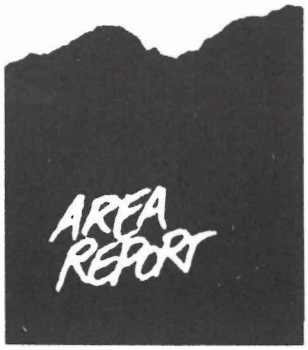

Steel, South Africa and sanctions

By Peter Gibbon

While detestation of the South African regime is widespread, many British companies and trade unions are still hesitant about pressing for a severance of their South African links. In this article Peter Gibbon looks at the problem with special reference to the British steel industry.

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Profiting from apartheid

Britain is by far the largest foreign investor in South Africa. The Anti-Apartheid Movement estimates its share to be 38 per cent of total foreign investment while the *Economist Intelligence Unit* (EIU) puts the figure at 40 per cent.[1]

According to the EIU there are about 1 400 subsidiaries of British companies in South Africa. The *Labour Research Department* (LRD) claim that these subsidiaries, together with the associates of these same and other British companies,[2] account for about 370 000 employees, or 7.5 per cent of the total South African workforce.

Despite the wind-down of Barclay's Bank, South Africa's other large bank, Standard Bank, is British owned. So too is its biggest chemical producer (AECI), its biggest glass producer (Glass South Africa) and largest packaging concern (Metal Box). Other British companies with heavy involvment include:

Bat Industries plc, British Electric Traction Co plc (BET), BOC Group plc, British Petroleum (BP), Consolidated Gold Fields (CGF), Courtalds plc, General Electric plc (GEC), Great Universal Stores, Imperial Chemical Industries (ICI), Lonrho, Northern Engineering Industries plc (NEI), Pilkingtons, Rio Tinto-Zinc, Rowntrees Mackintosh, Shell, Trafalgar House, and Unilever.

The reason for this heavy involvement is simple — profit. Between 1979 and 1983 UK company earnings from subsidiaries and associates in South Africa made up between 13 and 16 per cent of total overseas earnings (excluding oil companies), while the South African share of total UK overseas investment was 6.5 per cent (book value).[3] The Labour Research Department comment:

> "The picture is even more startling in the case of dividends. Between 1979 and 1983 South African subsidiaries and associates each year paid about 150 M GBP to their UK parents or associates . . . This was higher than for any other country than the US . . . Dividends from Australia for example ranged from 75 M GBP to 90 M GBP in the same period."

Sheffield-based firms, and British firms with Sheffield subsidiaries have traditionally shared in these investments and profits. In the 1970s BSC owned a considerable portion of South African steel producing capacity and employed 20 000 there. These interests were sold off in the MacGregor asset-realisation phase of 1981—82, with the exception of a local sales outlet. BSC still retains a technology agreement with the South African private steelmaker USCO, however.[4]

Other Shefield metal sector firms with steelmaking capacity had the following investment relationships in SA in 1986 (See Table 1).

Of general metal sector firms in Sheffield, the great majority are part of organizations having South African subsidiaries, or have them themselves. These include Davy's, Tempered Spring, Cooper and Turner, Craven and Tasker, Thomas W Ward, Hall and Stinson, Record Ridgeway, Neepsend, Hall & Pickles, Northern Mining Equipment, Twist Drill, Dormer Tools, Stanley Tools, Johnson Matthey Metals, Sheffield Smelting Co, Rabone Chesterman and Singlehurst Hydraulics.

As will be seen, The Sheffield steel sector is heavily involved in importing South African raw materials and ferroalloys (compounds of minerals and iron) used in steelmaking. the Sheffield area is further a national centre for raw materials and especially ferroalloy trading, stockholding and (in the case of some minor alloys) smelting.

The largest local ferroalloy producer is London and Scandinavian Metallurgical (Rotherham), owned by the US-based Metallurg Inc, with capacity of 15 kt/year in 10 furnaces.[5] London and Scandinavian produce ferro-vanadium,

ferro-aluminium, ferro-boron, ferro-titanium, and other alloys. Nicholson and Rhodes of Sheffield (owned by Johnson Firth Brown) produce ferro-titanium. Other local producers are R G Holland (owned by the Tom Martin group (S & W Beresford)), Ferroalloys and Metals of Glossop (owned by Neepsend) and Willian-Wogan of Catcliffe (owned by Aurora). It is not known to what extent these companies use South African raw materials, but the probability is that most of them use some.

Of ferroalloy traders in Sheffield, some advertise themselves as agents for South African mineral miners and smelters.[6]

Midgley and Sons of Carlise Street are Sheffield's main ferroalloy stockholders. They are the sole UK representative of Samancor (chrome and manganese miners and smelters).[7] R Hostombe of Regent Street, which also has interests in manufacturing printing machines and electric cables, advertises itself as an agent for Gencor. Minerais of Shepcote Lane is a subsidiary of the Luxemburg-based SA des Minerais, which is in turn 75 per cent West German owned. It is a stockholder and agent in Europe for consolidated Metallurgical Industriec, a ferro-chrome-producing subsidiary of Johannesburg Consolidated Industries.

LOSING OUT TO APARTHEID

The South African economy

South Africa is described by most economists today as a "dual economy". By this is meant that there is a sector characterized by formal employment (about 4.5—5 million workers), and another characterized by a combination of informal employment and subsistence agriculture. The former is white-run but with black workers, the latter is wholly African.

This dual structure dates back about a century, when white farm-owners and mine-owners began employing black labour in significant quantities. Relative to the scale of possible operations in farming and mining, white owners were short of capital. With state assistance, they therefore substituted labour for capital on a very large scale. Blacks were compelled by a variety of measures to work for Europeans, and were forced to travel enormous distances to do so.

Since the starvation wages paid them barely supported a bachelor, they were unable to settle with their families near to their workplaces. To prevent them returning to their families, 'desertion' was made a criminal offence punishable physically and by imprisonment.

With the profits generated by decades of this exploitation, industrialization eventually occured. From the outset, the South African state was heavily involved in supporting this industrialization both in order to strengthen South Africa internationally and white domination internally.

South Africa adopted protectionist economic policies, whereby foreign imports of goods which South Africa produced were penalized by high duties. It also adopted a policy of heavily subsidizing the construction of a transport system and the generation of electrical power consumed by industry.

