

people. Sovereign became the slave and the servant the master. It is not out of place to mention here that when the victims of Indira Gandhi's vendetta — detenus — urged before the Supreme Court that in view of country's international obligations in the field of human rights, the law must be interpreted to prevent the Government from violating them at home, Justice M.H. Beg (who later became the Chief Justice) evoked the doctrine of domestic jurisdiction.⁴

Constitutional Amendment

To prevent such repetition additional safeguards are included in exercise of emergency powers by the recent 44th Constitutional Amendment, such as approval of the Emergency Proclamation by two-third instead of simple majority, periodic review, and making it justiciable in the court of law. Furthermore, suspension of Article 21, which guarantees that no person shall be deprived of life or liberty without the procedure established by law, is no longer permissible. It may be recalled that the Supreme Court by majority had held that in view of suspension of Article 21, no person could move a Court for his release even if his detention was not in compliance with law or was mala fide.⁵ These amendments to an extent do promote the cause of human rights.

However, under Article 359, the President has the Power to suspend all other Fundamental Rights. Is it necessary to suspend right to equality contained in Article 14 in which is enshrined the rule of law? Or right to religious freedom — Article 25; right not to be discriminated on ground of religion, caste or sex — Article 15, abolition of touchability — Article 15, prohibition of trade in human being and forced labour — Articles 23 and 24? And if Article 32, the right to Constitutional remedies for viola-

tion of Fundamental Rights is suspended, would not all these rights including Article 21 stand suspended? It is one thing to vest the executive to suspend Fundamental Rights, like right of movement or association or trade which could hamper the Government effort to protect the country in emergency. But one cannot understand why should there be a power to suspend those Fundamental Rights which have no nexus with country's security especially when they are a reflection of human rights to which this country is committed.

Constitutional Fetters

This is not all. Even in normal times all Fundamental Rights can be reduced to paper rights if an enactment or executive order violating them is put in the famous Ninth Schedule because of the provisions of Article 31-B of the Constitution. This Article vests the Parliament with blanket power to protect laws even when they violate Fundamental Rights. Although this power has been grossly abused as much as laws relating to freedom of expression or personal liberty like the Prevention of Publication of Objectionable Matters Act, MISA, COFEPOSA⁶ are put in the Ninth Schedule, the Government is reluctant to delete Article 31-B. Hence Fundamental Rights are enjoyed not so much as rights but by the grace of the ruling party of the day provided they have adequate majority to amend the constitutions to include in the Ninth Schedule any act they choose.

Another disturbing feature of the Constitution is that it sanctions preventive detention even in peacetime. To detain a person without trial is alien to civilized law. Such a law for instance the MISA has been described as "lawless laws" by the Supreme Court and Article 9 of the Human Rights Declaration prohibits arbitrary arrest and detention.

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Party, Philosophy & Discipline

WHICH is a good party? Evidently the one that is not simply a collection of individuals but is a body corporate with a distinctive purposeful existence, different from its desire to capture power. Political power should be a means rather than an end to the members of such a party. There should be devotion to a cause in the rank and file of the party. Devotion leads to dedication and discipline. Discipline does not mean simply outward conformity to certain do's and don'ts. The more you impose discipline from above the less is the internal strength of the party. Discipline is to a party what *Dharma* is to a society.

Let the different political parties try to evolve a philosophy for themselves. Let them not be mere conglomerations of persons joined together for some selfish ends. It should be something different from a commercial undertaking or a joint stock company. It is also necessary that the philosophy of the party is not kept confined to the pages of the party manifesto. Members should understand it and devote themselves to translating it into action.

The question of discipline in the rank of a

party is important not only to keep the party in perfect health but also because of its bearing on the conduct of the people in general. A government is primarily an instrument of conservation and protection and not of destruction, or change. To inculcate a reverence for law in the people demands that the parties who aspire to be guardians of law should themselves set an example in this direction. The essence of democracy is a spirit of, and capacity for, self-governance. If the parties cannot govern themselves how can they hope to create in the community a desire for self-governance? While on the one hand it is essential for the community to guarantee and protect individual freedom it is desirable, on the other hand, for the individual to willingly submit to the general will. The greater this submission the less will be the coercive power of the State. In a party whose affairs are regulated not by any state law but by the decisions voluntarily accepted by the party units, one can set an example of how best individual freedom and social responsibility can be balanced. It is, therefore, necessary for the parties to prescribe a code of conduct for their members and to strictly follow it.

— Deendayal Upadhyaya

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l Upadhyaya

D. B. Thengdi

Deendayal— India's Gift to the Bewildered*

PANDIT DEENDAYAL UPADHYAYA was a nationalist to the core. He loved not only the abstract concept of "Nation" but also the nation in flesh and blood. But his patriotism did not prevent him from being an internationalist. Rather internationalism was only the natural evolution of his enlightened nationalism. He had realised that affinity of an individual with different organisms, ranging from family to the Universe, was only an outward manifestation of the evolution of his consciousness. The more developed the consciousness, the larger and higher would be the organism with which one is identified. But this being a process of evolution, the higher level of consciousness does not preclude the previous lower levels. It is inclusive, not exclusive, in character. One can be equally and simultaneously attached to all the organisms without doing injustice to any one of them. What is needed is a realistic, an integral view of things.

Even a human being must be considered in an integrated way; the body, mind, intelligence and soul of a person must not be thought of separately.

This realisation led Deendayalji to expound his theory of "Integral Humanism", which is in direct contrast with the compartmentalised thinking of the West. The latter has given rise to strife and struggle at all levels in all departments of life. The seed, the sprout, the trunk, the branch, the leaves and the fruit constitute one single, continuous process of evolution. They are not mutually conflicting or exclusive.

In fact, Panditji's comprehension was not confined to the human species. His integralism indicated the flowering of the human consciousness into universal consciousness. That is why he was a humanist without being homocentric. Consequently he thought

that the more appropriate term for his thought-system would be "Integralism". But in view of his field of practical activity he considered the term "Integral Humanism" more convenient in the immediate context, as a compromise between his ultimate concept and the common level of understanding in the field, even as his use of the term 'ism' was, again, a similar concession to the common level of understanding which could not comprehend the grand 'ism'-lessness of the eternal *Dharma*.

He was the first political leader of the country who added yet another dimension to the traditionally defined 'nation'-concept. Every nation has its soul, its 'Chiti', he declared. The strength and energy activating the nation is its 'Virat'. It is channelised by 'Chiti'. The place of 'Virat' in the life of a nation is similar to that of 'Prana' in the body. Just as 'Prana' infuses strength in various organs of the body, refreshes the intellect, and keeps body and soul together, so also in a nation, with a strong 'Virat' alone can democracy succeed and the government be effective. "When the 'Virat' is awake, diversity does not lead to conflict, and people cooperate with each other like the various limbs of the human body, or like the members of a family."

Panditji was, again, the first political leader in post-independence era to declare unequivocally that what mankind needed most was a *Dharma-Rajya*, not merely a rule by majority. He took pains to explain how *Dharma* was different from Religion and *Dharma Rajya* from theocracy. But *Dharma* alone is supreme. State is one of the several institutions or instruments of *Dharma*; an important one, but not above *Dharma*. It is subject to *Dharma*. Sovereignty vests in *Dharma*. *Dharma* sustains the Nation. Even the Constitution must be in tune with *Dharma*. The Articles of the Constitution

violating *Dharma* must be considered null and void to that extent. Both the Legislature and the Judiciary are on an equal plane. Neither is superior to the other. *Dharma* is higher than both; both are governed by *Dharma*. The people have a right to elect their own government. But neither the government nor the people have any right to act against *Dharma*.

Panditji was a votary of 'Bharatiyata' not only because it was his national heritage. He was convinced that the maladies of humanity in general and India in particular could be remedied only on the strength of Bharatiya culture. Is it possible for the West to reconcile individual liberty with social discipline? In the materialistic West, liberty soon degenerates into licentiousness, and discipline into regimentation. The West could never conceive of basic organic unity in the midst of apparent diversities, for it mistook uniformity for unity. It could never appreciate the merit of the Bharatiya socio-economic order, for it mistook our stability for stagnation and its own adventurism for dynamism. Western thinkers could not conceive of a unitary form of government with maximum decentralisation of administrative authority, because it is beyond their comprehension that there can be set up a central state authority without statism, and with regional, industrial and civic self-governments — which has been the special characteristic of the Bharatiya social order. The West considered national self-reliance incompatible with the spirit of international co-operation. In the West, nationalism can degenerate into imperialism and internationalism into disloyalty to one's own nation. The 'integral humanism' expounded by Panditji has exposed the inadequacies, lopsidedness, imbalance and futility of the compartmentalised thought-systems of the West. His integralism enabled him to visualise the emergence of a World State enriched

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by the growth and contribution of different national cultures, and evolution of 'Manava Dharma' enriched by the perfection of all religions, including 'materialism'.

Deendayalji was a 'Drashta', a seer, not merely a philosopher. Because of his 'Sadhana', his identification with Dharma, he could, like a Time Machine, roll himself back and forth in the centuries and stand face to face with the ancient seers as well as unborn generations. He worked out for us the solutions of modern problems in the light of ancient wisdom. He foresaw and diagnosed maladies that would afflict humanity in the distant future; and prescribed for

them the remedies tested with success by 'Sanatana Dharma'.

It has been said that people without a vision perish. A nation without its 'Drashta' is doomed to decay and death. But our Dharma is Sanatana, i.e. endless as well as beginningless. It has, therefore, been the sacred mission of Bharat Mata to give birth, in every age, to Drashtas who deliver a message of hope to the otherwise frustrated mankind pursuing false ideals. In this age, Pandit Deendayal Upadhyaya has been the precious gift of this Dharma Bhumi to the bewildered.



