

## Boom in India's iron and steel industry\*

B. P. Radhakrishna

Lakshmi Niwas Mittal is one of the richest men in the world today. Last year his photo appeared on the front cover of the *Time* magazine and the write-up which followed expressed outrage at the bid of this young tycoon for taking over Europe's largest steel-making company. The eyes of the world were directed towards this smiling youth hailing from a poor country, whose forefathers were cowed down and humiliated by the British, who had raised himself up to such an extent as to dare to bid, and succeed, in the purchase of Arcelor, the largest steel producer of the European continent. Closely following this event come the news that the Indian steel giant Ratan Tata has concluded a deal for the take over of Corus, the largest Anglo-Dutch steel maker, and thereby created the fifth largest steel-making company in the world. How did all this come to happen? Thereby hangs a tale of steel making, an industry which started in India several thousand years ago and had built up a name for producing high quality steel.

### Early supremacy of India as a maker of quality steel

It is worthwhile to pause and take note of the stages of development of this once flourishing industry in this country. The average citizen, and even the intelligent youth receiving instruction in science and technology perhaps, does not know that the initiation of the practical production of metals originated in India. Even today the *adivasi* tribes of Madhya Pradesh continue to practice the ancient art of steel making. New Delhi attracts tourists from different parts of the world and most of them visit Kutub Minar where their attention is drawn to the rustless iron pillar of Chandra Gupta (400 AD) standing nearby.

In my early days of field work, I used to come across heaps and heaps of slag around certain villages in Tumkur and Chitradurga districts containing broken pieces of clay crucibles which had been

used in making steel. This practice of steel making continued even up to very recent times and early travellers like Buchanan and Newbold witnessed the actual process as practiced in many villages of south India. There are many stone circles nearby, relics of ancient burial grounds, pointing to the existence of some ancient tribe, specialized in this art of steel making, who roamed all over south India and practiced their trade.

The steel produced was fashioned into swords which were then in great demand. It is claimed that the famous 'wootz' steel from which Damascus swords were made was originally from south India, and the term 'wootz' itself being derived from the Kannada term 'ukku'. Many researchers, both in India and abroad, have tried to trace the extent of the wootz making industry in ancient India and have been able to locate a number of sites. Archaeometallurgical studies have shown that the industry thrived in many places in south India and had spread to Sri Lanka, Turkmenistan and Uzbekistan by 1000 AD, indicating the existence of a pan-Asian crucible steel industry. Like many other industries, steel making also declined with the advent of colonial rule, but for which India, in all probability, would have remained as a world leader in steel making since ancient times.

The making of wootz steel is a mystery even to this day, and studies continue to find the special ingredients used in its manufacture. Kodachadri, a lofty mountain peak in the Sahyadri range and a conspicuous landmark, is 1345 m high above sea level and from where a magnificent view of the coastline of Karnataka can be had. In a small area of level ground at the peak is an iron pillar, 10 m in height and 12 cm in diameter, which is perhaps the oldest iron pillar identified and is ascribed to *Sankaracharya* (820 AD). Despite the heavy seasonal rainfall the pillar has not rusted.

A reference has already been made to the iron pillar near Kutub Minar, South Delhi, 7 m high and weighing 6 tonnes which is a historic relic testifying to the metallurgical art of ancient India. The 7 m long pillar is believed to have been forged from a series of disc-shaped iron

blooms and the mysterious feature of the iron pillar is its freedom from corrosion. The famous Thanjavur cannon also testifies to metallurgical skills of a high order which persisted till 1626–36 AD. The 300 mm bore cannon has a barrel length of 400 mm and 150 mm thickness and was made entirely by forge welding.

It is generally accepted that steel making in India commenced around 300 BC, flourished up to 1856 AD and continued even after, to meet the steel requirements of the country till 1896, when Bessemer patented his process of producing large quantities of steel in specially designed converters in UK. Sheffield became the centre of steel making and the colonial overlords began dumping steel on India in large quantities at cheaper rates, thus effectively causing the death of the indigenous industry. A very large number of artisans were thrown out of employment as a result of this invasion of cheap steel. The big armouries and the numerous metal artifacts too were wantonly destroyed to remove all traces of the early metallurgical skills of the Indian craftsman.

### Birth of modern steel industry

Years later, it was Jamshedji Tata who had the vision to foresee the needs of an independent India and took steps, against heavy opposition, to produce iron and steel in India. 'Tata steel' is now a familiar name everywhere and the credit for starting a mighty steel plant at Jamshedpur, especially at a time when the political freedom of the country was still a dream, should largely go to this visionary. Jamshedji Tata, at the same time, had the larger vision of creating a unique University of Advanced Research – the Indian Institute of Science, Bangalore, an institute which has become the mother of all science institutes in the country. Jamshedji was a unique person who sought no honour and claimed no privilege, the advancement of India and her people being his sole goal. We have come a long way from the days of Tata steel. J. R. D. Tata in his autobiography has successfully analysed the circumstances under which the great Tata first took the almost unbe-

\*Reprinted with permission from *J. Geol. Soc. India*, 2007, 69, 675–680.

lievable step of making steel which set the country on the path of modern science and industrial development.