Thirdly, it provided the capital to set up a local steel industry, so that a South African engineering industry could develop behind these tariff barriers. The resultant state-run steel concern, ISCOR (set up in 1928), was also seen as a means of subsidizing the training of white, especially Afrikaans, management for the private sector. Finally, the South African government organized the mass migration of skilled white workers from Europe to occupy craft levels within industry.

Industry and apartheid

The benefits of apartheid for white employers in the agricultural and mining sector were easy to see. Since the products of this sector were largely exported, and especially since blacks were not potential consumers of them, wages could be kept to an absolute minimum and black workers' families could be obliged to live hundreds of miles away where they could 'support themselves' by subsistence agriculture.

Table 1

Local company	Parent (where applicable)	South African connection
United Engineering Steels	GKN	7 subsidiaries and 1 associate, employing a total of 1516. Do not publicly recognize Trade Unions for local bargaining.
Forgemasters, Firth Brown, Firth Vickers	Johnson & Firth Brown	2 subsidiaries, employment unknown
Unbrako	SPS Technologies Inc (USA)	1 subsidiary
Sanderson Kayser	GEI	2 subsidiaries, employment unknown
Spear and Jackson	James Neill Holdings	2 subsidiaries, employment unknown.

Industry benefitted from apartheid in that extremely low black wages in agriculture and mining enabled manufacturers to attract plentiful labour by offering only marginally higher wages. But this 'competition for labour' was strongly resisted by white farmers and mine owners who, through the state, imposed rigid controls on black settlement in industrial areas in order to safeguard their own supply of black workers. With the collusion of white skilled workers, they also imposed a bar on blacks occupying skilled working-class or white-collar industrial jobs.

While industrialists therefore generally gained from apartheid, there was some unhappiness at the 'rigidity' it imposed on the labour market. There was also some concern about the restriction apartheid in effect placed on the development of consumption in the home market, for lowly paid or unpaid blacks could obviously never be customers for industry. Lastly there was a suspicion that South African industry had little incentive to adopt technological changes pioneered in the advanced countries, since there were recurrent skill shortages due to the political restrictions on what kind of work the great majority of the population would be given. On the whole nonethelss, these worries were voiced in private rather than on the political stage.

Competition from apartheid

• *Steel*

From the mid 1970s, British governments have steadily removed any kind of state protection or subsidy from our own nationalized industries. These have been force to compete in the British market against imports from the heavily state-subsidized industries of some countries and the low wage industries of others.

Two of the British nationalized industries which have been most exposed to competition from these sources have been steel and coal. These, of course, are the two industries traditionally at the heart of South Yorkshire's economy. Their decline can be seen to have been hastened by South African competition which has enjoyed both these advantages.

Over the decade 1976—85, Britain imported close to 900 kt of South African steel products, with a value of about 18 M GBP cif (cost + insurance + freight). This represented about 2.4 per cent of total steel product imports over the same period. While relatively this was not an enormous amount, it still clearly represented a loss of British jobs. The irony of this particular situation is that these steel job losses were to the benefit of a competitor which despite low wages was on all the major criteria far less 'efficient' than BSC.

Throughout this period, between three quarters and nine-tenths of the South African steel industry's output, capacity and employment has been accounted for by ISCOR. According to *Metal Bulletin Monthly* ISCOR was essentially a loss-making concern.[8] Its survival was due to artifically high home market prices, sustained by the South African state through an import licencing system which "amounted to an almost total ban on all imports of steel products". Exports of South African steel were undertaken mainly to further preserve the domestic price through reducing unconsumed stocks. In other words, rather than generating profits, exports of South African steel expressed a policy of dumping. "Profit margins are so small as to be invisible on exports . . . South Africa's steelmakers are not enthusiastic about exporting."[9]

All the evidence points to the fact that without state protection of the kind enjoyed by ISCOR (but withheld from BSC), South African steel production would be completely unviable. Whereas, for example, ISCOR's labour costs in 1983 were only 2.99 GBP per man hour, in contrast to BSC's 5.90 GBP, labour costs per tonne of steel were practically identical (ISCOR 50.28 GBP per tonne, BSC 55 GBP). The discrepancy between the two sets of figures was a product of the difference in the number of man hours taken to produce of tonne of steel (BSC 9.3, ISCOR 16.8), a product of ISCOR's inferior technology and racist organization of labour.

• *Coal*

The South African coal industry differs from ISCOR's steel production mainly in employing virtually unlimited numbers of blacks and receiving no direct state subsidy. Although it also has very backward technology and low productivity relative to the British mining industry, its very low wage costs give it a competitive edge.

Whereas the basic wage of the underground British coal miner in 1986 was about 110 GBP per week gross, with a possibility of making this up to about 160 GBP per week gross by bonus payments, that of the black South African underground coal miner was around 13.60 GBP per week, with the possibility of making this up by bonus to about 16.30 GBP per week gross.[10] Where black miners were not organized by the NUM (South Africa), pay was sometimes lower than 12.50 GBP per week. Unlike the steel industry, mining has not white manual workers, and only a thin band of white supervisors. The handful of 'white miners' are miners in name only — their only functions are disciplinary ones.[11]

Wages at these levels can still only be imposed by employers through maintaining the migratory labour system. Today migration from other African states has become less common, but it has only been replaced by migration from the so-called 'independent homelands'. In the migrants on annual contracts. As such they are not allowed to settle with their families near to the mine, instead being obliged to live in insanitary compounds with 16 to 20 men to a room. Compounds are divided up by management along tribal lines.

The South African mining industry's prices are also kept low by the applica-

tion of safety standards which would be unacceptable in any developed country. Provision of gear such as boots, helmets and ear muffs is grossly inadequate, while general mine safety provision is deplorable. While blacks are in effect responsible for safety, they are given little training in it. Questioning of safety situations is legal, but the *Miners and Works Act* gives the white miner the sole right to judge the merits of such questioning. Challenging his decision is a disciplinary offence.

Since non-racial trade unions become legal in 1979, the black mine unions have grown rapidly and have now organized gold, platinum, coal, chrome and tin mines. While legal, they are at best only tolerated by employers and at worst subjected to employers' offensives in the forms of refusal of recognition for local bargaining purposes, use of mass dismissals and of scab labour, use of spies and agents provocateurs, promotion of alternative 'tribal' organizations and intimidation and assaults of union activists by heavily armed private security forces.