* 25th September is the Birth anniversary of Pandit Deendayal Upadhyaya. To commemorate the auspicious occasion we publish the following writing by one of his close associates, Shri D.B. Thengdi.

R. R. Diwakar

Evolving Hinduism

"The last 150 years have demonstrated Hinduism's vitality and resilience. It is capable of change, can absorb new forces and respond creatively to them. A religion which has produced the Buddha and Gandhi need have no fears about the future."

M.N. Srinivas, Sociologist.

"Hinduism has stood up to the challenge of modern science better than any other religion. ... Hinduism emerges as an organic religion which keeps growing with the growth of religious experience and is conscious of its adherents. ... Thus it can cater to all tastes and to all levels of spirituality."

Atal Bihari Vajpayee.

TODAY Hinduism claims 500 million people out of 600, living in a vast country like India, which is their mother country, as well as the land of their religion, culture, and history for the last few thousand years. India as a nation is a free independent political entity ruling itself for the last three decades and more. The Indian people have the rare distinction of wresting their freedom in 1947 by a unique armless, non-violent fight from the clutches of the most powerful imperialistic nation ever, namely, the British, who ruled here for about two hundred years.

India has been for centuries and is even today a multi-religious, multi-lingual country. In fact, India is the home of large numbers of people belonging to all the major religions of the world and has in addition, Jains, Sikhs and Zoroastrians, who are only in India. Though Hinduism is the religion of an overwhelmingly large number of people in India (80 per cent) as stated above, the Constitution of independent India forbids any discrimination in anything on the basis of religion. The responsibility of implementing this national policy rests on all the peoples of India, so that all can live in peace and harmony for common good.

SEPTEMBER

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Obviously the subject I am dealing with is a very vast one and I can but take into consideration a few aspects of it.

Hinduism was the name given to this religion because it was the religion of the Hindus, that is people living on the banks of the river Sindhu. When foreigners entered Bharat Varsha from the north, they pronounced the name of the river as Hindu. That has stuck to the religion and has been accepted by all living in the whole of India. Even now some people would like to call this religion Sanātana Dharma, that is, eternal religion of Mānava Dharma, the Religion of Man. The name of the country is Bhārat, but India, derived from the name Hindu, has also stuck to this country.

One may well question if Hinduism is a religion in the normal sense of the term. Who is its originator, when did it begin, which is its authoritative scripture, what is its theology accepted by all Hindus, which is the ritualistic code common to all? These are difficult questions to answer. While the fundamental spiritual aim of Hinduism has been the total liberation (Moksha) of the human psyche and consciousness with a view to its supernal blissful communion with the universal cosmic Supra Consciousness, the ways and means have been allowed to be bafflingly varied, to be chosen by the aspirants according to their own natural bent of mind (Swabhāva). It is this 'inclusiveness' of ways and means in attaining the goal which has given rise to numerous descriptions and religious practices which prevent rigidity and stratification, and defeat all efforts at institutionalisation of the Hindu religion. Gandhi who, according to Nehru, was 'Hindu to the innermost depths of his being', commended this 'inclusiveness' heartily and said, "For me, Hinduism is self-sufficing; every variety of belief finds protection under its ample fold". He said, Hindu-

ism "defines man's mission on earth". It is for the same important reason that the learned author of the "Religious Experiences of the World" observes, that Hinduism is the one religion which can accommodate all beliefs without violence to its own basic tenets.

It was the rishis, the seers and saints of yore who attained the spiritual summit, namely, the realisation of total oneness of spirit, by the elevation and illumination of their own consciousness through Tapas (austere observances) and direct inner experience. The Vedas and Upanishads are the repositories of their inspired utterances embodying these experiences. They have also indicated how human beings with physical bodies, vital urges, sense hungers, and weakness for immediate pleasures can through self-control, discipline and necessary practices, free their consciousness and raise it to higher levels where spiritual light and harmony reign supreme. The attainment of communion with the Supreme Being (Sat), Supreme Consciousness (Chit) and Supreme Joy (Ananda) is then assured.

While Hinduism has always aimed at the highest spiritual goal for human consciousness, it has been realistic in recognising that man at present is a complex of body-life-mind and it is through these tools alone that a human being has to work to rise to the highest spiritual level. Control and proper functioning of the physical, vital, and mental energies is a necessary step for the elevation of consciousness. There are passages in the Upanishads which advocate a life of action and insist on paying adequate attention to worldly life. In fact, the knower of Brahma who is full of action (Kriyāvan) is declared superior to all others. The injunctions of the Isha Upanishad is that one should wish and will to live a hundred years performing his duties. So it is clear that integrated life with

control over matter by the spirit is the ideal. The twofold ideal of prosperous life (abhidaya) and spiritual attainment (nishreyas) is what is to be achieved. Though on account of the occasional emphasis on the spiritual, there have been trends sometimes of other worldliness, that is not the highest ideal held before the people by Hinduism. Even in the matter of spirituality, the finale of the evolving soul of man is not a vacuum or an indescribable negative nirvāna but a positive Sāyujya (identity) with the Supreme Spirit, the *causis causa* of all creation and manifestation, the infinite potentiality from which everything proceeds and in which everything merges.

In view of what I have said above, the dominant ethos of Hinduism can be described as integral and comprehensive, as a result of a synthesis of the forces that play in the drama of existence, the being becoming complex. The ethos is religio-secular, spirito-material and the stream of human life is to run in the perimeter of what are called the four Purushārthās — Dharma (the law), Artha (wealth), Kāma (desires) and Moksha (liberation), taking care, that Artha and Kāma are sandwiched between the ideal of Moksha to be attained, and Dharma, the Law of healthy, harmonious, peaceful, happy life. Artha and Kāma are to be used as tools and are not to be allowed to dominate life.

It may be observed that the life of the Hindus and their ethos from very ancient times through the centuries has been exposed to many currents and cross-currents on account of inner urges, environmental forces, and the people in India coming in contact with cultures of different persuasions. Being essentially non-aggressive and non-convertive, Hinduism in the course of its assimilative career and progress, has been

subject to the above forces and mainly to two other influences: the Naigamic (of the Nigam) and the Āgamic (of the Āgama). The Naigamic influence was the orthodox, Vedic, hierarchical, and Shastraic one, while the Āgamic influence which derived and leans upon Vedas and Vedānta, was from the more liberal, popular, unorthodox forces operating among the masses of people. The tenets and practices of the Āgamas are open to all, and are handed down from the *guru* to the *shishyas* (disciples). Even today while the caste hierarchy continues and Vedic lore and Shastras are supposed to be administered through the Mathādhipatis and the priestly class, there are a number of saintly persons and sadhus who claim their clientele without any caste, race, sex or age restrictions. It is the interplay of these influences which keeps Hinduism ever alive and evolving, without allowing it to be rigid so far as the spiritual life is concerned. While the caste rules may be binding in matters of orthodox ways of worship, Vedic learning, marriages and food, there is no restriction or rigidity in following the Āgamas and various kinds of yogas like Bhakti-yoga, Raja-yoga, Jnana-yoga and others. They are open to all and people belonging to all castes and creeds come together for following these yogas, and the most predominant and popular yoga is of course Bhakti-yoga.

There is one indissoluble bond between the Naigamic and Āgamic schools of thought and that is allegiance to the spirituality which dominates the Vedic and Upanishadic philosophy of life. The aim of the liberation of the soul from the shackles of material existence is common to both and to all. It is also agreed that there are several paths leading to it — Sadhanānām anekatā. It is therefore that Hinduism is not only most tolerant but it believes that people who follow other religions are also fellow-travellers. Hinduism

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accommodates all kinds of Sādhanas or spiritual and moral disciplines leading to progress in spirituality. While the person who believes in the Supreme Spirit and practises meditation to the exclusion of any other ritual is honoured, one who worships a river, or an idol as a symbol of the Supreme is as welcome, both are Hindus, to whatever caste each may belong. It is this unity in the spiritual aim and diversity in the means of attaining it which is the hallmark of Hindu catholicity.

Casteism, untouchability and other blemishes are today clogging the path of all-round progress of all Hindus in an equal degree, but they are on their way to decline and disappearance. A faith which acknowledges even stark materialism of the Charvakas (atheists) as a Darshana (a philosophy of life) welcomes in fact the whole of humanity to endeavour to rise higher in consciousness. To an atheist denying the existence of a soul or spirit, Shankarācharya said, it is present in you as 'self' which you cannot deny! They are not integral parts of basic Hindu insights for the progress of humanity. In the course of its further evolution along progressive lines, Hinduism is bound to shed all these shackles and make the way for a more shining and inspiring course towards the brighter future of mankind.

Reverting to the subject whether such a faith as Hinduism can be called a 'religion' at all as generally understood, one can only say, that the designation is not of great importance. Hinduism may as well as be said to be a faith for humanity which seeks unitive life with the Supreme Spirit of infinite power and potentiality by means of a discipline and variety of practices at once moral and elevating. It is in fact an encyclopaedic spiritual Sādhanā (discipline) system open to all

provided they believe in their own consciousness and its capacity to rise and link itself with the Supreme Consciousness, so that every breath becomes a sacrament and the whole of life, life in the Divine.

What I have said above is true of the mainstream of Hinduism and it is the result of the approach to human life as an opportunity to rise to divinity, taking the fullest possible advantage of the evolutionary urge and the possibility of transforming all the energies of man into instruments of ascent by skilful engineering, so that instead of functioning as mere physical, vital, or mental forces busy with seeking petty pleasures and fragmentary fulfilments they begin to act in unison in a harmonious combination, an orchestra playing in accompaniment to the cosmic 'Dance of Shiva', enjoying a sublime symphony of superhuman ecstasy.

