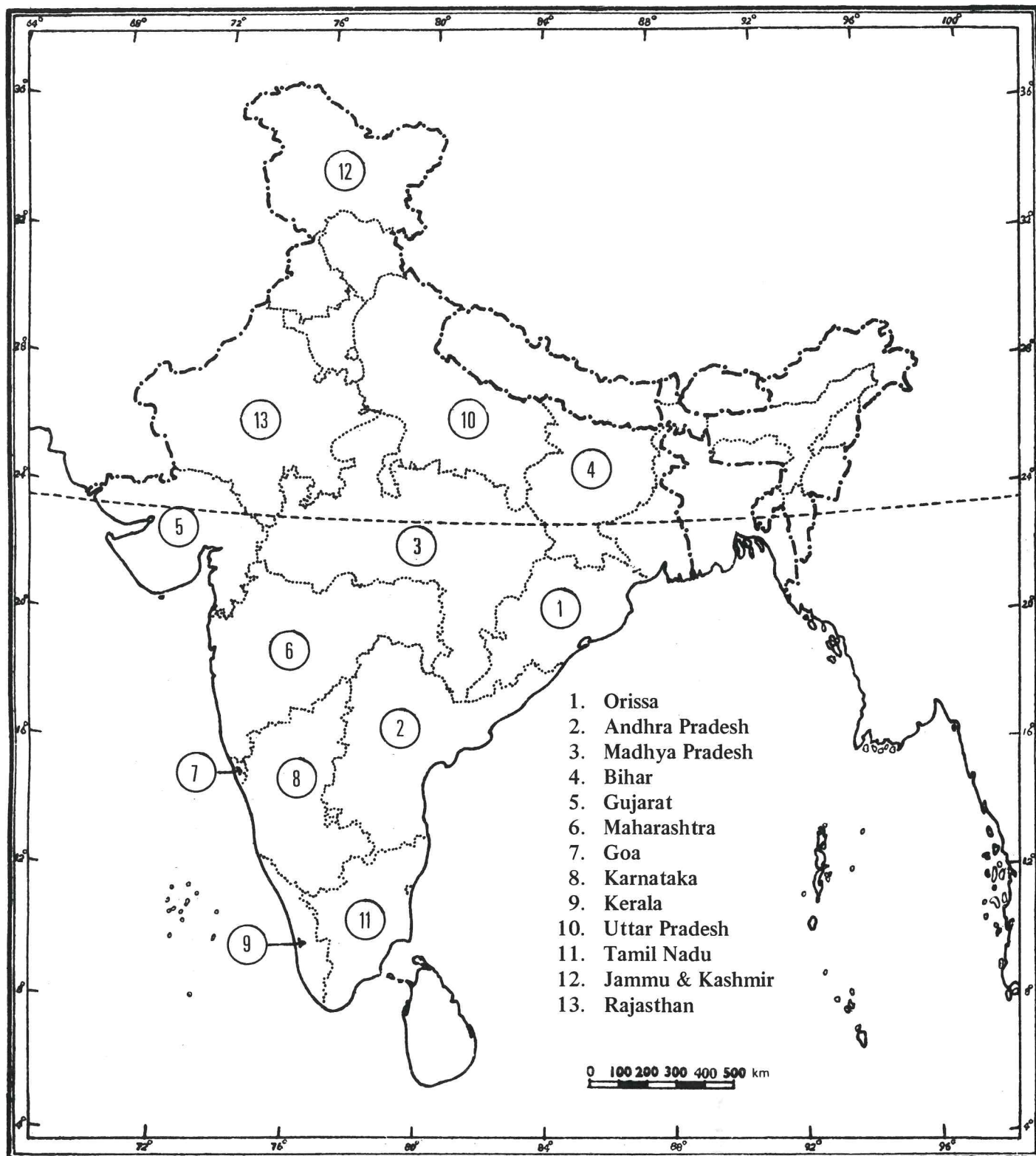
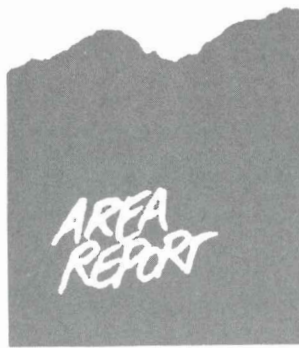


### The major mineral provinces in India





# The Indian minerals industry – an overview

By G D Kalra

In his second article G D Kalra looks at India's main export minerals and their potential in the years to come.

