"WASTE OF WASTE LAND"

The reclamation of derelict land and
the prevention of dereliction
in the United Kingdom

This paper supports the United Kingdom's slide-tape presentation "Waste of Waste Land", made for the UN Habitat Conference, Vancouver 1976.

The paper explains policies and measures for reclaiming the extensive areas of derelict land in the United Kingdom, and for preventing the occurrence of further dereliction resulting principally from mineral extraction. The paper has been produced as a self-contained document and may be read either with or without reference to the slide-tape presentation.

Department of the Environment
1976
CONTENTS

I INTRODUCTION

II THE RECLAMATION OF DERELICT LAND
   A THE PROBLEM
      Scale
      Origins
      Environmental aspects
      Public and Private action
   B AIM
   C MEASURES TAKEN
      Administrative system
      Grant system
      Process of reclamation
      Planning and after-use
      Public participation
   D EVALUATION
      Progress
      Costs
      Benefits

III PREVENTION OF DERELICTION
   A THE CONTINUING PROBLEM
      Scale
   B AIMS
   C MEASURES TAKEN
      Planning control
      After-uses
      Ironstone Restoration Fund
      Opencast coal workings
   D EVALUATION

IV CONCLUSIONS

ANNEX - BIBLIOGRAPHY
I INTRODUCTION

1. This paper examines the impact of mineral working and industrial development on the land; more specifically, it considers the means adopted in Britain for restoring spoiled land to beneficial use and for minimising or preventing further dereliction.

2. Derelict land is taken as being any land so damaged by industrial or other development, including the working of minerals, that it is not capable of further use without treatment; in other words it is land that has been used, then left in an unserviceable state. Mineral working is one of the main causes and creates serious problems. Extraction usually entails some damage to the environment, whether by the excavation of deep holes, the creation of extensive shallow pits, or the accumulation of great mounds of waste material. In addition to the effects of mineral operations, discontinued railway lines, disused industrial sites which are unwanted for redevelopment, and abandoned military areas also contribute to the problem in Britain.

3. In the last century the overriding concern was to increase industrial production and little thought was given to the environmental damage that ensued. This attitude is no longer acceptable for it has led to a waste of the precious and finite resource of land. Britain as a whole already has a population density of 597 persons per square mile and England alone 916 persons per square mile, the latter being one of the highest in the world. The limited supply of land has to meet many demands - for housing, for food production, for industry, and for recreation. Moreover, the appearance of squalor and neglect given by dereliction creates an unfitting environment for people living nearby and is a deterrent to new economic activities which are greatly needed in areas of declining prosperity. So leaving land in a derelict condition is wasteful in a number of ways which can no longer be ignored. Areas of dereliction left by previous generations need to be restored to some form of usefulness, whilst ways of preventing further damage to the environment by present and future activities need to be found.

4. The two aspects - reclamation and prevention - require different approaches. Reclamation generally calls for direct action by the public sector, while the prevention of further dereliction from mineral and other activities is achieved by conditions imposed on planning consents given to land owners and private companies for mineral operations and industrial development.
5. These two aspects are discussed separately in sections II and III, each section following the format recommended by the UN Habitat Secretariat for demonstration projects, i.e., analysis of the problems, the aims, the measures taken, and evaluation of the results. The main body of the paper concludes (section IV) with a summary of the main lessons that have been learnt from British experience. A selected list of further references is given in the Annex.

II THE RECLAMATION OF DERELICT LAND

A THE PROBLEM

Scale

6. Britain's derelict areas consist mainly of sites that have been abandoned during the nineteenth and twentieth centuries. Comprehensive controls on mineral operations and waste disposal were introduced in 1948, but dereliction is still being augmented by the closure of workings that commenced before that year and are thus not subject to control.