Although still under colonial rule, Tata observed that India remained in the backyard while an industrial revolution was rapidly transforming Europe and parts of Asia. He wanted to see his country in the forefront of science and technology.

Jamshedji knew that before the advent of steam and electric power, India had, for a thousand years or more, been the most industrialized country in the world, a pioneer and leader in the manufacture of cloth, iron and steel, ships and many other products, not to speak of its eminence in mathematics, astronomy, architecture and philosophy. Surely, he argued, the creative and productive genius of such a people could be made to flower again if given the tools of modern science and technology.

It is given to few to dream and see their dreams come true and take shape within their lifetime. Jamshedji relentlessly pursued his pet project and finally succeeded in putting up a steel plant at Sakchi (later named Jamshedpur). He was guided to this location by another patriot – Pramatha Nath Bose, a geologist of the Geological Survey of India. In spite of Jamshedji's drive and initiative, actual production could only start in 1912, three years after his death. The plant, with a small production of 100,000 tonnes of finished steel, steadily grew to become the largest integrated steel plant in India by the end of the World War II. This was no mean achievement under the conditions prevailing in the country in those days. 'Jamshedji became the man who helped the nation to believe in itself' and the man who lighted the path for many entrepreneurs in India to follow his example. The First World War resulted in a great demand for steel which Tata steel helped to meet. The famous Howrah Bridge of Kolkata was built in 1914 using 80,000 tonnes of steel produced by Tatas.

After independence came the era of socialistic planning and Tatas were not allowed to expand. Instead, three new plants were allowed to grow in the public sector through massive doses of borrowed money and India began to be burdened with foreign debt.

### **A wrong step**

The country needed foreign exchange, and that, too, quickly, to meet the grow-

ing import bill on oil and interest charges on foreign loans. Iron ore mining and export appeared the easiest way to garner the foreign exchange required as India was endowed with abundant iron ore of the highest quality lying right on surface requiring no great effort at mining. Millions and millions of tonnes of the highest grade iron ore were mined and exported in the raw state without any processing whatsoever, and a precious resource was frittered away with no thought for the future. The realization of the need to concentrate on production of steel and expand the industry came too late and the new plants had to search for iron ore supplies. The private sector, which had a raw deal within the country, had to go elsewhere to set up steel plants.

Trading in ore in the raw state at a low price and importing finished steel at enormous cost is a practice which is still continuing, with no perceptible effort at taking corrective action. Millions and millions of tonnes of valuable ore have been lost to the country by unrestricted export and the forest and agricultural land from which the resource has been extracted is laid waste. No thought was given to the rehabilitation of the local people and amelioration of their living conditions. The latest figures which the Indian Bureau of Mines has released relating to the year 2005–06 show more than 60% out of a production of 140 million tonnes of ore has been exported. Raw iron ore export is expanding instead of diminishing! The changes in mineral policy – liberalization, deregulation and amendments to Mineral Concession Rules announced more than ten years ago have not made any dent in this export trade and highest grade iron ore continues to be exported. In recent years, however, there is a sudden realization on the part of government of the necessity to promote steel production in a big way with foreign equity participation and Mittals and Tatas have been entrusted with the task of achieving a large and rapid expansion of steel production in the iron ore belt of Jharkhand and Orissa. Present production is 40 million tonnes of steel according to the National Steel Policy, it is proposed to be increased to 80 million tonnes by 2010. There is however, no sign of concrete steps being taken to achieve these targets. Meanwhile, China has forged ahead and is emerging as the single largest producer of steel with a peak production of 250 million tonnes, overtaking all other coun-

tries including Japan and USA. High prices for iron ore are being offered tempting countries like India to export their ore. Iron ore producers in India have fallen into the trap and continue to export larger and larger quantities of ore, a practice which is detrimental to the development of the indigenous steel industry in the long run.

Luckily for our country iron ore resources are adequate (over 15 billion tonnes) but this does not mean that we should continue to fritter away our resources which are needed for building indigenous steel capacity. There can be no excuse for continuing export of iron ore.

In spite of fairly perceptible industrial development, India is yet to realize that just extracting and transporting raw ore without any processing whatsoever betray a primitive, simplistic approach to country's economy. A mountain of income will grow if only the raw ore is converted in India to steel and ferro-alloys, which will return a thousand times more revenue than the meagre earnings from the export of ore in the raw state. Conversion of ore into steel and its alloys will also give scope for the flowering of new talent and contribute in no small measure to the overall prosperity of the State.

For all this to happen steps have to be initiated, mining areas to be located and planned for large-scale production. Procuring of mining lease after crossing numerous hurdles in the way by government and courts and transfer of ownership of land pose grave problems. If real progress has to be achieved, action has to be initiated with the least possible delay. The more serious problem is about the transfer of land.