India is one of the largest exporters of minerals in the world. India ranks among the top five *iron ore* exporting countries. Endowed with vast reserves of a wide variety of grades, it has been steadily increasing its production. This resource is ably backed by well developed mining, transportation and port facilities enabling India to cater to the needs of growing number of countries: Japan, Korea and many others in the Far East, Eastern and Western Europe.

Only seven countries in the world have *manganese ore*, vital for the steel industry. And India is one of them. The ores conform to a wide spectrum of specifications and can thus meet the requirements of both ferro-alloy manufacturers and blast furnace smelters. The manganese exports follow the destinaries of iron ore.

India's *chrome* ore resources are of the order of 110 Mt, and include metallurgical, chemical and refractory grades. The current production of chrome ore is in the range of 300 to 500 kt/year, and is being exported to Japan, Czechoslovakia, China and the Philippines.

India's reserves of *barytes*, estimated at 60 Mt, are mostly of drilling mud variety. Iran, Iraq, Saudia Arabia, Qatar and the United Arab Emirates, have been almost exclusive markets for Indian barytes.

According to recent geological estimates, India may be the third richest country in *bauxite* reserves after Australia and Guinea. Used primarily for production of aluminium metal, bauxite has been exported to the Middle East, Spain, Italy, USA, Japan, GDR and Czechoslovakia. Recently India made its entry in the export market of alumina and wishes to add dimensions to this export through setting up of alumina plants with financial collaboration, against buy-back agreements. One such contract with USSR is under negotiation.

India holds a monopoly in the global trade in fabricated *sheet mica* but re-

cently there has been a shift in the direction of exports, from the Western block to the Eastern block, predominantly USSR. India's overall quantum of export of mica has been very much affected due to (i) introduction of solid state electronics and electrical controls, and (ii) use of mica scrap available in other countries in production of built-in mica such as mica paper with diversified applicability. India has also gone into production of mica paper with technical collaboration with Japan against buy-back arrangements.

India is today the largest exporter of cut and polished *diamonds* in the world. Its main export markets are USA, Belgium, Hongkong, Japan, Switzerland and Singapore.

India's exports also include *non-coking coal, sillimanite, granite, vermiculite, magnesite, steatite and bentonite*.

Recently there has been a quantum jump in liberalisation of economic policies adopted hitherto by India. This encompasses the following related to the mineral industry:

- India now welcomes introduction of foreign technology and capital instead of going for self-sufficiency it had aspired for. India is skipping the middle stage technology advancement and going straight for high technology. This brings in the simultaneous upgradation of the capability to supply the necessary raw materials and to make use of high technology.
- There are plans to change the trade structure through import of the latest technology for processing of minerals/ores to cater to the specifications of export market.
- India has embarked on barter trade in minerals/metals in the international market. Examples of barter with Trinidad and Tobago, Zambia and Zimbabwe have been given above. Agreements have also been signed with Jordan for the export of earth moving equipment. The country has also chosen



a vast range of products for counter trade export of minerals.

- The Government has allowed the public sector undertakings engaged in production and exports of minerals to enter the capital market with public issues of bonds and long term deposits. This has relieved these units from depending exclusively on budgetary support of the Government for expansion and on diversifying their activities.

- Business ventures abroad are likely to add to the dimensions of mineral trade of India. India is entering into joint ventures with the province of Manitoba in Canada for a project to produce 2 million tonnes of potash annually and with Saudi Arabia for a phosphatic fertiliser plant. Plans for rock phosphate mining in USA are also in the pipeline. India is planning to enter into joint venture mining projects for diamond in Africa and Latin America.

*Minerals and Metals Trading Corporation (MMTC)*, a state government undertaking for canalising export and import of minerals, plans to extend credit facilities to entrepreneurs who have equity participation in foreign mines for diamond and sapphire prospecting in India and abroad.

### **India and the structural changes in the world market for minerals**

Structural changes in the world market for minerals will also cast their shadows on mineral exports from India.

These shifts can be summarised as follows:

1. While the prices of all finished goods are going up every year, the prices of raw materials are going down in the international market. This is largely due to the state of over supply versus demand. The prices of iron ore, for instance, have gone down by about 33 per cent since 1982-83. The present arrangements between iron ore suppliers, and consumers have faded and have produced the antithesis of what is ex-

pected from the working of a free market.

