent of the survey, the known occurrence of pyritic shales in the area surveyed, it is considered that the results are of little value.

5. Recent Work (See Fig. 2)

It was considered that the likelihood of this area holding economic mineral deposits was small. Four short lines of soil sampling were however laid out to confirm that mineralisation was indeed confined to the immediate vicinity of the quartz veins. These lines covered a somewhat larger area to the north east than the original soil sampling survey. As expected, results were generally of little interest. The few moderately high values could all be related either to the main veins, tip contamination or other small quartz veins which have been pitted or trenched at various points. An underground survey of the old mine confirmed this appraisal.

6. Conclusions

In this area mineralisation is restricted to quartz veins and the immediate wall rock. Even in the veins mineralisation is sporadic and often iron sulphides are dominant. This area cannot be regarded as of any further interest.

JST 1972 PAUL DUNGATE / IAN WALLACE