7. In order to establish the size and nature of the problem, annual surveys have been made most years since 1964, initiated and co-ordinated by central government and carried out by local government. The results show that at present in Britain there are 50,000 hectares (134,000 acres) of derelict land still in need of treatment. This considerable area does not include current mineral workings, or despoiled land where treatment is not considered justified – because workable deposits of mineral still remain, or because of remoteness, or because in the course of time old workings have merged into the landscape. Approximately half the 50,000 hectares is accounted for by mineral extraction, and the remainder by other abandoned uses.

Origins

8. The industrial revolution brought about an unprecedented increase in the demand for raw materials and in the scale of industrial and mineral operations. Britain has a considerable variety of mineral deposits in demand for industry and other purposes. Of these coal can be singled out both because of its importance to industry since the middle of the last century, and because of the impact its extraction has had on the environment. Deep coal mining has given rise to problems of subsidence and to the tipping of waste on a large scale. Other minerals which have contributed to dereliction include clay for the pottery and brick manufacturing industries, slate for roof construction, tin and other non-ferrous metals, iron-ore, and sand and gravel workings.
9. At first, little was done to remedy the situation. As the full impact of the industrial revolution was felt, dereliction became more extensive, the costs of reclamation increased and industrialists found it impracticable and uneconomic to repair the damage caused by their activities. Moreover, they did not have the benefit of the machinery that is now available for mass earth shifting.

Environmental aspects.
10. The general unsightliness of derelict land is compounded by two additional factors in Britain. Firstly, in several regions derelict land is concentrated, so that whole landscapes are disfigured. Secondly, dereliction is often close to where people live and not in remote locations where it might be conveniently forgotten.

11. The problem does not stop at unsightliness. Much of Britain's dereliction lies in the older industrial centres whose prosperity has now declined, relative to other parts of the country where industry has developed more recently. Such areas of decline tend to suffer from multiple problems including low incomes, loss of population, a high proportion of older housing and other facilities, and difficulty in attracting new investment. Dereliction and neglect render these areas unattractive both for existing residents and for potential developers.

12. Dereliction may also create dangerous conditions. Deep quarries, concealed shafts and deposits of slurry present a potential danger particularly for children and straying farm animals. Spontaneous combustion of colliery spoil heaps can frequently occur, and, during reclamation, tips have been found to be on fire with temperatures up to 500°C. The dangers inherent in derelict land were sharply brought home to the country in 1966 when a colliery pit heap, in which water had collected, slid down a South Wales valley side onto the school below, killing 116 children and 28 adults. This tragic event finally dispelled any apathy there may have been over the need for urgent and comprehensive action.

Public and private action
13. Reclamation is sometimes undertaken by private landowners where the value of the reclaimed land is greater than the cost of reclamation. This will usually be in areas of land shortage and high land values, where there is a local demand for building sites. But much dereliction is not so favourably located and the often expensive and unprofitable work of reclamation has to be undertaken by the public sector.
B AIM
14. The aim of government policy in Britain is, so far as resources allow, to reclaim derelict land and restore it to a beneficial use as soon as possible, with priority being given to the less prosperous parts of the country.

C MEASURES TAKEN

Administrative System
15. In the majority of cases reclamation is financed by grants from central government; and is carried out in England by local government, and in Scotland and Wales by specialised agencies.* In Northern Ireland where the problem is not comparable to that in the rest of Britain, grants are made when necessary by the Northern Ireland Department of the Environment.

16. A notable innovation in recent years, which has accelerated progress, has been the formation by some larger local authorities, with central government encouragement, of specialist, multi-disciplinary teams, to carry out the many tasks involved in reclamation. The teams include planners, engineers, landscape architects, ecologists and surveyors. There is little doubt that these teams have been largely responsible for the increased scale of reclamation that has been attained and for the improved quality of the results.

Grant System
17. Government aid for reclamation has been available in certain parts of the country since 1945, and has been gradually extended until in 1966 it covered the whole country. From then until 1975 there were three rates of grant, 85%, 75% and 50% of approved expenditure. In December 1975 a more simple approach was adopted and grants of 100% are now payable in "assisted areas" and of 50% elsewhere. Assisted areas are the less prosperous parts of the country, to which financial assistance is given by central government for the purpose of stimulating economic growth; they include the areas covered by the Scottish and Welsh Development Agencies.