British coal imports from South Africa first reached significant levels in the late 1970s, after the completion of the Richards Bay bulk coal handling facility in Natal. For most of the early 1980s they ran at 60—80 kt per year of anthracite, average value 3 M GBP/year cif. This figure leapt during the 1984—85 miners' strike, when total coal imports rose from their previous level of just above 4 m tonnes per year to almost 13 m tonnes per year. South Africa's share of this according to customs cleared figures was just under 0.4 M tonnes, with a value of 21 M GBP cif. In 1986 total British coal imports have continued at their 1985 levels, despite the resumption of local coal production. In the first 9 months of the year total imports ran at 8.4 Mt, of which South Africa's customs cleared share was 125 kt, with a value of 5.5 M GBP cif. It should also be mentioned that since 1982 up to a quarter of British coal imports have been recorded as of Dutch origin. Since Holland no longer produces coal, this must all be re-exports to Britain of sales by diverse sources on the Rotterdam spot market. A considerable proportion is believed to be of South African origin.

Propping up apartheid

• *South African raw materials and British steel*

The pro-South Africa lobby in Britain, led by the *United Kingdom South African Trade Association* (UKSATA) argues that the British steel industry is so dependent upon certain South African raw materials unavailable from other sources that it would collapse in the event of comprehensive sanctions. These raw materials are the group of so-called 'strategic raw materials' — chromite and chromium products, manganese and manganese products and vanadium.

In steelmaking, these are added to basic raw materials in various quantities to give qualities such as resistance to corrosion, grain refinement, hardness and so on. In each case South Africa possesses a sizeable or very sizeable share of world reserves and mining and processing capacity.

Yet while South Africa is indisputably a major or very major producer of these commodities, it can be argued that Britain's dependence on it as a source of supply is by no means inevitable. Should it wish, it could in every case find other suppliers to the same specification. Indeed, given existing levels of steel production, the world could do without South African supplies of these commodities for the forseeable future. This is not to say that there are no advantages to British steel makers in using South African suppliers, or that an interruption of South African suppliers would be cost free. Rather it is to say that Britain's dependence on South African suppliers is in large measure historical, and that it could survive without the assistance its current scale currently provides the South African regime. This diagnosis is supported by the Economist Intelligence Unit, amongst others:

> "A number of South Africa's major exports (iron and steel, uranium, copper, chrome, manganese and coal) are competing in markets which are currently oversupplied. They are thus vulnerable . . . to being avoided for political reasons as their customers would face no short-term penalties for such action." [12]

The procedure here is to discuss these 'strategic' raw materials in turn, before examining the British steel industry's dependence on some of South Africa's 'non-strategic' ones.

• *Chromite ore and ferro-chrome*

Chromium is used primarily in stainless steel, which by definition contains a minimum of 13 per cent chromium metal. The most common stainless steel specification contains 18 per cent chromium metal; some stainless steels contain 35 per cent. It is also used in other alloy steels such as structural steel, ball-bearing steel and crucible steel. The chemical industry is another consumer and, in compounds.

The primary raw material for chromium is always the mineral chromite. This is mined by both surface and underground methods. South Africa possesses about 68 per cent of world chromite reserves and in 1985 is estimated to have mined about 35 per cent of world chromite.[13] No economically extractable chromite is to be found in the UK. There are six major South African chromite mining companies, all of which are subsidiaries of one or another of the major South African mining giants: Anglo American, Anglo Vaal, Samancor, Gencor and Barlow Rand.

Other than the partial absence of underground working, conditions are identical to the gold and coal mining in-

dustries: the division between white 'miners' and black labourers, very low wages, poor safety, large-scale use of migrant labour, compound accommodation, private security police, etc. South African mined production in 1985 is estimated to have reached 3.5 Mt. Its nearest competitors, USSR, Albania and Zimbabwe had estimated productions of 2.5 Mt, 0.9 Mt and 0.47 Mt respectively.

Chromium is an input in steel production only in the alloy form of ferrochrome. This is produced by melting chromite in an electric furnace, a process requiring large amounts of energy.

Of the materials listed above, the market for ferro-chrome has been the most buoyant in the last decade. This is due to the increasing importance of stainless steels relative to steels generally, especially in advanced industrial countries where most steel consumption now consists in replacement products.

South African ferro-chrome's use only became widespread in the 1970s. Up to this time it was regarded as cheap, but metallurgically undesirable owing to its high carbon content. However, the general adoption of the *Argon-Oxygen Decarburising* (AOD) method of stainless steelmaking changed this picture. AOD enabled producers to utilize the feature of South African ferrochrome which hitherto had been its disadvantage, since it decarburised melts from high additional carbon levels without real difficulty. In addition it allowed improved sulphur removal, savings of nickel, and control of cleaness. South African chromite producers expanded on-site ferro-chrome smelting, and competed successfully in the market on the basis of their cheap labour and electricity costs and the availability of suitable local coals.

In the face of a combination of fierce competition and rising energy costs, many US, Japanese and European ferro-chrome producers reduced capacity or went to the wall in the 1970s. British ferro-chrome smelting from imported ores disappeared completely. By 1985 South Africa is estimated to have secured a 29 per cent share of world ferrochrome production.[13] With the exception of a smelter owned by CMI (Johannesburg Consolidated), South African ferro-chrome production was wholly in the hands of the mining giants.

As world stainless steel production began to revive in the mid-1980s, other producers announced expansion of capacity, especially Finland, Turkey and India. Plant had reopened or been commissioned in Italy, Greece and Sweden. As capacity was de-mothballed, South Africa's share of world production was expected to decline. In 1984 South Africa's share of world ferro-chrome capacity was only 16.5 per cent.

Britain, however, remains relatively highly dependent on South African ferro-chrome imports. The extent of this dependence is subject to controversy, and even shrouded in a degree of secrecy.

The British government's *Overseas Trade Statistics* do not provide a proper breakdown of most of Britain's ferroalloy imports either by alloyed metal or by country of origin. Nonetheless, by a process of elimination it is possible to compute a value for South Africa's share of ferrochrome imports. In 1984 and 1985 this amounted to 256 806 t and 259 286 t respectively, or 39 per cent and 38 per cent of total ferro-chrome imports, approximate cif value 12.2 M GBP and 14.1 M GBP.