The course of the evolution of Hinduism however clogged and slow as certain anti-evolutionary forces which are but part of the game are coming in the way of responding to just and fair socio-economic concepts which though inherent in the spiritual approach (Vishwa-Kutumba) and mentioned in ancient texts, have not found realisation in everyday life. The hierarchical caste system, feudalistic ways which came into being, perhaps for historical reasons, the not very happy attitude towards women are all anachronisms in a twentieth century Hinduism. Though a brave attempt has been made long ago, it has yet to ripen into a universal revolution which can wipe off the blemishes and remove hurdles in the way of a total and quick advance.

There are a few other challenges posed by poverty, by other aggressive systems of religion, and purely atheistic and materialistic approaches to life which our religious

people ought to encounter. Neglecting them as being out of bounds for religious consideration would be a grave mistake as they would erode religious life itself. Then the word would go round that Hinduism which claims to cater to welfare here as well as hereafter, to prosperity as well as to liberation of the spirit, is no longer a comprehensive integrated philosophy and a universal system of life and living.

It is only when those who think and speak in terms of Hinduism and care for not merely preserving the values but in making them living instruments of all-round progress and advance, take to work out necessary changes, that Hinduism will be able, not only to live healthily and brightly but will also serve as a model of a dynamic, living, evolving faith which can contribute to the world effort of humanity to march divinity on earth.

Having made a few observations on the

vitality and evolving capacity of Hinduism, at the same time pointing out how necessary it is to wipe out the blemishes which are plaguing present-day Hinduism, I may as well round up this small article by a quotation from the writings of Nirad C. Choudhury, a severe critic of the Hindus :

"They (Hindus) are the masters and rulers. They have regained political power after many centuries and are fully aware of it, perhaps over-aware. They are also the only source of energy for the country considered as a human machine; it is their desires and aspirations which are keeping it running. No other element counts.

"The Hindu character has been the most decisive determining influence on the historical process."

'The Continent of Circe'
(Well known Gandhian and a reputed writer,
Bangalore)

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India and Early West

BY THE seventh millennium B.C., man had begun to settle along areas watered by rainfall, rivers that did not freeze over, and inland lakes. He began cultivating the land and raising domestic animals whilst living in relative harmony with his kind. And the first signs of civilization emerged in the territories stretching westward from the Indus Valley to the Atlantic across western Asia, along the North African shore, and eastward to the Yangtze Valley. In these areas well-organised village life soon developed. Improved agricultural techniques and growing stability led to a closer social organisation in which each individual surrendered part of his freedom for the collective gain. As time passed large cities emerged with all the complexities of urban civilization. The earliest known civilizations were founded almost contemporaneously in India, Egypt, and Mesopotamia.

Unsurpassed Vitality of Hindu Civilization

Whilst other ancient civilizations have long ceased to exist, Indian civilization has continued to grow despite revolutionary changes. The ancient cultures of Egypt, Mesopotamia, and Persia have not survived and their present cultures no longer form an unbroken chain linking past with present. Modern Egyptians, for example, are almost completely dissociated from the civilization which flourished on the Nile thousands of years ago. But in India today, Hindus seek inspiration from concepts similar to those originally advanced by their ancestors. Social institutions and relationships, language and literature, are far more continuous than even those of Greece and Italy. The antiquity of Indian civilization may in itself be a doubtful virtue, but the fact that it has survived would imply an extraordinary vitality and self-perpetuating quality surpassed nowhere and only approximately matched by Chinese civilization.

Indian contacts with the Western world date back to pre-historic times. Trade relations, preceded by the migration of peoples, inevitably developed into cultural relations. This view is not only amply supported by both philological and archaeological evidence, but by a vast body of corroborative literary evidence as well: Vedic literature and the Jatakas, Jewish chronicles, and the accounts of Greek historians all suggest contact between India and the West.

It is only during the past few decades that the pre-history of Asia has come to be studied seriously. The skeletal evidence of the archaeological excavations made thus far reveals that the earliest traces of farming communities in the Indian sub-continent are to be found in the area contiguous to Sind, on the western bank of the lower reaches of the Indus river. The region is arid at present but there are indications — for example, stone-built dams erected to control floods — of greater rainfalls in the third millennium B.C. and of a jungle fauna including tigers, elephants, and rhinoceroses. Several distinct varieties of wheel-turned pottery — differing in colour and the character of painted designs — have been found in the region. Too little is known about these antecedent stages of human settlement in the Indus Valley from which emerged the earliest known civilization of India: the Harappan civilization which flourished around 2500 B.C. In this period great cities existed with well-planned houses (equipped with baths, chutes, sanitary arrangements), citadels, communal granaries, highly developed drainage systems and dockyards. There was an organized city government and a settled society. This advanced urban civilization represented an exceptional adjustment of human life to a specific environment.

Whilst the exact area and period of the

Harappan or Indus civilization have yet to be firmly fixed, it is now accepted that it extended east and southward far beyond the Indus Valley and that it was certainly contemporary with the other earliest known civilizations: Egypt and Mesopotamia where two non-Aryan races, the Sumerians and Semites, created amazing civilizations. Geographically, the Harappan civilization was probably twice the size of the old kingdom of Egypt and four times the size of Sumer and Akkad. The main settlements of Harappa, Mohenjodaro, and Lothal are considerable distances from each other. Mohenjodaro on the lower Indus river and Harappa on the Ravi river were separated by over three hundred and fifty miles. The smaller township trading centres and farming communities occupied a much more extensive area. Archaeological excavations of the last decade have resulted in a considerable extension of what were formerly believed to be the boundaries of the Harappan civilization to now include areas of Uttar Pradesh, north Rajasthan and Gujarat. The Harappan civilization, therefore, occupied an area stretching almost from Delhi to Bombay.

Direct Contacts

Although these ancient civilizations were largely independent entities, the fact that direct contacts between them existed is supported by concrete evidence, mainly in the form of small objects of value. A number of seals of Indus Valley design and workmanship have been found at various sites in the Euphrates and Tigris areas. Close scrutiny of the seals found in Mesopotamia and a comparison with seals from various regions of western Asia positively indicate that they were either manufactured in the Indus cities or were close copies of Indus types.¹ The form of writing used in the Indus Valley, still to be deciphered,

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resembles in many respects those used in Sumer and Egypt. This script is pictographic in character and, insofar as it has survived, is almost exclusively engraved on seals in the form of texts, some of which are accompanied by pictures of animals. The paucity of the known inscriptions, the absence of long texts in Indus characters, and the variety and multiplicity of the signs employed have made decipherment impossible so far, although several scholars claim to have discovered a clue to the Indus script. Hopefully more knowledge of the cultural and commercial intercourse between these civilizations will be available once these seals are adequately deciphered. However, it is not unlikely that the seals may be found to contain nothing of great importance.

Characters similar to those on the Indus seals have also been found on tablets excavated from Easter Island. This discovery has presented a difficult problem for the prehistorian. It is not known if the two belong to a common source, if one provided the model for the other, or if the similarity is purely accidental due to inaccuracies of drawing. If the Indus models travelled about thirteen thousand miles eastward, it seems strange that the characters should have remained unaltered, because figures generally do not remain identical during prolonged transmission. And, if the seals were actually made in the Indus Valley and taken to Easter Island, what is the explanation for the differences in arrangement between the two groups of seals? The Easter Island tablets have a boustrophedon arrangement — the alternate rows are upside down — which has not been discovered in the Indus seals so far. Furthermore, the Easter Island tablets are made of local or drift wood. Still the parallel characters are close enough to suggest contact.

Evidence of Indian contact with the ancient

civilizations to her west, however, is certain. Knobbed pottery vases came to Sumer from India and so did cotton. The historical origins of cotton are somewhat uncertain, but the antiquity of the Indian cotton trade is undoubted. In the Akkadian tongue, Indian cotton was expressed by ideographs meaning "vegetable cloth". Assurbanipal (668-626 B.C.) cultivated Indian plants including the "wool-bearing trees" of India. When the Greeks first saw Indians, the latter were dressed in "wool grown on trees". Herodotus mentions Indian cotton, and the first account of cotton grown outside the western boundaries of India was given in 350 B.C. by Theophrastus, who described the "wool-bearing trees" of Tylee (Bahrein), stating that cotton was cultivated in India as well.² When perennial cotton plants — originally native only to India — were first grown in western Asia is a matter of conjecture, but "since there is known to have been contact between Mohenjodaro and contemporary civilizations in Babylonia, it seems likely that the cottons of the Indus Valley were distributed along the Persian coast and as far up the Persian Gulf as perennials could be successfully grown."³

Commercial intercourse between the Indus and the Tigris-Euphrates civilizations is also demonstrated by the Harappan manufactures found in Mesopotamia. Semi-precious stones, such as amazonite, came from Gujarat or even the Nilgiri Hills; foodstuffs and metal from Rajasthan or Baluchistan; and shank shell from southern India. All these reached Mesopotamia during the last half of the third millennium B.C. Indeed, a colony of Indus merchants may well have settled in a Sumerian city. On the other hand, a white marble seal, an adze, pottery rings, and horned figures are some of the items imported from Sumer into the Indus region. Furthermore, some of the numerous naturalistic figurines of baked clay found in

Indus cities depict persons of distinctly Mongolian features. Archaeological researchers have also brought to light Indus remains, belonging to 2000 B.C.-1000 B.C., in Southern Turkmenia in Soviet Central Asia.