* The Scottish and Welsh Development Agencies were set up by the government at the end of 1975 and beginning of 1976 to undertake certain development functions including the reclamation of derelict land. The Welsh Development Agency also pays grant to local authorities to undertake reclamation.
18. Central government grants are now payable to local authorities initially on the gross cost incurred in acquiring and reclaiming derelict land, but account is taken of the enhancement in the value of the land after reclamation. For example, if the costs of land acquisition and reclamation works for a particular scheme were £100,000, this would be the amount of the 100% grant paid initially but it would subsequently be adjusted to take into account the disposal value of the reclaimed land. Thus if the disposal value was £40,000 the net amount of the grant payment would be £60,000. If the after-value exceeds the reclamation costs no grant is payable. However, where the land is to be used for public open space the after value is disregarded for grant purposes - this provides an additional incentive to local authorities to reclaim land for public benefit which might otherwise be left in a derelict condition.

19. The costs eligible for grant include land acquisition and reclamation works such as the demolition and removal of buildings, earth-moving, land drainage, top-soiling and grassing, a certain amount of tree and shrub planting and any necessary survey and consultancy fees. Works of development which would normally be undertaken by a developer such as the construction of roads, sewers, buildings etc, are excluded.

20. To encourage local authorities in their reclamation programmes, grants from central government are made specifically for the purpose so that reclamation schemes do not have to compete for financial support with other desirable projects at the local level.

The Process of reclamation
21. At the outset of reclamation a survey of the site is needed in order to identify the characteristics and problems of the land, prior to the drawing up of detailed plans of reclamation. Special difficulties such as slurry lagoons and concealed mine shafts need to be located; drainage investigated; and a chemical analysis made where heaps of waste material are present, in order to test the stability, toxicity and planting potential of the soil.

22. In the last 30-40 years advances in knowledge and technology have greatly improved the methods and reduced the costs of reclamation. Heavy earth-moving equipment has transformed the problems presented by moving many thousands of tons of waste material. Plant and machinery now available can cope with any reclamation task, however large. Experiments have shown that certain trees
Priors Fields, Stoke-on-Trent, before and after reclamation. 5 hectares (12 acres) of open parkland have been created from colliery wasteland in this city of 260,000. Photos courtesy of Stoke City Council.
can be grown direct in raw shale or heavy overburden without levelling and consolidation, or the importation of soil. Similarly grasses can be grown direct in raw shale and inert matter with the use of additives. However, for best results it has been found desirable to use topsoil wherever this is available at reasonable cost.

23. Research to improve reclamation techniques and achieve higher standards is a continuing activity, and much work is undertaken by universities and government research centres. Current studies include the investigation of the structure and chemistry of reclaimed soils; nutrient problems and the establishment and maintenance of vegetation on colliery spoil; and the development of techniques for locating buried mine shafts.

24. Dereliction caused by mineral extraction usually takes the form of either pits or mounds. It is rarely possible, however, for the two to be paired in reclamation schemes because the costs of transporting waste material are very high and the transport itself can create environmental problems. But dry pits within reach of large towns and cities are valuable assets for refuse tipping and are often put to this purpose, while wet pits are generally kept as water areas for recreation and amenity. The complete reduction of large spoil heaps is rarely necessary; recontouring, reshaping and landscaping can be most successful. Sometimes waste material can be partially or wholly recycled; for instance slag, colliery shale and pulverised fuel ash have substantial commercial uses.