On the other hand, there are reasons to suspect that these figures underestimate the real level of South African ferro-chrome imports. It is known that the substantial South African imports in 1983 for the British government's strategic stockpile (see below) were never recorded in the Overseas Trade statistics. Moreover, a report in the *Financial Times* by an editor of the *Metal Bulletin* stated that 90 per cent of British ferro-chrome was of South African origin.[14] (Possibly this may have been a mis-print for chromite ore). Finally, it is believed that the consumer of the great majority of ferrochrome in Britain, the SMACC (Tinsley Park) section of BSC Stainless, Shepcote Lane, Sheffield uses over 50 per cent and sometimes considerably more of South African ferro-chrome.

BSC have found South African ferrochrome advantageous to use partly because of the conomies it provides and partly because of metallurgical advantages such as its low phosphorus content. However, other charge-grade ferrochromes are available and its preference for the South African product also reflects the strong historical ties between BSC and South African producers.

During the early 1970s BSC's director for raw materials was W N Menzies-Wilson, a former chair of BSC's South African subsidiary Stewarts and Lloyds and director of Samancor's predecessor Amcor. It was Menzies-Wilson who first contracted iron ore supplies from ISCOR's Sishen deposits in 1971 (see below), and who strenghtened links across the board with African raw materials suppliers.[15]

Having adopted the AOD process at Tinsley Park, Panteg (Pontypool) and Stocksbridge in the early 1970s, and finding itself with 2 M GBP worth of non-convertible Rands from its South African operations, BSC was approached in 1974 by Johannesburg Consolidated for joint construction of a ferrochrome smelter at Lydenburg.[16] This was turned down by the then Trade and Industry Secretary Tony Benn, but agreed by his successor (Eric Varley) in 1975. The resulting joint venture (CMI) began production in 1977, pelletising existing unused fines. BSC participated in the profits and contracted to take about 10 kt/year at normal prices. In 1982 BSC's interest in CMI was sold to Johannesburg Consolidated, but the ferro-chrome contract remained. In addition BSC obtain ferro-chrome from Samancor through Midgley's of Sheffield (see above).

Other important current suppliers of

ferrochrome to the British steel industry are Sweden 20 kt/year and Zimbabwe (about 9 kt/year). Swedish ferrochrome is mainly smelted from imported Finnish and Albanian ores.[17] The Zimbabwean ferro-chrome industry, which produces to almost identical specifications as the South African is wholly owned by US- and South African-based multinationals. Intake from a further quality alternative source of supply (Outokumpu of Finland) is believed to have reduced as a result of a dispute over the pricing of Finnish steel products on the British market — an irony concerning South African steel producers' practices.

• *Manganese ore and its derivatives*

Manganese is a very important additive and alloy in the manufacture of steel. In addition it is used as a slag-former and deoxidising agent. Its major significance results primarily from its capacity to bind sulphur and to raise the resistance of steel. Flat rolled products contain about 2 per cent manganese for microstructural refinement. Certain steels such as Hadfield's steel (used traditionally in rails, earthmoving and mining equipment) contain 10—14 per cent manganese. The shift of steel production away from these varieties means that manganese consumption has declined to an average of 1 per cent of steel's composition. It is non-substitutable.

90 per cent of the manganese imported to Britain is used in the metal industries and 85 per cent by the steel industry. South Africa possesses about 45 per cent of world reserves. As in the case of chromium, South Africa is a major centre both for manganese ore mining and refining/smelting into various metals and metal alloys. Technology (mixture of surface and underground mining), working conditions and concentration of ownership are similar to chromium. The bulk of manganese ore mined in South Africa in 1984 was by Samancor (1.7 Mt) and Ammosal (owned by Anglovaal), (1.09 Mt). Together their production accounted for 12.3 per cent of world mining. South Africa's total share was 13.3 per cent. South African production of manganese derivatives is also highly concentrated. Samancor's Metalloys ferro-manganese smelter is the non-socialist world's fourth largest. Ammosal/Anglovaal's Feralloys smelter was eighth and Highveld/Anglo American's Transalloys smelter was twelfth. Together they produced 13.1 per cent of world ferromanganese production.[18] Translalloys and Metalloys also produced large quantities of the low carbon ladle addition ferro-silico-manganese, while Delta Manganese (a subsidiary of the British-based multinational Delta Group plc) had the capacity to produce 40 kt per year of manganese metal (mainly used in aluminium manufacture, but a substitute for ferromanganese in non-ferrous alloys and stainless and carbon steels).[19]

No economically extractable manganese ore is to be found in the UK, and all supplies therefore have to be imported. Despite South Africa's relatively low share of world mined production of this ore, South Africa accounted for 155.6 kt or 40 per cent of total British imports in 1985, with a value of 7.14 M GBP cif.[20] The steel industry's other traditional supplier of manganese ore has been Brazil. Other sources are Australia, Gabon, India and the USSR.

Unlike the case of ferro-chrome, Britain does not have to import any ferromanganese, which can be and is produced in blast furnaces. British production has been traditionally located at Cleveland Iron Works (BSC Teeside), which has an annual capacity of 200 kt. However, whereas the annual steel industry consumption of ferromanganese is approximately 115 kt/year, Cleveland Iron has in recent years been run at constantly below half capacity to smelt only a 83 kt/year share of this.[21]

South Africa's share of ferro-manganese imports has fluctuated wildly during the 1980s. In 1983, 66 119 t was imported, followed in 1984 by only 2 kt and in 1985 by 8.5 kt (value 1.9 M GBP cif). The major import source in this period became Norway (this is also true of ferro-silicon). In view of these fluctuations, expressing South African ferromanganese imports in percentage terms is not particularly meaningful.

Ferro-silico-manganese is a wholly imported product, although presumably it could also be refined at Cleveland. Imports 1983—85 ran at a regular 29 kt/year, of which the steel industry's consumption was approximately 21 kt/year. South Africa's 1985 share of these imports was 4.5 kt/year, worth 1.35 M GBP cif.