2. The value of iron ore was measured, till now, only in terms of its iron content and other gangue materials like silica etc, irrespective of the metallurgical properties. Some of the lumpy ores which lost ground to sinter fines, have proved in actual metallurgical practices as good as, if not better than, man made pellets. These ores have been recently termed as "natural pellets". These experiments have shown that these natural pellets are very good raw materials for making sponge iron both through the Lurgi process and the Midrex process. These ores can also be used in blast furnaces to improve production and productivity.

3. The blue dust which was hitherto considered as a waste product of iron-ore mining, can be used for production of high-tech products such as: (i) iron powder utilised in powder metallurgy; (ii) electronic components like ferrite and magnetite; (iii) high quality steel and (iv) high quality sinters.

4. There is expected to be a shift in the geographical location of demand for volume usage of minerals and metals towards the developing countries. One of the most rapid shifts in this regional change can be expected in demand for steel. It is forecast that by 2000, four of the world's largest steel markets will be outside the region covered by the Organisation for *Economic Cooperation and Development* (OECD).

5. The environment surrounding the minerals consuming industry is progressively worsening. This has attracted stringent legislation all over the world, eg pollution control involving heavy investment on installation of devices for dilution of effluents within the prescribed limits. This has enhanced the cost of production resulting in mineral-based industries facing a life-or-death crisis.

Equally stiff is the legislation governing the environment of mines, partic-

ularly the open cast workings. The land after extraction of minerals in open cast workings has got to be restored to the use the land was originally put prior to initiation of open cast workings. Most of the countries legislation prescribe this level of expectation. This enhances the cost of production.

6. New markets for iron ore are opening up in Eastern Europe, notably Romania, as a result of the depletion of high grade Soviet ore. There are good prospects for increased sales to China where the objective is to double steel production by the year 2000; China has low grade reserves of iron ore.

7. Metallurgical industry is a large consumer of energy. In recent years there has been emphasis on energy conservation as one of the ways of cost reduction of metals produced. A catalytic effect of energy crunch was a speeding of the following trends:

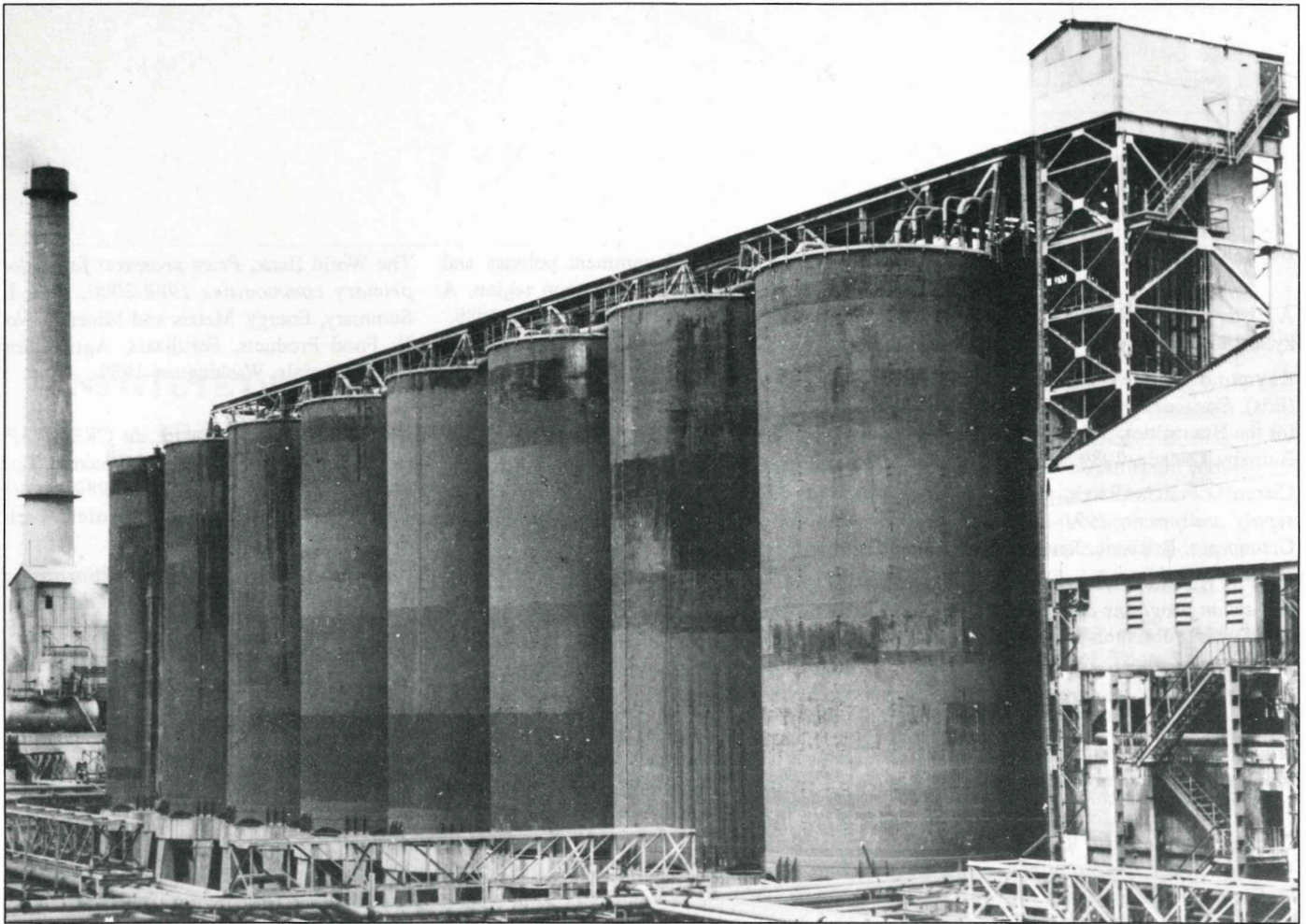
- growth of scrap-based electric furnace
- change of blend of burden charge in polycrystalline forms, lumps, pellets and sinters.