Planning and after-use
25. The after-use of reclaimed land depends on such matters as, for example, the bearing capacity of the restored soil, the finance available and the land use needs of the area. A great variety of after uses is possible. Sometimes the features of a site may be exploited to good effect, for example to provide walkways along old railway lines, amphitheatres in dry pits, rowing lakes in wet ones, and mounds of spoil may be landscaped to screen unsightly development, such as industrial plant or caravans. Some reclaimed sites may be developed with factories, houses and schools when the soil is sufficiently consolidated and stable. Derelict sites are increasingly being used for recreational purposes to make up for the shortage of space in urban areas. Sometimes recreation use is temporary, for example when the land is intended for industry
or housing but is not immediately needed. In rural areas reclaimed land is mostly put to agricultural or forestry purposes. Whatever after-use is decided upon should fit in the general planning of the area. Where dereliction is widespread the programme of reclamation needs to be part of a comprehensive plan which takes account of the needs, problems and opportunities in the area as a whole. The siting of a number of new towns has deliberately sought to incorporate and make use of derelict land, thereby saving more fertile areas from development. At Telford, for example, over a tenth of the site was derelict as the result of coal mining and much has already been reclaimed and developed, the town centre itself being built on part of this area. Washington, Skelmersdale and Warrington provide other examples.

Public participation
26. To be successful, reclamation should foster local interest. The support of the public is enlisted by the local authority wherever possible. Residents affected by a proposed scheme are asked well in advance for their views on the uses to which the land should be put after reclamation. Participation is stimulated by the use of films and other publicity techniques, by introducing awards for specially deserving or interesting reclamation schemes and by encouraging schools and other organisations to take part in the work.

D EVALUATION
Progress
27. By 1971 33% of the derelict land area justifying treatment recorded in 1964 in England and Wales (24,000 hectares or 60,000 acres) had been reclaimed. This does not mean however that the total area needing reclamation had declined by a third, because during that period and subsequently, the acreage needing treatment was being augmented by the closure of workings not covered by restoration conditions. Derelict land is currently being reclaimed at the rate of 3,000 hectares (7,400 acres) a year compared with 2,200 hectares (5,500 acres) in 1970-71. At this rate it should be possible to clear the existing backlog in less than 20 years.

Costs
28. In 1974/5 the gross cost of grant aided reclamation schemes averaged £5,700 per hectare in England. Against this may be set the value of the reclaimed land, and the value of the farmland spared from development, so that
the net economic cost to society is considerably less than this figure, and in some cases the value of the reclaimed site exceeds the costs of reclamation. Current expenditure by local authorities on reclamation is in the region of £13 million a year.

Benefits
29. Although the aesthetic benefit cannot be isolated and quantified it is nevertheless substantial. The removal of eyesores and their transformation in many cases into attractive scenery, not only creates a better environment for those who live and work nearby, but also helps stimulate civic pride and consciousness. In this way the removal of the remains of defunct economic activity helps prepare the way for a better future. There is also the benefit which the new use bestows in itself, whether it is more houses, more jobs, more facilities for recreation or more land for agriculture. Finally, there is the benefit of land saved from development by the reuse of restored land to be taken into account.

III  PREVENTION OF DERELICTION
A. THE CONTINUING PROBLEM
Scale
30. The demand for minerals is generally heavy and increasing. Some 4,000 hectares of land (10,000 acres) are taken each year for mineral working in Britain. 1,600 hectares (4,000 acres) are accounted for by sand and gravel extraction for the construction industry and a further 1,200 hectares (3,000 acres) by opencast coal mining. Some 200 hectares (500 acres) is required annually for surface tipping by the underground coal mining industry. Over 600 hectares (1,500 acres) are taken by quarries worked into hillsides or by the excavation of deep holes, for clay, chalk and stone. About 400 hectares (1,000 acres) is used in the quarrying of seams which lie under thick overburden, for example, ironstone, gypsum and fullers earth.

31. In view of the scale of these operations there is an obvious need to prevent the workings from becoming derelict when excavation stops. Failure to do so would create for future generations the kinds of problems considered in the previous section.
32. In addition to the need for progressive reclamation there are also more immediate problems to guard against because mineral working may cause considerable local disturbance whilst in progress, from the noise of blasting and machinery, dust, heavy vehicles, and visual intrusion of plant or spoil.