In 1983, the last year for which figures are available, 3 421 t of manganese metal was imported to the UK, 2 152 t of this originated in South Africa (value 1.93 M GBP cif). This represented over 15 per cent of South African total production during this year.[22]

• *Vanadium and ferro-vanadium*

Vanadium is an alloy metal in high-speed steel, crucible steel and *high-strength low-alloyed steel* (HSLA). It is also used in certain low-alloyed fine-grained steel. Vanadium additives improve the abrasive resistance and the strength qualities of steel at high temperatures. The steel industry uses vanadium only in the form of ferro-vanadium and only in very small quantities (usually only about 0.1 per cent). Consumption of ferro-vanadium in the British steel industry averaged just under 600 tpy metal content for the period 1980—85.[23]

Worldwide vanadium production is low (approximately 30 kt/year) and 36 per cent of it in 1985 is estimated to have originated in South Africa, which also has the largest vanadium reserves.[24] A single South African producer, Highveld Steel and Vanadium, owned by Anglo American, accounted for about a fifth of world production. Highveld is an integrated iron ore

miner/steel producer, whose iron ore is rich in vanadium deposits. It produces vanadium initially in a slag form and exports it as slags and as vandium pentoxide (V_2O_5, 98 per cent vanadium). There are no vanadium deposits in the UK and all Britain's vanadium requirements are imported.

Vanadium pentoxide is not recorded as a separate item in the Overseas Trade Statistics. The latest available figures for imports of it, broken down by country of origin, are to be found in the British Geological Society's *UK Mineral Statistics 1984*. These record an average annual import for 1980—83 of 1 168 t/year. Of this, only an average of just over 15 t/year are recorded as South African in origin. Finland is recorded as accounting for about 80 per cent of British imports of V_2O_5 in this period. This picture may have changed subsequently, since in 1985 the largest Finnish producer mothballed operations due to falling sales and low prices.

In addition to the ferro-vanadium obtained from local refiners who have smelted imported vanadium pentoxide, the British steel industry directly imports refined ferro-vanadium. An average of 645 t/year were obtained in this manner between 1980 and 1983, practically all described as refined within the EEC (undifferentiated) and Austria. France, Belgium and Luxemburg are all significant importers of South African vanadium pentoxide and of ash and residues containing vanadium, and it can be safely assumed that a substantial proportion of this ferro-vanadium is hence ultimately of South African origin.

Vanadium is a relatively expensive commodity. Even 15 t of vanadium pentoxide would cost 60 000 GBP at 1986 prices. Nontheless — despite an impression that BSC use considerably more South African vanadium than the figures suggest — it appears that for this commodity at least Britain is not actually dependent on South Africa to anything like the extent that UKSATA seems to believe is inevitable.

• *'Non-strategic' raw materials used in steelmaking*

Chromium, manganese and vanadium are of course only three of many ingredients of steel. Certain other ingredients, such as cobalt, are equally rare. The supposed uniqueness of chrome, manganese and vanadium is that they are both rare and found in large quantities in South Africa.

Given the lack of consequent dependency on South African vanadium, at least until 1985, it is therefore ironic that British props up the apartheid regime by obtaining significant quantities of a number of other raw materials from South Africa, when these are in no sense mainly South African products.

A relevant example here is iron ore. In recent years, the British steel industry's consumption of this has run at about 15 Mt/year and all but about 0.4 Mt/year has been imported. The bulk of British iron ore, though usable, has a relatively low iron and high phosphorus content.

South Africa's share of world iron ore production is less than 5 per cent, the leading producers being the US, Australia, Brazil and Canada. Yet Britain imports up to 7 per cent of its iron ore from South Africa. In quantitative terms, Britain imported just under 1 Mt of South African iron ore in 1985, at a value of 15.34 M GBP cif.[25]

While this iron ore has a marginally higher than average iron content, this cannot explain imports of this magnitude. The historically close relationship between BSC and ISCOR seems decisive, since it is ISCOR which is the source of the imports.

A senior research metallurgist at Sheffield City Polytechnic commented 'there seems no good reason for importing iron ore from South Africa'. Other steel producers (with the exception of the Japanese) appear to be of the same opinion, for in 1984 the recently constructed 861 km railway from the Sishen iron ore field to the port of Saldanha (W Cape) was operating at only 50 per cent capacity. It may be noted in passing that this railway appears to have been constructed as part of a geopolitical plan to provide South Africa's whites with an economically viable Western Cape redoubt to retreat to in the event of black revolution.[26]

Besides the probability of a certain level of consumption of South African coal, the British steel industry also appears to consume quantities of South African titanium, zirconium, tin and nickel, or their derivatives. Economically the most significant of these was nickel.

Nickel's greatest importance is in alloys with other elements, where it increased the strength and resistance to corrosion of steels over a wide range of temperatures. It gives steel a very tough quality, escpecially at low temperatures.

Over 95 per cent of nickel consumption in the non-socialist world occurs within the steel industry, the great majority of which is used in stainless steel whose standard composition includes 8 per cent nickel. The remainder is used in nickel based superalloys and in electrical resistance material.

Stainless steel production uses nickel in two forms and in roughly equal proportions. The first form is ferro-nickel, a ferro-alloy refined from the oxide nickels found in equatorial and tropical regions. The second form is pure unwrought nicke, derived from the sulphide nickels found in temperate and polar regions.

Ferro-nickel averaging about 30 per cent metal content is mainly imported to Britain from Greece and is not produced by South Africa. Over the three years 1983—85 imports averaged 14.3 kt (metal content = 4.3 kt), while the metal content of nickel consumed in the steel industry averaged 13.4 kt. Hence an average about 9.3 kt of unwrought nickel was consumed in the same period. UK unwrought nickel imports 1983—85 averaged just over 14 kt. The

chief source of this unwrought nickel is given in the Overseas Trade Statistics as Holland, i e it comrpises reexports from unknown sources. South Africa is a significant direct source of the remainder, averaging 1,438 t/year, or just over 10 per cent during 1983—85 (value 3.6 M GBP in 1983, 5.86 M GBP in 1984 and 5.3 M GBP in 1985 cif). This is despite the fact that by international standards South Africa is an insignificant producer approximately 3 per cent of world reserves and 1 per cent of world production in 1984.[27] Indeed, there is no direct mining of nickel as such in South Africa, most of it being produced as a by-product at the Lonrho-owned Westplat platinum mine.