In Southern Afghanistan, French excavators have discovered remains of huge granaries, akin to those of Harappa, and a great mud-brick building belonging to the third millennium B.C., with a facade of half-columns suggestive of Mesopotamia. The full implications of these remains, insofar as they throw light on international contact, have yet to be properly assessed, but their discovery has led Sir Leonard Woolley to suggest, as an explanation of the similarities between the Indus and Sumerian civilizations, that the people of Sumer were newcomers from the East who had brought their arts and crafts with them, and that both peoples probably had a common origin.⁴

India and Egypt

Indirect contact between ancient India and Egypt through Mesopotamia is generally admitted, but evidence of a direct relationship between the two is at best fragmentary and inconclusive. There are elements in the folk art, language, and rural culture of Bengal which have an affinity with their Egyptian counterparts and which have not been explained satisfactorily in terms of Aryan, Mongolian, or Dravidian influences. There are also similarities between place names in Bengal and Egypt,⁵ and recently an Egyptian scholar, El Mansouri, has pointed out that in both Egypt and India the worship of cow, sun, snake, and river was common. These and other resemblances — such as a likeness between certain pottery ornaments of Mohenjodaro and those of Egypt, between the Indus script and the Elamite script, between the caste system of

India and a similar classification in ancient Egypt — are attributed to "ties of common Dravidian and Aryan blood". Furthermore, the Indian gods, Siva, Vishnu, and Brahma, are likened to the solar gods of Egypt; as are Iswara to Osiris; Nandi to Apis; and Hanuman to Cynocephalus. Both in India and Egypt the lotus flower, too, was held sacred.

Of all the Egyptian objects and motifs indicating some contact between India and Egypt during the Indus Valley period, "the cord pattern occurring in a copper tablet in the Indus Valley and on three Egyptian seals is the most striking link between the two countries."⁶ Indian products were certainly known since indigo, muslin and tamarind, for example, have been found in Egyptian tombs, and ebony, ivory, sandalwood, and cotton goods reached Egypt from India in the second millennium B.C.

Whether direct or through Mesopotamia, there is "concrete evidence of a network of trade linking up the whole area from the Tigris to the Indus and the Oxus and its extension west of the Euphrates as far as the Nile."⁷ International trade on such a scale presupposes efficient organization and attractive profits. Trade was mainly overland, but the discovery of Indus-like seals in Bahrein in the Persian Gulf, the dockyard at Lothal in Gujarat, and a steatite seal at Lothal with two jumping gazelles flanking a two-headed dragon suggest that maritime trade existed as well. Flourishing commercial traffic naturally involved the movement of people. Skilled artisans travelled freely and settled wherever they found a demand for their skills. Agencies and depots must have been established for the collection and storage of freight and cargo. Trade always encourages the pooling of human experience and in the ancient world it was perhaps a more potent agency in the

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diffusion of culture than it is today. City life, cultivation of cereals, domestication of cattle and sheep, metallurgy, a textile industry, the manufacture of bricks and pots, and the drilling of hard stones for beads were some of the common features of these early civilizations. It cannot be stated with any certainty where these inventions originated, but their dissemination must have been due to mutual borrowing.

The Oriental Institute near Baghdad excavated at Tell Agrab a green steatite vase of typical Sumerian workmanship, portraying a humped bull in front of a manger. As the vase depicts a characteristic scene of an Indus cult, it is clear that by the middle of the third millennium B.C., an Indian cult was already being practised in Mesopotamia. As in modern times, ancient foreigners demanded the comforts of their religion in a strange country, and this led to the transmission of cults and general religion dissemination. Since Indus manufactures were imported to Sumer and Akkad, and Indus cults were certainly known and possibly celebrated there, the Indus culture must have made contributions, however slight or obscure, to the traditions inherited by Europe from Sumer and Babylonia. Archaeology thus has shown that two thousand years before the earliest references in cuneiform texts to contact with India, she was sending her manufactures to the land where the roots of western civilization lie. "In other words", as Gordon Childe puts it, "in the third millennium B.C. India was already in a position to contribute to the building up of the cultural tradition that constitutes our spiritual heritage as she notoriously has done since the time of Alexander."⁸

In both western Asia and the Indus Valley men wore a long beard, shaved their upper

lip, and kept their hair very long. The swastika and cross were their religious and magical symbols. The demonolatory of Babylonia with its malignant serpents came to be known in India, and their Babylonian names were preserved in the *Atharva Veda*. The serpent Taimata against whom the *Atharva Veda* prescribes a charm, and who bears a non-Sanskrit name, appears to resemble closely the Assyrian dragon Taimat. Both in India and Babylonia, physical and mental abnormalities were attributed to demons, and in both regions several powerful demons were believed to cause certain cosmic disturbances. Also fire was the messenger between gods and men in Babylonia as in India. Amongst the other striking similarities between the two cultures are the organization of society into cities; the use of picture signs for writing; and the continued but sparing use of stone, along with copper and bronze, for the manufacture of weapons, tools and vessels.

Despite these similarities, the Egyptian, Mesopotamian, and Indus civilizations undeniably developed in their own independent ways and assumed distinct personalities. Their tools, weapons, and vessels have different forms, and the symbols of their scripts differ. The Indus civilization itself was thoroughly individual, deeply rooted in Indian soil, and was already forming the basis of modern Indian culture.⁹

The civilizations of Egypt and Mesopotamia were attacked, destroyed, and were replaced from about 2000 B.C. by successive military empires which dominated western Asia. At about the same time the Indus civilization was also destroyed.

During the second millennium B.C. the continuous area of civilization extended from the alluvial valleys to cover most of

western Asia and India, with an outpost as far distant as China. The political history of Mesopotamia, however, for the two thousand years before it came under Persian domination, is full of military conflict. Information concerning Indian contacts with the West during this, the later Indus, period is not precise, although documents from Babylonia and Asia Minor testify to some interchange. Recently, in the Babylonian texts of the kings of Akkad and in lexical texts, Leemans has identified two names, Magan or Makkan and Meluhha, with Makran in Baluchistan and with western India respectively.¹⁰ The names of kings recorded in the Kassite documents (ca. 1760-1600 B.C.) recall Indo-Aryan deities. It was the Kassites who introduced into Babylonia the use of the horse for drawing chariots, and the late Babylonian name for a horse, *Susu*, seems to be derived from the Sanskrit *asva*.¹¹ The Kassites, who ruled for several centuries after 1800 B.C., and who were probably not entirely of Indo-European stock, appear to have borrowed some of their gods from the Aryans, for example *Surias* (Sanskrit *Surya*, Sun god), *Maruttas* (Sanskrit *Marut*, wind god), *Bugas* (Sanskrit *Bhaga*), *Simalia* (Sanskrit *Himalaya*), *Dakas* (Sanskrit *Daksa*, a star god).

The kings of Mittani on the Upper Euphrates, of the fifteenth or sixteenth century B.C., frequently bore Aryan names, such as *Ariatama*, *Sutarna*, and *Dusratta*, and they worshipped the Vedic gods, *Mitra*, *Varuna* (u-ru-v-na), *Indra* (in-da-ra), and the twins *Nasatya* (na-sa-at-ti-i-ia), an alternative name for the *Asvins*, all of whose names are found in their cuneiform inscriptions. In 1907 Hugo Winckler startled the academic world by identifying four of the numerous gods mentioned in a treaty signed between the kings of Mittani and the Hittites in 1360 B.C. with those already known in Vedic literature.

Common Cultural Heritage

A fragmentary handbook on chariot racing found in the documents at Boghaz Koi, the Hittite capital in Asia Minor, further endorses the Indo-Europeans' common cultural heritage. Many of the technical terms used for so many circuits of the course are very close to Sanskrit. For example, *aikavartanna*, *teravartanna*, *panzavartanna*, *shattavartanna*, are used for one, three, five, and seven laps of the race. In Sanskrit, *varianam* means a turning. In discussing the Hittite deities, the Bull god and the Mother goddess, Garstang is most arrested by "the obvious parallelism with the symbolism and the ritual of the Indian god Siva, a result for which, however surprising, we are prepared by the inclusion of *Mitra*, *Varuna*, and *Indra* among the deities of Mittani."¹² The *Marianna* class of warriors among the Mittani is reminiscent of the Vedic *Marya*, "the heroes". Numerals and other words of Aryan origin have also been identified in Mittanic texts. During the same period the Tell-el-Amarna tablets mention Aryan princes, such as Biridaswa of Yenoam and Suwardata of Keilah, in Syria and Palestine. The language of the Mittanis was not Indo-European, and although the Anatolian Hittites were mainly of Indo-European stock, having emigrated from the Araxes Valley sometime in the third millennium B.C., their subjects were non-Aryan Asians and it was the native language, the Babylonian script, and the local gods which the Hittites adopted. The numerals and divine and personal names referred to are actually the oldest specimens of any Aryan speech known to scholars and, significantly, they are in this form very nearly pure Indian, being much more akin to Sanskrit than to any Iranian dialects.¹³

The Phoenicians of the Levant, important in the ancient world as traders, explorers,

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and craftsmen, were also in contact with India.¹⁴ The Phoenicians were immigrants to Syria from the Persian Gulf. They set up harbour towns and guarded them jealously throughout their history. The Phoenicians were possibly the most adventurous and skilled tradesmen of the ancient world, and their trade with India was profitable and lucrative. Although their territory was neither large nor fertile, their commerce made them rich and powerful. According to Jewish chronicles, as early as 975 B.C. Hiram, the King of Tyre, acting jointly with Solomon of Judah, demanded triennially a fleet to bring ivory, apes, peacocks, almug or albug trees, and precious stones from the port of Ophir. This may have been a port on the western Indian coast — there continues to be much speculation about its location — as the objects imported were unmistakably of Indian origin. Ophir was so famous for its gold that the expression "gold of Ophir" became proverbial in Hebrew.

The sources for ivory in ancient times were Syria, the Sudan, Somaliland, and India. The Phoenicians, who first seem to have imported it from Syria, found this source exhausted by the eighth century B.C. It was then that they turned their attention to India as a fresh source of supply and organized expeditions for that purpose.¹⁵ Logs of Indian teak have been found in the Temple of the Moon at Mugheir built during the sixth century B.C. under the Chaldean Empire, and in the palace of Nebuchadnezzar (604-562 B.C.), who raised Babylonia to a new epoch of greatness. In addition to ivory, the Indians also exported at this time various kinds of birds and beasts (including the valuable Sind horses), cotton goods, gold, silver, and jewels. The Arab traders originally brought rice to Europe from the south Indian ports. Other Indian articles reaching the West from these ports at

different times included cinnamon, ginger, pepper, and beryl.