B. AIMS
33. The generally accepted aims underlying the measures taken through planning control in Britain for the prevention of dereliction are:
   i. to ensure that land worked for minerals is not abandoned or left derelict but is restored or treated with a view to bringing it back to some form of beneficial use;
   ii. to ensure that the working and the associated uses of land for plant, waste disposal and other related purposes are carried on with proper regard for the appearance and other amenity of the area;
   iii. to limit, or if need be to prevent, the working of minerals where such working would be seriously detrimental to the comfort and living conditions of people in the area or to amenities generally, and where other sources of the mineral are available and can be worked with less harmful effects.

C. MEASURES TAKEN
Planning control
34. In Britain almost all physical development is subject to planning control. The legal definition of development includes 'operations in on over or under the land', hence mining and quarrying operations come within its scope. Permission to use land for these purposes must be obtained prior to the commencement of work from the local planning authority. The authority may refuse permission, or may grant consent. Where consent is given conditions will invariably be imposed.

35. Conditions may relate to the depth and direction of working; access road; control of noise; the programming of work; waste disposal; the siting of buildings, plant and machinery; and also to restoration. They may also be imposed in order to reduce the visual impact of excavation while work is in progress, for example by screen planting, and to control the siting of plant and the siting and treatment of waste tips.
36. The conditions must be 'reasonable'; thus for instance they should not involve expenditure that would make the operation unprofitable. A condition considered to be unreasonable by the Secretary of State would not be upheld by him on appeal.

37. It is also the function of planning control to ensure as far as possible that mineral deposits needed to meet present or future requirements are kept available and not unnecessarily sterilised by surface development. For this purpose county planning authorities endeavour to inform themselves about supply and demand on a national and regional scale, and have this in mind when deciding whether deposits should be worked or protected. Central government assists through the dissemination of information, initiating surveys, and encouraging technical conferences.

38. In addition to complying with planning conditions, operators must also have regard to requirements of other relevant legislation which, for example, regulates emissions of dust, smoke and fumes, requires fencing of workings for safety reasons or protects the interests of statutory bodies such as the Water Authorities.

After-use

39. Conditions requiring some form of restoration or treatment of the site are now imposed on all planning consents for mineral working; thus possible after-uses have to be considered from the outset. The form of restoration or treatment will vary considerably, according to the type of mineral being worked and to the local circumstances. Often land can be restored to its former use, and the temporary use for mineral extraction is subsequently not apparent. This is quite feasible, for example, where seams are worked from beneath thick overburden which can be replaced, making the importation of filling material unnecessary. Open cast coal and ironstone workings are usually restored to a high standard in this way. The topsoil and subsoil are carefully stripped and stored to be ready for respradling when the mineral has been extracted. In many cases the sites are sub-divided and the subdivisions worked in succession, each area being restored immediately after excavation, thus achieving progressive reclamation while work is still in progress.

40. Where the overburden is insufficient for restoration purposes types of filling material that are used include pulverised fuel ash from electricity generating stations; town refuse; waste from other mining operations; and rubble. If a site is being restored for agricultural use considerable care is taken with the topsoil by the application of fertilisers, rotation of suitable crops and by breaking up compacted soil, for the first few years.
At Dalmeny in West Lothian, Scotland, 12 miles from Edinburgh, a 50 year old mound of oil shale waste has been remodelled to conceal 11 crude oil storage tanks from view. Photos courtesy of British Petroleum Co Ltd
41. Filling material is not always to be found within economic carrying distance, and alternative uses have to be found for the unrestored site. Lagoons left by sand and gravel workings may be used for water recreational purposes and with this end in view the local planning authority will impose conditions requiring suitable landscaping. Sometimes excavations can be used for the location of unsightly development, or for example an exposed rock face may prove to be important for geological study. But where filling material is not available and the unrestored site cannot be put to a useful purpose, as is the case with some exceptionally deep brick clay workings in the Midlands of England, the local planning authority will seek to minimise the visual damage by requiring screen planting and other landscaping measures. Little can be done about bare quarry faces left by the extraction of hard rocks such as limestone and igneous rocks, but in time these faces usually weather and merge with the surrounding landscape.