Another case of South Africa's share of British imports well outweighing its share of world production is represented by tin, used in steel to electrolytically plate cold rolled steel strip for use as tinplate steel. British steel industry consumption of tin (mainly in South Wales) accounts on average for about 3.7 kt between a quarter and a half of total British tin consumption.

Tin is imported in a variety of forms: as ores and concentrates, ashes and residues, as unwrought metal and as scrap. In 1983 South Africa produced 1.3 per cent of world mined tin and 1.1 per cent of smelted tin. Due to inconsistencies in recording imports of this metal, it is not possible to give averages for the three years 1983—85, so figures will be given only for 1983 and 1985.

In 1983 the UK imported 19.5 kt of tin ash and residues. Of this 4.8 kt (24.6 per cent) was imported from South Africa (supplied by Zaaiplaats tin minte). No figure for 1984 or 1985 of total imports or South Africa's share of them is available, and the value of the 1983 imports is unknown.

Of the 7.35 kt of 1983 UK imports of unwrought tin metal, 719 or 9.8 per cent was of South African origin (value over 6 M GBP cif). The comparable figures for unwrought tin for 1985 were 7 349 t total imports, of which 324/4.4 per cent (value 2.96 GBP) was from South Africa. No figures are available for South Africa's share of UK imports of tin ores and concentrates or tin scrap in either year; nor are figures available for the latter at all after 1983. Tin, of course, is also mined in Britain.

Titanium and zirconium are two minor metals used in steel production found somewhat more predominantly in South Africa, and imported to the UK for use in the steel industry. Titanium is a hard metal whose lightness generates many aerospace steel applications. In its metal form it is derived exclusively from rutile ores, of which South Africa's world mined share in 1983 was 17 per cent, and from rutile slags, of which South Africa's world mined share was 34 per cent in the same year.

The British steel industry consumes about 600 t/year of ferro-titanium, which is practically all refined in Britain from imported rutile ores and slags. South Africa's share of imported ores has not been recorded since 1982 when it reached 21.5 kt (6 per cent of the total) at a value of 3 M GBP cif. Its share of imported slags over the period 1980—83 was 92 per cent (average 9.4 kt/year with an average value of 1.05 GBP cif).

Zirconium is a very strongly resistant metal whose most frequent use is as cladding for uranium fuel in the nuclear power industry. The steel industry uses zirconium in the production of heavy materials, primarily piping, for atomic power plants, and as a deoxidising agent. It is also used in the chemical industry as an anti-corrosive. Further, a great deal of zirconium is used in its mineral form, zircon, as sand-cast for moulds and ores in foundries, for furnance linings and as an abrasive and colour pigment.

Australia has the largest reserves of zirconium (29 per cent) followed by South Africa with 25 per cent. Australia accounted for 72 per cent of world zirconium production in 1984 and South Africa 14 per cent. Average consumption of the metal alloy ferro-silicon-zirconium in the British steel industry has in recent years ran at about 123 t/year. It seems that the vast majority of this is imported from the US, having been refined from Australian ores.

As for zircon sand, consumption in the British steel industry is unrecorded. However, imports of the zirconium ores and concentrates from which it is derived totalled 38 kt in 1983. According to the UK Overseas Trade Statistics, South Africa accounted for 9.3 kt of this, but unofficial South African sources put the figure at 14.434 kt (value 1.2 M GBP cif).

The final metal used in the steel industry of which South Africa has a share of imports is cobalt. Cobalt is used in the manufacture of high-speed steel and crucible steel, as well as in hard metals. It is also used in superalloys, dyes, catalysts, magnets, etc. South Africa accounts for only an insignificant share of world cobalt production (1 per cent or less), although the chief producing countries — Zaire and Zambia — both channel the great bulk of their exports via South Africa and are therefore highly dependent on developments there.

Cobalt consumption in the British steel industry has averaged just over 50 t/year in recent years. By contrast, total imports are much higher than this. In 1983 a total of 300 t was imported to the UK, 17 t from South Africa (value 0.09 M GBP cif).

The total value of imported South African metals and minerals with a wholly or mainly steel industry end-use in 1985 can be estimated at something in excess of 50 M GBP cif. While not all of this can be accounted for by steel industry end-use, the great bulk of it can. Within this category the most important consumer in the British Steel Corporation, which in 1985 accounted for 76 per cent of industry output and capacity. Within the Sheffield area, while BSC is no longer the principal steel employer it is without doubt the most important consumer of South

African raw materials, for stainless steel-making is the main end use of both ferro-chrome and nickel.

Propping up apartheid — the British strategic materials stockpile

Most significant bulk national consumers of rare or strategic metals have traditionally stockpiled them to counteract the effects of temporary or medium-term interruptions of supply to defence industries, etc. The United States, for example, appears to have maintained such a stockpile since the second World War. It is believed to contain approximately three years' supply of most important metals.

In recent years, as the crisis in South Africa has intensified and the regional situation become less stable, countries such as Japan who have never possessed stockpiles have acquired them. Early in 1983 the British government decided to follow suit. It allocated 35 M GBP for the purchase of ferro-manganese, manganese ore, ferro-silico-manganese, ferro-chrome, chromite ore, silico-chrome, cobalt, vanadium and ferro-vandium. Rented premises at Sheffield Forgemasters were selected as the stockpile's home and Brandeis Instel Inc, an American subsidiary of the state-owned French metal processing company Pechiney were appointed as the purchasing agents.[28]

Brandeis Instel proceeded to make a series of bulk purchases from South Africa. These included all 50 kt of high carbon ferro-manganese, 500 t of refined ferro-manganese, 2 kt of medium carbon ferro-manganese and 39 kt of low grade manganese ore purchased, and all 29 kt of high carbon ferro-chrome purchased. The stockpile was completed by mid-March at a cost of 40—45 M GBP. No enquiry appears to have been made concerning why original costings were exceeded.[29] The quantities stockpiled in no case exceeded four months' supply of the relevant metals, and in many cases were far less. Yet, according to *The Engineer,* in November 1984 "the Department of Trade and Industry decided to sell it off because 'it was no longer considered necessary' and also to meet budgetary restraints imposed by the Treasury".[30]

In the first fifteen months after this decision, one quarter of the original stockpile was sold.[31] It is not clear whether sales occurred pro-rata or of specified metals. Between March and July 1986 it is unclear whether further sales were made. Here matters become complicated The issue of *The Engineer* cited stated that a decision had been taken 'to stop selling off the stockpile in the light of the South African crisis'. However, according to a recent written parliamentary reply to Richard Caborn MP from a Junior Minister of the Trade and Industry Department, this policy was reversed on 26 July 1986 when the decision was taken to sell off a quarter of the stockpile as it then stood. By implication, the stockpile now stands at just above half of its original inadequate size, making Britain extremely vulnerable to any interruption of supply.