- emergence of oxygen process of steel smelting which affected the consumption of ferro-manganese and tilted the trend towards increased use of scrap.

8. There is an ever increasing international trade in metal scrap. As for instance, in the iron and steel industry prompt scrap collection is decreasing per tonne of steel shipped because of improved processes and better yields, for example from continuous casting. Obsolete or capital scrap however could increase as it is linked with actual consumption of steel products over several years before the time when it is recovered. Several studies indicate that this is 15 years and the percentage recovered varies from 50% to 60%. Presently the iron and steel industry is in a period of structural change in which low growth or even zero growth is possible, thanks to the over swelling scrap trade.

9. Initial development and growth of aluminium industry was mainly concen-





trated in the industrially advanced countries of the West. The progress was particularly impressive during the fifties and sixties, a period of relatively stable and sustained growth in the market economies. The industry benefitted from the functions of certain favourable factors, viz low interest rates and capital costs, adequate supplies of power at low prices, easy access to raw materials and above all, favourable market conditions. The economics of these factors favoured the transfer of bauxite to the integrated aluminium plant from the ore producing countries and installation of aluminium smelting capacity near the source of cheap hydro-electric power.

Escalating energy costs during the seventies and its impact on transportation costs have necessitated a turnaround in the stages towards aluminium manufacturing. Recent evidence indicates increasing transfer of aluminium production from developed countries to bauxite producers. Given the importance of hydro-electric power, this being more economical in the long run

than any other source. Future smelting capacities may come up in the developing regions of Asia and Africa with comparatively large unutilised potential of hydro-power. This trend is likely to have its impact on international trade in alumina and bauxite.

10. Chromite is the main raw material in the production of ferro-chrome or chrome charge, an essential input in the manufacture of stainless steel along with nickel. The production trend of stainless steel is poised for a sustained growth in the future because of its non-substitutable applications due to its anti-corrosive properties. Demand for metallurgical grade chromite is anticipated to grow unhindered.

Use of refractory grade chromite in the manufacture of basic magnesium chrome bricks has suffered considerably. The magnesium-chrome bricks have been substantially replaced by tarred-dolomite refractories in the Oxygen process of steel smelting due to economic reasons, while high alumina refractories have made its dent in other

applications of magchrome bricks such as cement kilns etc.

11. The directions and quantum of exports of barytes from India has been shifting with the locations and intensity of exploration for oil and natural gas in the world. The intensity of exploration is governed by the prevailing international prices of crude petroleum which have been experiencing a downward dip during the last two years despite the best efforts of OPEC to arrest the trend. This has resulted in sluggishness in international trade in barytes with repercussions on Indian exports.

To sum up: India's profile of mineral trade will undergo a transformation as it gears to meet the present and anticipated structural changes that may emerge both at the national and international scenarios. The broadening perspective by 2000 AD will take India into new markets, new products, new modes and means of transport affecting not just a change but a megashift-to move in line with the megatrends in global trading of minerals. ■