Some of the articles of commerce mentioned in the Jewish annals bear names of Indian origin. For instance, *Kophu* (ape) in Hebrew, is *kapi* in Sanskrit; *eleph* (ivory) in Hebrew, is *ibha* in Sanskrit; and the Hebrew *almug* (sandalwood) is probably from the Sanskrit *Valgu*. In tracing similarities in literature, scholars, moreover, have noted the curious resemblance between the Maha-Ummagga Jataka¹⁶ and the story of the judgement of Solomon.

During the reign of Solomon (973-933 B.C.) the position of Palestine, situated in easily accessible proximity to India, western Asia, and Africa, became much clearer than before. Solomon's father, David, during his campaigns, had occupied Ezion-Gaber on the Gulf of Akabah, Solomon retained this position Ezion-Gaber, or the neighbouring port of Elath, was the point of embarkation for India and the Far East, and "he who possessed it and Palestine commanded the bridge which joined three continents."¹⁷ After the death of Solomon, the Persian Gulf became the chief trade route between India and Asia Minor.

The recent finding in 1963 of a round stone-seal from Pandu Rajar Dhibi in Bengal and the identification of its script and pictographs with the Phaistos pictographs and "Linear A" scripts point to the possibility that the Indians of Bengal were in trading contact with the inhabitants of Crete during the second half of the second millennium B.C.¹⁸

There is considerable evidence to suggest that the ancient Indians were accomplished sailors and enterprising merchants. Allusions to Indian ships and seafaring activities

in the Vedic and Buddhist literatures are numerous and extensive. The *Baveru Jataka* (no. 339) describes periodic voyages of Indian merchants to the kingdom of Baveru. Scholars equate this kingdom with Babylon, which had become a commercial metropolis after the overthrow of the Assyrian Empire in 606 B.C. The crowded marketplaces of Babylon were filled with merchants from distant lands —Phoenicians, Ionians, and Indians amongst them. References to ships holding seven hundred people are found in *Jataka* stories. These stories may exaggerate but there is no doubt that Indian seamen built ships larger than those usually employed, even at a much later date, in the Mediterranean.

Assyrian and Babylonian influence on India during the prehistoric and early historic periods must have been significant, although the nature and extent of this influence are very obscure. Bühler suggests that the Brahmi script used in Asokan inscriptions—the parent stock from which all Indian alphabets have been derived—was borrowed from Semitic sources, probably in the seventh century B.C. Other scholars such as

Rawlinson, find Bühler's arguments somewhat unsatisfactory. It has been generally held that the Brahmi script was derived from a foreign source, although there are wide disagreements as to the identity of that source. Since the discovery of the seals at Mohenjodaro, however, scholars have begun speculating on the possibility that this alphabet may have developed from an earlier ideographic form of writing used in the Indus Valley itself. Therefore, judgement must be suspended until the writing is deciphered. Excavations in the Indus Valley have already led to a revision of the earlier view that Indian art had originated from a foreign source not much earlier than the third century B.C., and additional investigation may well lead to further reconsiderations. The influence, too, of Babylonian mythology on Indian literature, and of Chaldean astronomy on Indian scientific thought, has been suggested and disputed. What is not disputed is the contact.

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FOOTNOTES

1. V. Gordon Childe, *New Light on the Most Ancient East*, p. 169.
2. Herodotus, *The Histories*, III, 106.
3. J.B. Hutchinson, R.C. Silow, and S.G. Stephens, *The Evolution of Gossypium*, p. 88.
4. Jacquetta Hawkes and Sir Leonard Woolley, *History of Mankind*, I, 396.
5. Two scholars, S.K. Ray, an Indian, and E.I. Mansouri, an Egyptian, have pointed out striking similarities between the cultures of these two areas and have suggested, in independent studies, a historic and close relationship between ancient Egypt and prehistoric India, especially Bengal. S.K. Ray, "Prehistoric India and Ancient Egypt"; and S.M. E.I. Mansouri, *Art-Culture of India and Egypt*.
6. A.L. Pusalkar, *Cultural Heritage of India*, I, p. 155.
7. Childe, *New Light on the Most Ancient East*, p. 170.
8. Childe, *Indo-European, Convergence and Borrowing*, p. 19.
9. Childe, *New Light on the Most Ancient East*, pp. 183-84.
10. H.D. Sankalia, *Indian Archaeology Today*, p. 69.
11. Pusalkar, *Cultural Heritage of India*, I, p. 148.
12. John Garstang, *The Hittite Empire*, p. 205.
13. V. Gordon Childe, *The Aryans*, p. 19. The precise manner in which the kings of Mittani and the Vedic Aryans were connected will remain obscure until further inscriptions are brought to light through archaeological excavations.

14. Although the Phoenicians had the knowledge available in the Punic, city has Sidon and Tyre, excavations, however, in Sicily.
15. The Indian origin from the collection of importing ivory from Arabia, ivory from camel. The case of in the Persian Gulf Oriental Ivories."
16. *Aha-Umagga Jataka*.
17. Cecil Roth, *A Short History of India*.
18. See Michael Riddle.

Substantial section of the elites (64 per cent) now believe that the parties are symmetrical in interests. Both Government and the people of Indian people do so in more or less as their Hinduism is also a religion about the future.

84.4 per cent of the elites are locally dissatisfied with the culture in India. The non-elites are poor.

14. Although the Phoenicians have left a rich legacy of ancient west Asian lore to the West, such as the alphabet, the knowledge available about them, as compared to the Romans or the Greeks, is scanty. No Phoenician, or Punic, city has been resurrected which could give an overall picture of their ancient life. The sites of Sidon and Tyre, much destroyed and repeatedly rebuilt, may yet yield rich rewards. Potentially fruitful excavations, however, including underwater work, are now under way at the site called Motya, near Marsala in Sicily.
15. The Indian origin of ivory has been confirmed in recent years by the fact that some specimens of ivory from the collection of Nimzud have been recognised to be of Indian material. The Phoenicians were importing ivory from Dedan, in North Arabia, by the sixth century B.C. As there were no elephants in Arabia, ivory must have been imported from India or Somaliland by sea and thence across Arabia by camel. The case for its Indian origin is reinforced by the discovery of several pieces of ivory at Bahrain in the Persian Gulf, probably of the sixth or seventh century B.C. See G.E. Bean, "Early Greek and Oriental Ivories", *Journal of Hellenic Studies*, LXVIII (1948) 1.
16. *Aha-Umagga Jataka*, no. 546.
17. Cecil Roth, *A Short History of the Jewish People*, p. 21.
18. See Michael Ridley, *The Seal of Aetia and the Minon Scripts*.



Muslim Thinking

Substantial segments of the Muslim elites (64 per cent) and non-elites (57 per cent) now believe that non-Muslim political parties are sympathetic to Muslim needs and interests. Both groups also perceive that the Government is contributing to the welfare of Indian people including Muslims and it does so in more or less the same proportion as their Hindu counterparts. Such a similarity is also seen in their sanguine expectations about the progress of the country in the future.

84.4 per cent of the non-elites and 92.6 per cent of the elites among Muslims are politically dissatisfied as they find a threat to their culture in India whereas 38 per cent among the non-elites and 40.9 per cent among the elites are politically satisfied.

Almost half of the Muslim non-elites think that the Muslims should have their own party—The Muslim Elite. The Muslim elites, however, do not hold this view, only one out of three among them want a separate Muslim party. But the Muslim elites are more unhappy than the non-elites on the issue of adequate Muslim representation. As against 37 per cent among the non-elites who believe that the present system does not provide fair representation to the Muslims the percentage among the Muslim elites holding this view is 67 per cent. However, among both groups, those dissatisfied in this regard want reservation of seats as the corrective for the situation.

Seminar (July, 1979)

N. M. Ghatate

Human Rights and Sovereignty

THE promotion and protection of human rights has been an important plank of India's foreign policy. It has acquired a new dimension after a traumatic experience of Indira Gandhi's Emergency when human rights, which were taken for granted in India, were trampled with impunity. In spite of international covenant and constitutional guarantees, millions of people all over the world are either actually denied or can be denied even basic human rights such as equality before law, freedom from arbitrary arrest or inhuman punishment and treatment behind bars. The record of the UN and the International Community is hardly heartening. It thus becomes necessary to examine the obstacles and loopholes which thwart the timeless urge of man to live with dignity and without fear.

Charter Obligations

Appalled by the Nazi atrocities and brutalities of the Second World War, the framers of the United Nations Charter attached high importance to the promotion and protection of human rights and fundamental freedoms. Seeking co-operation for ensuring respect and promotion of human rights is made one of the chief activities of UN and the Charter reminds its members of this duty more than any other duty. Besides the repeated use of the word "shall" in the Charter, which in legal parlance acquires mandatory character, put the UN and its members under a legal obligation to respect and promote human rights. Furthermore, Article 56 in Chapter VII of the Charter permits unilateral or joint sanctions against a country violating human rights.

Although there is not a shadow of doubt that the acceptance of the Charter involves a positive commitment by the member states to the recognition and advancement of human rights, the progress made in this

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direction is not the biggest hurdle hampering, if UN efforts to the doctrine of clause 7 of states:

Nothing shall authorise the UN to intervene in the internal affairs of any state or to submit such a matter to the present or future tribunals shall not be a basis for enforcement of the Charter.