By way of a postscript it should be pointed out that the government has attempted to shroud the issue of the stockpile in secrecy, refusing to answer questions about its origins, size, value, or location. It also seems that the stockpile was never cleared through customs. The government has sought to justify this by reference to issues of physical security and commercial secrecy. In reality this has been a smokescreen for a buying policy favouring South African suppliers within the context of general inaction.

Living without apartheid: raw material supplies

1986 was a year in which both governmental and people's sanctions were applied against South Africa on an unprecedented scale. In addition to the EEC ban on imports of South African iron, steel and gold coins, as well as on new foreign investment there, the United States Congress passed a bill banning the imports of South African iron, steel, coal, textiles and agricultural products. Several Commonwealth countries, notably Canada, Australia and New Zealand, announced what amounted to a general embargo on South African products. On the front of people's sanctions, trade union action in France obliged their electricity generating board to cease purchasing South African coal. In England the health service unions obliged a number of Health Authorities to stop using South African foodstuffs and medical supplies. Up and down the country large supermarket chains were obliged to withdraw South African products and a whole range of British, European and North American transnational cooperations have been forced to sell off their South African subsidiaries.

These events reflect the increasing success of efforts to isolate South Africa internationally, and are supported by the largest South African trade unions and opposition political organizations.

While detestation of the South African regime is widespread, many British companies and trade unions are hesitant about pressing for a severance of their South African links. This is largely due to a belief that profits and jobs might be lost by failing to find replacement markets or sources of raw materials.

A couple of general arguments can be ranged against this attitude. Firstly, it now seems probable that trade with South Africa in the next decade will be interrupted by means outside the control of individual British companies or trade unions. Either a change of British government, or of world opinion, or most likely revolution within South Africa itself will mean that British firms will be obliged to look elsewhere for buyers and suppliers before the mid-1990s. Secondly, the longer British firms persist in maintaining South African links, the more vulnerable they will be to losing business to rivals in countries such as Nigeria which are

deeply hostile to the South African regime.

With regard to the first argument, the case for British steel producers to break their dependence on South African imports before they are obliged to is particularly strong. Practically all supplies of strategic materials are obtained on contract. For a large consumer such as BSC, contracts will generally be direct with the producer rather than with an intermediary British-based trader (except perhaps in the case of the minor metals and ferro-alloys). Bulk contracts have a dual structure: an understanding of up to five years that a producer will satisfy a given percentage of the consumer's total demand, and a yearly negotiated price fixed on a USD/lb metal content basis. Normally, understanding are broken only in emergencies. Clearly, the inflexibility of this system militates against those seeking to switch suppliers on an unplanned basis.

The argument that South Africa is the 'natural' or only viable source of supply of many of the raw materials imported by British steel producers is one that can be answered, too. This answer is best provided by returning to the actual materials imported.

Of these, it has been made clear that South Africa produces only a tiny or even insignificant proportion of world coal, iron ore, nickel, tin and cobalt, yet is grossly overrepresented in British imports of all these products.

It can be said without fear of contradiction that alternative suppliers at the same or lower cost could be provided in each of these cases, and South Africa could go out of export production of them without any noticable effect on the world price. In addition it should be recalled that Britain itself is or has been in the recent past a bulk producer of coal, tin and iron ore, and in the first two cases could supply without difficulty the share of steel industry's needs currently provided by South Africa.

The cases of chromium, manganese, titanium and zirconium are more complex, for here as has been seen, South Africa enjoys 35, 13, 17 and 14 per cent respectively of world production of the ore form of these minerals. In addition, in the cases of chromium and manganese the other major suppliers are all socialist countries.

It is worth pointing out that the case of vanadium, at least before 1985, shows that a metal's physical concentration in South Africa need not lead to a commercial dependence upon it as a supplier. South Africa's share of vanadium production is greater than that of any of the other metals discussed, yet Britain had only a marginal level of direct imports of South African vanadium.

Most recent reviews of possibilities of reducing dependence upon importation from South Africa of metals and minerals conclude that South African chromium would be the most difficult to substitute of the four materials mentioned.[32] It may therefore be worthwhile to look in particular detail at this material.

The 1985 edition of *Minerals Facts and Problems* provided the following tables for world chromite ore and ferrochromium production, relative to existing and planned capacity.

Table 2 shows that even if South Africa's total chromite ore mining capacity and projected capacity was withdrawn, existing world capacity would be only 5 kt below 1983 world production levels. Moreover, practically all the non-socialist world's chromite ore needs could be met from existing capacity without imports from the socialist countries.

Table 3 tells a similar story but even more convincingly.

Should South Africa's current and projected ferro-chrome capacity be withdrawn, world ferro-chrome capacity would have still exceeded production by 527 kt in 1983 and will exceed by 617 kt in 1990, assuming 1983 production levels remained stable. The table further demonstrates that practically all the non-socialist world ferro-chrome needs at 1983 levels could still be met internally if South African supplies terminated (shortfall: 150 kt).

As it happens, world chromite ore production expanded by about 17 per cent between 1983 and 1985, thus creating a potential shortfall if all South African capacity was withdrawn and production did not slip back.

It seems quite clear that additional capacity could be brought onstream to meet any such shortfall, however. According to the same publication there are 252 Mt of immediately economically-extractable non-South African chromite ore reserves.

At a conservative 40 per cent metal content this gives 100 Mt, or over 36 years' supply of non-South African chromite ore at current mined production levels. The non-South African reserve base (demonstrated resources that are currently economic, marginally economic and some that are currently subeconomic) is four to five times larger than the reserves.