### **Corporate social responsibility lacking**

The government and the corporate sector, which are serious about development are eager to acquire land belonging to the tribal and poorer people, which abound in ore at minimum cost. The corporate sector wants these people to be evicted and the land handed over to them. Neither the government nor the industry has given serious thought about the rehabilitation of the displaced people. It is the primary duty of the government of the people, by the people, for the people to ensure regular income to the displaced owners by

making them co-sharers in the prosperity which will accrue from the utilization of minerals found in their land.

We expect the government and corporate sector as a whole to take note of their societal obligations and take perceptible steps to usher in a better standard of living for the rural poor who have been deprived of their land. The picture of the tribal people of Karnataka, Jharkhand, Bengal and Orissa, driven out of their land to make room for giant steel plants does not seem to have disturbed either the government or the masters of steel making.

This insensitivity of the corporate sector in discharging its social responsibilities, turning a blind eye to rehabilitation, education, health, housing, sanitation and several other aspects of the workers' lives, who are the owners of the land rich in ore, is disturbing. This is the worst aspect of industrial growth and unless a proper solution is found and the welfare of the rural poor is given due attention, the wealth generated by the mineral will have no meaning for the people.

Archaic mining laws of the colonial era still continue to operate and rights to the mineral wealth below ground is denied to the owners of the land. In the prevailing practice governments forcefully take over the land rich in mineral resources for the industry, without imposing on them any condition to rehabilitate the displaced persons and earmark a certain percentage of the profit for displaced rightful owners of the mineral wealth. The equitable way would be to consider the landowner as a partner in the business and assure him of an annual return. The present discontent found in many parts of India will disappear when the people are convinced that the development of the industry is to their advantage by improving their living conditions and assuring them of a share in the profit.

In the present organizational set up prevailing in the country every organization, either in the public or private sector, is only robbing the poor of his only resource – his land, without at the same time taking any steps to make him also a

co-sharer in the prosperity which the industry will assuredly bring.

As the late Anil Agarwal, the eminent environmentalist, said both nationally and internationally, participation, equity and community-based national resource management system alone will lead the nations of the world towards a durable peace and development.

Governments at State and Centre cannot remain blind to the conditions of the poor who are being brazenly robbed of their only sustenance and must take steps without further delay in setting right these wrongs. If we do not do this, instead of India being a shining economy it will continue to remain poor and discontent and long suppressed anger bursting forth in different parts of the country, taking it back to the dark ages of repression and blind submission to authority. Wise state-manship is called for. Drafting mineral policies without a real indepth study of how the industry will affect the population of the region will not enable us to reach any of the goals we have set for ourselves.

There are now new opportunities opening up for the development of steel industry. Metal glasses are being produced heralding a revolution in steel making. These glasses are stated to be 7 mm in thickness and are stronger and resistant to corrosion.

In all these developments, the Indians who pioneered in the production of *wootz* steel are nowhere to be seen. Modern research should branch out into new ways and produce materials which can revolutionize the art of steel making. For this to happen the Indian scientists and artisans must first gain a better understanding of the ancient art of steel making and help establish a continuity in metallurgical skills.

Our tradition compares knowledge to an ancient *aswatha* (peepal) tree with its roots above and branches below, never dying and remaining imperishable. The old trunk is ever alive but can give rise to newer branches in perpetuity. Grafted branches from outside can flourish for a while but soon wither for lack of suste-

nance as they are not part of the tree and cannot draw sustenance from the deep rooted old tree which never dies. Knowledge should grow from its own inherent strength. Borrowed knowledge will never have this spontaneous, unbroken, imperishable and inherent power. By analogy, Indian metallurgical science should gain in strength by delving deep into history and tracing step by step development of the art. Then they will have the ability and confidence to branch out into newer ways and not be camp followers of the West for ever. They can then plan for the manufacture of newer types of steel and alloys with their myriad properties. Borrowed knowledge is like an artificial flower which cannot be compared to the real flower, which blooms and radiates its splendour year after year.

The moral of the *aswatha* tree is clear. We must not squander the mineral wealth which nature has lavished on us by merely digging up and exporting it but, instead, become masters in the production of various varieties of steel and alloys and developing all the tools required for our growing industry. A vast income will grow and the world will knock at our door seeking our quality products, as they did three thousand years ago. The steel industry has a great future. That future is assured provided we make that knowledge our own, delving deep into the history of our nation which for many centuries had specialized in the art of steel making. The wealth generated should not enrich just the fortunate few to live in luxury, but should be equally shared among the people who have parted with the land. India will shine only when all sections of society prosper, and not merely a few. A new contract will have to be forged between industry and the people to usher in a new era of prosperity.

---

*B. P. Radhakrishna lives at 243/30, Fifth Main Road, Chamaraipet, Bangalore 560 018, India.  
e-mail: kitts@bgl.vsnl.net.in*