Ironstone Restoration Fund
42. For the restoration of ironstone workings planning controls are supplemented by financial provisions. Up to the 1940s the working of this mineral, largely in the East Midlands of England, had resulted in severe environmental problems. The machinery employed often left the land in a hill and dale formation, useless for agriculture. The Ironstone Restoration Fund was established in 1951 to combat this problem. The fund is financed by substantial contributions from the producers and landowners, through a levy charged on each ton of ironstone raised, and by a small fixed contribution from central government. The producer is charged with the costs of reclamation up to a certain limit (at present £1275) per hectare; if the cost of reclamation exceeds this figure he may draw upon the fund. The fund has also been used to restore the land left derelict before 1951. The scheme has been instrumental in ensuring a high standard of reclamation; its success is partly due to the concentration of the industry in terms of both ownership and location.

Opencast coal workings
43. Opencast coal is worked mainly by the National Coal Board (NCB). Most of the sites are in rural areas, and a high standard of reclamation is achieved, usually to agriculture. The NCB operate under conditions which provide for:
   i. the separate stripping, storing, and replacement of topsoil;
   ii. permanent under-drainage of restored land;
Open cast coalmining by the National Coal Board at Parkhouse, Derbyshire, has resulted in an overall gain in productive land, including the return of a derelict colliery tip to agriculture. Photos courtesy of National Coal Board.
iii. replanting of hedges and the replacement of fences and, in parts of the countryside where they are traditional, the rebuilding of stone walls;
iv. the planting of trees and shelter belts and the rehabilitation of woodland;
v. a five-year period of management and treatment of restored lands by the Ministry of Agriculture.

44. Most of the Board's sites are given a comparatively short operational life, and restoration of the larger sites is normally progressive behind the excavation. In many cases the opportunity is taken of dealing at the same time with any earlier dereliction there may be nearby and also with the drainage of areas affected by mining subsidence. After restoration the land is usually handed back to the owners or occupiers from whom it has been leased.

D. EVALUATION

45. The use of planning controls to prevent dereliction has met with a measure of success but certain problems still remain:

i. in the early stages some planning conditions were imperfectly drawn up and in consequence were difficult to apply. This situation has improved with experience but the difficulty of formulating conditions which will be regarded as still appropriate after, say, twenty years operation remains;

ii. geological conditions have not always agreed with original expectations, resulting in for instance more waste material being produced or deeper excavations than were first envisaged;

iii. filling material thought to be available at the time of consent has later proved to be unobtainable;

iv. temporary slackening in demand or change in ownership has interrupted operation, leaving sites with the appearance of dereliction for considerable periods.

46. In view of these and other problems the central government set up in 1972 a committee of enquiry, to examine the operation of the statutory provisions (except those relating to opencast coal) by which planning control is exercisable over mineral exploration, surface mineral working and installations, the deposit on the surface of spoil or waste from mineral workings, and the after treatment of surface land worked for minerals. The committee, whose
The report* is now being considered by central government, concluded that the present planning system needs adapting to meet the special problems presented by mineral working. They made a number of proposals for improving planning control over mineral operation. The proposals included an increase in the use of qualified staff and the range of expertise called on (this might be partly achieved by staff sharing between county planning authorities); a new power for authorities to review and if necessary modify conditions attached to planning consents in order to ensure that the conditions continued to be appropriate; and more severe penalties for major breaches of conditions.

47. At the same time as the committee was formed a programme of studies was put in hand into the long term demand for aggregates which are essential for the building and construction industries, and the possible sources of supply. These minerals occupy extensive areas and their working has caused severe environmental damage. The programme included the establishment of local authority working parties to investigate local supply and demand problems. The overall aim of the studies, which are still in progress, is to provide a national picture of resources and likely demands.