It seems highly probable that a total withdrawal or interruption of South African chromite ore and ferrochrome production would nonetheless lead to a consierable price rise in these products. It may be possible to compensate for this by reducing chromium's use in the various steels processed, utilizing chromite ores with lower chromium contents that at present, and increasing the proportion of chromium consumption in the form of scrap steel. Stainless steel scrap takes care of a large proportion of Britain's current chromium needs — on occasion up to 50 per cent in the manufacture of stainless steel. The proportion of scrap is different for different steel producers, and depends also on its price and availability. In any event, since it is clear that there will be no absolute shortage of chromium, provided end-use consumption remains at present levels, the chromium price should after a time stabilize and then begin to drop.

The above discussion has of course

assumed a total withdrawal of South African chromium supplies. In practice, such an event is unlikely. A switch in supply from South Africa by British steel producers alone would have few effects on the world price, and under present conditions should merely entail the costs of changing supplier (ordering and testing samples plus technical adjustment.)

The cases of manganese, titanium and zirconium are all similar to that of chrome. In the case of ferro-manganese, the additional argument exists that a ban on South African imports could lead to an expansion of the existing low levels of British ferro-manganese capacity utilization. It might be added that given a change in energy pricing policy, British ferro-alloy production generally could become viable (the principal production cost in ferro-alloy smelting/refining is energy, whose costs in Britain are about 70—80 per cent higher than the Scandinavian countries whose production in these fields is expanding).

Notes:

[1] P Freer, *South Africa to 1990,* the Economist Intelligence Unit, London 1986, p 66.

[2] Subsidiary = parent company holding 50 per cent of shares, associate = parent company holds 10—50 per cent of shares.

[3] Labour Research Department (LRD), *Profiting from Apartheid,* London 1986, p 5.

[4] E Webster, *Cast in a Racial Mould,* Raven Press, Johannesburg 1985, p 130.

[5] All figures in metric tonnes (t) except where stated.

[6] *Ferroalloy Directory,* London 1984.

[7] Since 1983 owned by Gencor.

[8] *Metal Bulletin Monthly,* May 1984.

[9] Ibid.

[10] South African figures from, S Brunt, *A South African Experience,* Derbyshire Area, National Union of Mineworkers (NUM), Chesterfield 1986.

[11] Cf J P Leger, *Towards Safer Underground Gold Mining, University of Witwatersrand,*

Table 2

World chromite mine production, 1983 and capacity, 1983 and 1990.
(Thousand short tons of metal content)

	Production[e] 1983	Capacity 1983	Capacity[e] 1990[1]
North America	—	—	—
South America			
Brazil	90	125	125
Cuba	9	29	29
Total[2]	99	154	154
Europe			
Albania	305	323	323
Finland	62	187	187
Greece	16	17	17
USSR	942	1 000	1 000
Total[2]	1 325	1 500	1 500
Africa			
Madagascar	14	42	42
South Africa	758	1 460	1 460
Sudan	9	10	10
Zimbabwe	162	377	377
Total[2]	943	1 890	1 890
Asia			
India	123	190	225
Iran	18	30	30
Japan	2	2	2
Pakistan	—	1	1
Phillipines	83	170	190
Turkey	114	240	240
Vietnam	5	5	5
Total[2]	345	640	690
Oceania			
New Caledonia	33	33	33
World total	2 745	4 200	4 200

Notes:
N/A = Not Available
e = estimated
[1] Forecast
[2] Data may not add to totals because of independent rounding.

Table 3

World ferro-chrome production, 1983 and capacity, 1983 and 1990
(thousand short tons of metal content)

	Production[e] 1983	Capacity 1983	Capacity 1990[1]
North America			
Mexico	2	2	2
United States	13	187	150
Total[2]	15	190	150
South America			
Brazil	45	76	76
Europe			
Albania	20	22	22
Czechoslovakia	15	16	16
Finland	33	33	66
France	10	58	58
Greece	N/A	17	17
Germany West	24	62	62
Germany East	11	12	12
Italy	20	30	30
Norway	5	20	0
Poland	26	30	30
Romania	N/A	58	58
Spain	8	13	13
Sweden	117	167	167
Turkey	18	41	96
USSR	413	420	420
Yugoslavia	36	49	49
Total[2]	756	1 050	1 120
Africa			
South Africa	330	401	401
Zimbabwe	82	189	189
Total[2]	412	590	590
Asia			
China	69	70	70
India	25	84	144
Japan	177	348	348
Philippines	13	37	37
Total[2]	284	540	600
World total[2]	1 512	2 440	2 530

Johannesburg 1985.

[12] P Freer, *South Africa to 1990,* p 84.

[13] A MacMillan, S Briggs and N Buxton, *Annual Review of the World Nickel Industry,* Shearson Lehman Brothers 1986.

[14] *Financial Times,* London 1986-08-15.

[15] R First et al, *The South African Connection,* London 1979.

[16] By 1986 the AOD unit at Stocksbridge had closed. That at Tinsley Park/Shepcote Lane (SMACC) is several times larger than all the remaining British capacity added together.

[17] US Bureau of Mines, *Minerals Yearbook Vol III,* Washington 1984.

[18] *Metal Bulletin Monthly,* November 1986.

[19] US Bureau of Mines, *Minerals Yearbook Vol III.*

[20] *Overseas Trade Statistics,* British Government, Annual.

[21] *Iron and Steel Statistics Annual 1980—85,* Iron and Steel Statistics Bureau, Croydon 1986.

[22] US Bureau of Mines, *Minerals Yearbook Vol III,* as above.

[23] *Iron and Steel Statistics Annual 1980—1985.*

[24] Macmillan, Briggs and Buxton, as above.

[25] *Iron and Steel Statistics,* as above.

[26] M Lipton, *Capitalism and Apartheid,* Pall Mall Press, London 1985, p 81.

[27] Macmillan, Briggs and Buxton, as above.

[28] US Bureau of Mines *Minerals Yearbook Vol III,* as above.

[29] *Metal Bulletin* 1983-03-18.

[30] *The Engineer,* 1986-07-10.

[31] Ibid.

[32] See eg, D Williamson, The importance of South African mineral production, *Metal Market Weekly Review,* No 216, 1986.

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