This clause of the Charter shall not be a basis for their obligation to the UN. It has been used by the UN to justify its intervention in the internal affairs of states. The Union of Soviet Socialist Republics, stating that the Charter embodied in it the principle of self-determination, protected by the Charter, therefore, necessary concept of

Domestic Jurisdiction

It implies that the UN has no right to interfere in the internal affairs of states. Both the UN and its members are recognised by the Charter as sovereign states. The feeling of sovereignty is a sensitive issue in international relations.

direction is not very satisfactory. The single biggest hurdle which has been greatly hampering, if not completely blocking the UN efforts in this field is the famous doctrine of domestic jurisdiction found in clause 7 of Article 2 of the Charter. It states:

Nothing contained in the present Charter shall authorise the United Nations to intervene in matters which are essentially within the domestic jurisdiction of any state or shall require the members to submit such matters to settlement under the present Charter; but this principle shall not prejudice the application of enforcement measures under Chapter VII.

This clause has become a convenient mechanism for countries seeking to escape their obligations under the Charter; and it has been used more often in relation to human rights than to any other subjects. The Union of South Africa is on record for stating that its policy of racial segregation embodied in the doctrine of *apartheid* is protected by the Charter itself. It is, therefore, necessary to understand what does the concept of domestic jurisdiction mean.

Domestic Jurisdiction

It implies that every country is the master of its own house. It is an internal manifestation of the doctrine of national sovereignty, the external being the equality among the states. Both these concepts, which are recognised by international law, express themselves in and constantly condition international affairs. Countries operating in the international system, where community feeling is still lacking, are naturally ultra-sensitive to any attempt to whittle their sovereignty in domestic affairs. However,

the doctrine of domestic jurisdiction itself is not a static doctrine.

Whether an exercise of certain sovereign power, is a matter of domestic jurisdiction or not depends upon state of interdependence and country's international obligations. In the opinion of the Permanent Court of International Justice, it is "a relative question, it depends, upon the development of international relation". If one inevitable result of increasing interdependence among states is erosion of national sovereignty, the other is the steady contradiction of the ambit of domestic jurisdiction.

The UN and the League of Nations

The best example is the compassion of the phraseology of the domestic jurisdiction clause as expressed in Article 15 : 8 of the Covenant of the League of Nations and in Article 2(7) of the Charter of the United Nations. The phrase "solely within the domestic jurisdiction" found in the Covenant was substituted by a slightly liberal phrase "essentially within the domestic jurisdiction" when twenty-five years later countries drafted the Charter. Furthermore, whereas the League of Nations was not even prepared to make recommendations on the question of domestic jurisdiction, the United Nations has accepted its obligation to intervene in domestic matters should such matters be a threat to peace.

The use of the adjective "essentially" in Article 2(7) means that the Charter does not authorise intervention in matters which are "essentially" internal or domestic matters of a country. In other words, intervention is NOT ruled out unless they are *essentially* domestic in their character.

The central question therefore is, can the violation of human rights be regarded as

essentially a domestic matter of a country or is it a subject of international concern. To put it differently — Is a country today sovereign to treat its subjects anyway they like?

International Obligations

Apart from obligations under the UN Charter, there are scores of UN resolutions and multinational conventions and treaties such as Universal Declaration of Human Rights, 1948, the Nuremberg Principles, the Genocide Convention, the International Conventions on Civil and Political Rights, and Economic Social and Cultural Rights, and Rights of Prisoners, and International Convention on Elimination of All Forms of Radical Discrimination which have drastically limited national sovereignty in the field of human rights. And today, no country whether it is a monarchy or a republic, democratic or dictatorial, self-governing or non-self-governing can escape international accountability for violation of human rights. The Nuremberg Principles, which were unanimously accepted by the UN pins responsibility on individual for crimes against humanity. Accordingly, any official, howsoever high he may be, can be condemned as an international criminal, provided choice was available to him, if "he applies laws which are in violation of laws of humanity, or if he prosecutes groups or persons whose rights are recognised by most civilised nations."²

Thus today the doctrine of domestic jurisdiction just does not hold water when it comes to human rights. It has become the subject of international jurisdiction, commanding every country not only to promote and protect human rights within their jurisdiction but also ensure their implementation abroad by taking necessary

steps including intervention against an offending country.

India's Role

No doubt in international affairs India has a glorious record of championing the cause of human rights. Ours was the first country to raise her voice against *apartheid* and that too even before we became independent. Time and again India has condemned countries for not respecting human rights, or using lawless laws for executing, or detaining unfortunate victims of racist governments of Africa. She has not only supported the UN sanctions against these racist regimes but is also seeking international co-operation to impose more severe sanctions and has not hesitated to criticize the countries who are directly or indirectly supporting these regimes. But this is only one side — the external side — of the coin. What about the other side — our domestic front?

Just as sovereignty is an external manifestation of equality amongst nations, democracy with a republican system, which India has, is an internal ensurance against inequality. This is further reinforced by grant of fundamental rights with impartial judiciary to protect them against their violation not only by the executive but also by transient legislative majority. These fundamental rights, which are described as the soul of our Constitution, incorporate almost all the basic rights found in the Universal Declaration of Human Rights.³ One could scarcely imagine total deprivation of freedom and subversion of the Constitution was possible. But this happened during the 1975 — Emergency and that too by abuse rather than use of the constitutional process. Fundamental rights became paper rights, and institutions the Constitution established to check the executive failed to protect the

No democratic country worth its salt retains this drastic power except in emergency,⁷ and is it not ironical that source of this draconian power is found in that chapter of the Constitution which guarantees fundamental rights? Moreover, a valuable right to consult and engage a lawyer of his choice is guaranteed to a person facing trial, but to a person who is detained without trial this right is not available.⁸

Legal Obstacles

It is not possible here to examine all the laws which impede implementation of human rights. But some illustrations are given to underscore the need to have a second look at our laws. Section 46 of the Prison Act, which British framed in 1896, provides for inhuman punishment like whipping, penal diet, coarse clothing and imposition of iron fetters of different type and weight which restricts natural movement.⁹ Many prisoners are subjected to this degrading treatment even today, although Rule 31 of the UN Standard Minimum Rules for the Treatment of Prisoners — which India supported — completely prohibits any corporal, cruel, inhuman and degrading punishment; and Rule 33 specifically says "Instruments of restraints, such as handcuffs, chains, irons — shall never be used as punishment."¹⁰ This Rule also prohibits use of mechanical restraints as precaution against escape when prisoners are taken out of jails to courts, and Rule 45 require that prisoners shall not be exposed to public view as far as possible and they should be protected from curiosity and publicity in any form.¹¹ Yet we find hundreds of prisoners even undertrials are daily paraded in handcuffs before the public with a total disregard to the effect such a humiliating condition would have on the mind of the prisoners who may even be innocent.

Capital Punishment

Then there is the death penalty and the plight of undertrials about which much is being written. But the fact is that hundreds of undertrials still loiter in jail for a longer period than maximum punishment that could be given to them even if found guilty, and the capital punishment is still on the statute book of Gandhi's non-violent India despite the UN recommendation to the contrary.

It is pertinent to note that the International Executive Committee of Amnesty International in its recent memorandum of April 8, 1979 to the UN Secretary General to convene an emergency meeting of the UN Security Council under Article 99 of the Charter to halt execution and political killings has stated:

"We unequivocally condemn each killing as denial of the purpose of the United Nations Charter and violation of human rights and fundamental freedom proclaimed in the Universal Declaration of Human Rights."¹²

Supreme Court

The judiciary, however, has done a distinctive service in promoting the cause of human rights. Through interpretation, it has humanized laws, and has even enlarged their scope to bestow rights which are found in the Declaration of Human Rights but not spelt out in domestic laws. Section 56 of the Prison Act has been read down drastically curtailing the wide powers of jail authorities to impose fetters on the prisoners.¹³ Undertrials who have undergone more than half the period of maximum sentence for offence charged for are ordered to be enlarged on bail or personal bond. In the famous case of *Ram Bahadur Rai*, the Chief Justice of

India, Mr. Y.V. Chandrachud, has held, "Peaceful protest and voicing contrary opinion are powerful wholesome weapons in the democratic repertoire and it is therefore unconstitutional to pick up a peaceful protestor and put him behind the prison bar."¹³ Though the right to be protected from arbitrary interference with privacy or family mentioned in Article 12 of the Declaration of Human Rights is not mentioned in the Constitution, Justice K. Subba Rao in the *Kharag Singh's* case interpreted right to life mentioned in Article 21 to include this right.¹⁴

Similarly right to travel abroad recognised by Article 13 of the Human Rights Declaration has been construed to be included in the right to liberty in Article 21 by the Supreme Court in *Satwant Singh's* case.¹⁵

In recent judgement of Menaka Gandhi's passport case, the Supreme Court has gone a long way. Justice P.N. Bhagwati, who delivered the majority judgement held that, "attempts of the Court should be to expand the reach and ambit of Fundamental Rights" and Article 21 covered variety of rights which makes life and liberty meaningful. And the law which deprives life and liberty has to be according to Chief Justice of India, "fair, just and reasonable and not fanciful, oppressive or arbitrary". While

Justice Krishna Iyer agreeing with the majority pointed out, "spirit of MAN is at the root of Article 21." The role of judiciary however is limited because it is duty bound to apply municipal law even if it is in conflict with international law and country's international obligations and it can press into service into interpretative power as it has done above when municipal law is vague.

Conclusion

It is high time that we examine our laws and amend them so that they are in harmony and not in conflict with India's international obligations in the field of human rights, lest we are exposed to the criticism of having double standards. It is also a precondition for effective foreign policy in the field of human rights and hence it is as much a concern of foreign affairs as of domestic affairs. But if we continue to ignore domestic situation, there may arise a graver problem to reckon with. The world community might one day chose to intervene. And it goes without saying that neither the assertion of national sovereignty or of the doctrine of domestic jurisdiction will be of any defence as far as the human rights are concerned.