IV CONCLUSIONS

48. British experience has demonstrated that it is better to have measures to control mineral working and to so minimise the dis-benefits of dereliction. These measures consider after-uses and restoration before mineral workings commence, seek to minimise the impact while operations are in progress, and require progressive restoration as operations advance.

49. The main features of British experience may be summarised by the following needs that have been identified:

- Reclamation of Derelict Land
  i. for central government to provide financial assistance for the reclamation of land that became derelict before planning control was fully effective.
  ii. for local government or a national agency to have the executive responsibility to initiate and implement schemes;
  iii. for multi-disciplinary teams to undertake the specialised tasks involved;

* "Planning Control over Mineral Working" report of the Committee under the chairmanship of Sir Roger Stevens GCMG: HMSO 1976
iv. for restored land to be returned whenever possible to socially economically beneficial uses;
v. for reclamation to be related to wider questions of land conservation and land use policies.

Prevention of Dereliction

i. for land reclamation and the control of mineral working to form part of an integrated policy of land use and resource management at national, regional and local levels.

ii. for controls to ensure after-uses and restoration are planned before mineral working commences.

iii. for monitoring to ensure individual operations are complying with planning conditions.
BIBLIOGRAPHY

Select list of further reading on reclamation of derelict land and prevention of dereliction.

BARR (John)

Derelict Britain.
Bibliography.

BLUNDEAN (John)

The mineral resources of Britain
545pp.; Hutchinson, 1975
Bibliography.

BRADSHAW (Anthony)

Pollution and plant evolution.
Discusses breeding and sowing tolerant plant strains to reclaim derelict land contaminated by heavy metals.

BRITISH QUARRYING AND SLAG FEDERATION

Quarries and the landscape; by S M Haywood
The Federation 1974, 70pp. Bibliography

COTSWOLD WATER PARK

Description of Gloucestershire and Wiltshire County Councils' plan for a 14,000 acre recreational area in the Upper Thames Valley with a continuous series of lakes formed from disused gravel pits.

COUNTRYSIDE IN 1970:

Advisory Committee on Industry and the Countryside:
Sub-Group on Damage to the Countryside by Industry.
Report.

COUNTRYSIDE COMMISSION

Disused railways in the countryside of England and Wales; a report to the Countryside Commission by J H Appleton, with a section on disused railways and agriculture by Richard J Appleton.
82pp., HMSO, 1970.
DAVISON (D J)
Reclamation of Derelict land

DEPARTMENT OF THE ENVIRONMENT:
Committee on Planning Control over Mineral Working.
Report. (Chairman: Sir Roger Stevens).
Issued jointly with the Scottish Development Department and the Welsh Office.

DIXON (R E C)
Restoration of quarried areas

GOODMAN (G T) & BRAY (E S)

NATIONAL COUNCIL OF ASSOCIATED IRON ORE PRODUCERS
Iron-stone and agriculture.

NEWCASTLE UPON TYNE: University

OXENHAM (J R)
Reclaiming derelict land.
204 pp.; Faber, 1966.
with bibliography.

OXENHAM (J R)
Land reclamation.
Discusses the role of the engineer in reclamation and the problems he is likely to encounter.

SAND AND GRAVEL ASSOCIATION OF GREAT BRITAIN
New lands for old.
STOKE-ON-TRENT
Reclamation Programme: Stoke-on-Trent

TATTERSALL (D)
The reclamation of derelict land

THOMAS (Trevor M)
Derelict land in South Wales.
References.

WALLWORK (K)
Derelict Land - Problems in Modern Geography

WALLWORK (K L)
Minerals and the problem of derelict land in the East Midlands

WEDDLE (Arnold E)
The disposal of pulverised fuel ash.

WELSH ECONOMIC COUNCIL