(Advocate, Supreme Court of India)

FOOTNOTES

1. In the dispute between Britain and France whether Nationality Decrees of 1921 issued in French Protectorate of Morocco and Tunis affecting British citizens and making them liable to join the French Military Service were protected by the concept of domestic jurisdiction, the Court made very valuable interpretative observation on this concept. See, *Permanent Court of International Justice Advisory Opinion of February 7, 1923*, P.C.I.J. Published Series, B, No. 4.
2. Robert Woetzel *The Nuremberg Trials and International Law*, p. 1.
3. Some human rights mentioned in UN Declaration are also found in the Directive Principles. Though they are not enforceable in the law courts, Article 37 specifically provides that they are "nevertheless fundamental in the governance of the country and it shall be the duty of the State to apply these principles in making laws." For comparative table of provisions of Human Rights Declaration and the Indian Constitution see L.M. Singhvi (ed.) *Horizons of Freedom*, New Delhi: National Publishing House, 1969, p. 232.

4. *A.D.M. Jabalpur Vs. Shivkant Shukla*, 1976 (Sup) SCR 172 at 325-326.
5. *A.D.M. Jabalpur Vs. Shivkant Shukla*, *Ibid.*
6. The Maintenance of Internal Security Act, 1971 (MISA) which was drastically amended during the Emergency in violation of minimum safeguards provided in Article 22, and put in the Ninth Schedule, is now repealed. But Conservation of Foreign Exchange and Prevention of Smuggling Activities Act, which is also a preventive detention law is still on the statute book and in the Ninth Schedule.
7. In Britain, France, the United States or Canada preventive detention has been used only during war.
8. Right of legal consultation guaranteed under clause (1) of Article 22 is expressly made non-applicable to persons detained under any preventive detention law by clause 3(b) of Article 22.
9. Wearing Gandhi cap is still a prison offence under subclause 10 of Clause 576-B of the Punjab Jail Manual of 1898.
10. The UN General Assembly on August 30, 1955 adopted a resolution recommending the members to consider the adoption and implementation of these rules and inform the Secretary General with regard to its implementation every 3 years.
11. Statement of Thomas Hammerberg, *Amnesty International, Newsletter*, May, 1979, p. 1.
12. Charles Sobhraj *Vs.* Delhi Administration AIR 1978 S.C. 1308.
13. Ram Bahadur Rai *Vs.* State of Bihar, 1975 (2) SCR 732.
14. Kharag Singh *Vs.* State of U.P. 1964 (1) SCR 332.
15. Satwant Singh *Vs.* Regional Passport Officer, New Delhi, 1978(2) SCR 621.
16. Menaka Gandhi *Vs.* U.O.I. AIR 1978 SC. 597.

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Hinduism and National Identity

HISTORICALLY, the great achievement of the Hindu religion is that it has enabled Hindu society and culture to survive through vicissitudes which have destroyed other societies and cultures contemporaneous with it.

In addition, the religion has created what must be regarded as the true nationalism of the country. It is this which gives appropriateness to the name of Hinduism, which foreigners have given to the religion of the Indo-Aryans, for whom their religion was nameless. The word Hindu was originally only a geographical term, employed which is known to the outside world as India. And

the words 'India' and 'Indian' are only Greek and Latin adaptations from the Persian word. But since the inhabitants could never in any aspect of their life be separated from their religion the word 'Hindu' became religious, and the national identity became the same as adherence to a religion. The fusion is the only real guarantee behind the national identity of Indians. If Hinduism disappears at any time the inhabitants of India will, unless they acquire identities derived from other religions like Islam or Christianity, cease to have any distinctive identity.

Nirad C. Choudhary ("Hinduism")

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Sid Gautam

Irrigation Development in the Third World— Role of Appropriate Technology*

THE FIRST World Food Conference met in Rome in November of 1974 to discuss an acute food crisis that kept almost 460 million people permanently hungry, the group is composed of the small farmers, tenants and the rural people without land or employment, and the desperately poor in the slums of the major cities.

There are basically two approaches to increase the agricultural production, which could ease this world-wide hunger. The first is the expansion of cultivation to new land, and the second is to increase yields per unit of land by improving environmental conditions and by the application of additional agricultural inputs. The two approaches, characterizing "horizontal" and "vertical" expansion of production are to some extent an artificial distinction, as the extension of agriculture to new land is commonly accompanied by measures to raise production above the minimum base level. The single, most essential of these is the provision and control of water, applied through irrigation, drainage, flood protection, stock watering, etc.

Major Priorities

The World Food Conference was presented two major priorities for the joint development of land water resources. The first is the improvement and rehabilitation of existing irrigation schemes, which are not now being fully utilized, and the second is a target of a 25 per cent in irrigated area from 1975 to 1985.

In 1975, the world total irrigated area amounted to 223 million hectares, which included 97 million hectares in the developing countries. By 1990, it is estimated that these figures will have risen to 273 million and 119 million respectively.

Table 1 presents the actual and projected equipped irrigated areas and cropping intensities in the various regions of the world.

During the last couple of years, cost of undertaking irrigation projects have skyrocketed. With most of the easily accessible project sites gone, future projects will require more money and manpower.

The high global costs of new works, estimated at over 60,000 million dollars at 1975, prices, or 2800 dollars per hectare on an average, reflects the general need to exploit more difficult and expensive land and water resources than have been developed in the past. It also incorporates works of drainage (ranging from 200 to 1,000 dollars per

hectare), land preparation and other essential inputs which were so often lacking in earlier schemes and are now the subject of the improvements discussed above.

Improvement and rehabilitation of existing irrigation projects is a very costly undertaking. However, it is essential to do because in the absence of these needed improvements the projects will never be fully utilized.

In the developing economies of Africa, Latin America, the Near East and Asia, improvements to the existing main and on-farm systems is called for by 1990 on 45 million hectares out of a total of 92 million, at an estimated cost of more than 2,200 million dollars at 1975 prices. (see Table 2)

Table 1. *Actual and Projected Equipped Irrigated Areas (1000 ha) and Cropping Intensities (% utilization of cultivated area)*

Region	1965		1975		1990	
	EA	CI	EA	CI	EA	CI
Africa	1882	104	2610	107	3570	121
Latin America	9623	77	11749	89	14850	95
Near East	13329	80	17105	95	21400	106
Asia	45691	119	60522	129	74370	142

Table 2. *Irrigation Improvement Targets 1975-1990 (Areas in 1,000 ha, Costs in US \$ Millions)*

Region	1975 Existing Irrigation Area	Minor Improvement Area	Cost	Major Improvement Area	Cost	Total Areas	Cost
Africa	2610	522	209	261	235	783	444
Latin America	11749	2349	566	2349	1540	4698	2106
Near East	17105	6368	3184	3421	3179	9789	6263
Asia	60522	17614	5284	12104	8472	29718	13756
Totals	91986	26853	9243	18135	12556	44988	22569

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Magnitude of the Task

The increase in gross demand for water from all sources, to meet the tentative 1975-1990 programme for irrigation in the developing economies alone is estimated at almost $449 \times 10^9 \text{ m}^3$. Thus, by 1990 the annual demand will be approaching 1700 cubic kilometers.

This, then is the magnitude of the programme to be executed by 1990 in the developing countries:

- 22 million hectares of new irrigation
- 45 million hectares of improved irrigation
- 440 thousand million cubic metres of additional irrigation water
- 97 thousand million dollars of investment, at 1975 prices

In the light of the above-mentioned figures, the author would like to submit that if the execution of these projects is carried out through labour-intensive technology, it will prove to be a great boon to these countries. Because the effect of a more appropriate technology can be substantial in agricultural and non-agricultural sectors. The time has come to give needed attention to choice of appropriate technology in undertaking irrigation projects in the developing countries.

Appropriate Technology

The choice of technology has become the focal point of discussion during the last couple of years. For a long period, the strong critics of the capital-intensive technology have advocated the use of labour-intensive technology. In early 1963, leading Gandhian leader, Jayaprakash Narayan and the Planning Commission of India invited the

late Dr E.F. Schumacher, a well-known British economist, to India. Dr Schumacher was influenced by the Gandhian ideas of village industry and technology and adapted them to the modern needs. During his visit, he also coined the word, "intermediate technology", and made it a world-wide movement.

Later on, some scholars used the term "low cost" technology and tried to use it in place of "intermediate technology". Since "intermediate" focuses on the engineering dimensions and "low cost" on the economic dimensions only, subsequently a number of scholars coined a new term, "appropriate technology". This term signifies an alternate development strategy which advocates a technology that is optimum from a social point of view. Generally, the use of "appropriate technology" in the developing countries mean use of labour-intensive technology in place of capital-intensive technology.

This paper uses the term "appropriate technology" as a productive labour-intensive technology, which is economically efficient compared with modern equipment-intensive methods. Thus, all references to labour-intensive technology are presumed to mean appropriate technology.¹

Rationale For Appropriate Technology

For a long period, a number of leading economists have argued that most of the developing countries should use their abundant labour supply to undertake infrastructure facilities.² Since these countries had an overwhelming supply of labour and a relative scarcity of capital, the use of labour-intensive technology was in the interests of these countries. Recently, some studies have provided additional support for the use of appropriate technology.³

The evidence presented in these studies confirms the fact that the use of capital equipment tends to cost more in developing countries than in the developed countries; because most of the equipment has to be imported so that the initial cost includes substantial transport cost, import duties and related expense. Running and maintenance costs are similarly inflated in so far as fuel, lubricants and spare parts have to be imported. Operators have to be trained to work the machinery and mechanics to maintain it. It takes time to develop the skills required; in the meantime, equipment may be damaged by faulty operations. It takes longer and often costs more to repair or service the equipment than is usual in countries where the technical skills are more advanced, and manufacturers' service departments are close at hand. As a result, the utilization factor of machines is very low in the developing countries. For the purpose of illustration, the Asian data is given in the following table 3.

Furthermore, in order to make the optional choice of technology, the planners have to use the shadow pricing, which provides the

real picture of the opportunity forgone by the society in the use of limited factors of production in a country. Because the use of market prices distorts the choices in favour of the use of capital-intensive technology, and thereby deprives the developing countries of labour-intensive technology, and deepens their problems of poverty, hunger, and malnutrition.

During the last couple of years, several studies have proved that the use of shadow pricing definitely leads to the use of labour intensive technology. I.D. Carruthers carried out a comparative study of market price and shadow price in undertaking an irrigation project.⁴ The following table No. 4, presents the results of this study which shows that the open drain example using mainly hand labour has important implications for labour-intensive projects because total costs fall with shadow pricing. It is also noteworthy that the use of shadow pricing definitely results in the increase of the total costs, which implies that the planners should give serious considerations to the use of labour-intensive technology in these developing countries.

Table 3. Utilization of Equipment: Comparison Between Countries (As percentage of available worktime.)

(Source: E.C.A.F.E., Flood Control Series No. 17, 1961)

Kind of Equipment	Burma	Ceylon	An Asian Country	India	Japan	New Zealand	Philippines
Tractors, Bulldozers	72	50	50-75	52	36	50	69
Tractor Drawn Scrapers	—	50	50-75	52	—	50	—
Motor Scrapers	58	50	50-75	52	12	30	69
Dumpers	—	50	50-75	52	30	50	—
Shovels	62	50	50-75	52	37	50	51
Motor Graders	—	—	—	—	—	—	—
Loaders	—	—	—	—	—	—	—
Rollers	—	—	—	—	—	—	—

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Table 4. Effect of Shadow Pricing on Development Costs (Rs/Acre)

	Market Price	Shadow Price	Percentage Change
Tube Wells*	90	116	+29
Tile Drains*	158	215	+34
Open Drains			
(I) Machine Dug	240	295	+23
(II) Mainly Hand Labour	240	209	-15

*By Equipment

Source: *Men or Machines*, 1974.

During the last couple of years, the I.L.O.,⁵ and World Bank studies⁶ have also provided additional support for the use of labour-intensive technology. However, that does not mean that developing countries have started using labour-intensive technology. "In practice, advocates of 'market pricing' generally prevail because of the opportunity costs."⁷ According to Mazhar Ali, even when labour-intensive techniques can efficiently do the job, "the machine have flourished, at many times at the cost of manual labour, for a number of reasons. The administration has always exercised a rigid control on the earthwork rates paid to the manual labour, but it has been rather pampering the machine-operation organizations. The audit never raises an objection on the machine rates which have steadily been mounting. The machine also can be put on a job and continue working even in the absence of proper and formal approval and sanctions. The money transactions from a field agency are considered as a transfer entry or book adjustment of money and is not seriously viewed."⁸

Nevertheless, there are many countries where water resources development projects have been successfully completed through labour-intensive projects.

In the southern provinces of China, a large number of small reservoirs were made with labour-intensive technologies. Furthermore, one of the most important and largest irrigation canals of China — the Main Irrigation canal of North Kiangsi — was completed in 80 days. This 106 miles of canal of 420 foot bed-width was dug entirely by 1.3 million people without any use of machinery. Excavation, transport, and ramplung was all done manually. Such a speed of construction of earthwork on canals has not been achieved anywhere, even with the help of mechanical equipment.⁹

Labour-intensive techniques have also been widely used in India. However, out of many projects, the time of construction of the Nagarjunasagar Dam, built by labour-intensive techniques, compares well with the highly mechanized Bhakra Dam. On the Bhakra Dam, it took seven years to complete the work, involving 1.38 million units of 100 cubic feet each, whereas in the case of Nagarjunasagar, it had been possible to achieve 1.9 million units of 100 cubic feet each in ten years.¹⁰ It is not difficult to find such examples in many other countries where sincere and serious efforts were made to use labour-intensive techniques.

Despite these successful undertakings, labour-intensive techniques did not receive due attention in the planning and execution of water resources development projects in the developing countries. As a matter of fact, as the countries marched on the road of developing more and more water projects, the planning authorities look more for opportunities to use capital-intensive technology to complete the projects as early as possible. Rising unemployment and scarcity of capital did lead some scholars and political leaders to plead for substituting labour-intensive technology for capital-intensive technology. But the engineers who planned and executed these projects, with the help of contractors, did virtually little to use labour-intensive technology. Therefore, labour-intensive techniques did not play a leading role in the water resources development projects of the developing countries.

Problems Encountered in Use

The planners, engineers, contractors and other officials in these countries had serious doubts regarding the efficiency of labour-intensive techniques. Large contractors, native or foreigners, perceive the use of labour-intensive methods as being always inefficient and do not commit themselves to projects requiring longer construction periods. Generally, they leave such jobs to small local contractors.

There are many projects in India and other developing countries which took more time in completion than the estimated planning time. In several cases, the blame was laid on the inordinate delay in the completion of work done with labour-intensive methods.

The literature on the developing countries is overwhelmed with fact that the developing countries are highly populated and there is

a large number of unemployed and under-employed people in the agricultural sector.

Therefore, these surplus labourers can easily be employed on labour-intensive projects. However, the studies have shown that the availability of easy labour has posed big problems in India,¹¹ Egypt,¹² and other countries.

Similarly, there are problems of training, supervision and making the proper combination of men and machines. In many cases, the labour-intensive was not done properly. Therefore, in order to make labour-intensive techniques an integral part of the water resources development project, much work to be done to do sequential planning and proper training and impartation of supervision skills in the labour leaders.

Two Experiments

As early as 1954, the then Economic Commission for Asia and the Far East (ECAFE, now ESCAP) singled out earthwork as a major construction activity in its tenth session and approved a project entitled "Manual labour and its effective use in competition with machines for earthwork in the ECAFE region." A working party on earthwork was convened and the meeting in New Delhi in 1959 recommended taking up experimental or pilot projects, under varying conditions, for work study in earthmoving operations on projects where manual labour was extensively employed.¹³

The International Labour Organisation was also requested to assist in this project. During 1961-63, the ILO carried out a study in India to measure the exact output attainable with the traditional methods; the methods were then improved to achieve higher productivity.

Two ILO studies, on the Sharavathi Valley Project in India¹⁴ and on the Pasig River Flood Control Levee Construction in the Philippines, were particularly concerned with bridging the technological gap by modifications of existing labour-intensive methods and development of new techniques to achieve higher productivity.

An analysis of the possibilities for improvement showed that it was possible to raise the productivity of the best workers (Malabari workers) by 20-30 per cent, and that of the other labour groups by 100 per cent by detailed changes within the broad general framework of the traditional methods.¹⁵

Recommendations for Future

Today, ample evidence is available to prove the fact that labour-intensive technology is very cost-effective in undertaking the water resources in the developing countries.

In addition to the studies conducted by the ILO and the World Bank, the projects completed through labour-intensive technology in China and other countries provide credence to the use of "appropriate technology". Nevertheless, the widespread use of "appropriate technology" will need more than the sound proof of its cost-effectiveness. Therefore, the author is recommending a list of things that should be changed before "appropriate technology" can become the integral part of the planning and executing of water resources development projects in the Third World countries:

1. Prevailing engineering education patterns had no, or very little place for labour-intensive technology. Therefore it is no wonder that the irrigation projects were planned in a way that will

require heavy use of capital intensive technology. Today therefore it is very important that the perspective engineers should be trained for the engineers, who plan to work on the projects in developing countries.

2. One can understand the use of capital-intensive technology in the labour-short developed countries. However, when the projects were planned for developing countries, the use of capital-intensive technology was highly undesirable. Today, it is essential that the projects planned for developing countries should be based on labour-intensive technology should be an integral part of planning strategy. Otherwise, any window-dressing will create more problems later on.
3. There is also a vital need to change the contracting system. It has been noticed that the local contractors use more labour. However they often had problems in competing with the foreign contractors. According to a Pakistani researcher, "the odds have generally been against the Pakistani firms on competing on tenders for the Indus Basin Projects. The result was that in almost all cases, the rates on which the works of IBF were let out were considerably higher than the local rates in the country for similar works."¹⁶
4. Despite the fact that developing countries have an abundant supply of labour, there were several projects which suffered from periodic to acute shortages of unskilled labours. Part of this problem is the result of the fact that the administration of labour-intensive activity is an underdeveloped art and an undeveloped science in these countries. This area really needs a lot of

attention and engineers, administrators and other professionals should pay attention to this problem.

5. During the last 30 years, a large number of the irrigation projects in the developing countries were undertaken with the aid of the developed countries. However, in many cases, the use of the tied-aid systems encouraged the use of machines at the cost of labour. Mahbub ul Haq, presently Director of the World Bank, analyzed the cost of tied credits during 1960-63. On the basis of samples of 20 development projects, he concluded that the weighted average contract price was 51 per cent higher than the equivalent international bids.¹⁷

6. Finally, there are several other important factors which play important roles in making efficient use of labour-intensive techniques. Climate, standards of nutrition and health, the level of supervision, organization, payment methods, working methods, quality of tools and the standards of site management are just a few of the host of factors which affect the productivity of labour.¹⁸

Equal attention should be paid to these factors while using labour-intensive technology.

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FOOTNOTES

1. Inder K. Sud, "An Approach for Selection of Labour Vs. Capital-Intensive Technologies for Water Resources Development Projects" (UN Water Conference Mar del Plata, Argentina, March 1977) and several other scholars have used "labour-intensive technology" and "appropriate technology" as interchangeable concepts.
2. W. Arthur Lewis, *Economic Development with Unlimited Supplies of Labour*, The Manchester School of Economics and Social Studies, May 1954. Ragner Nurkse, *Problems of Capital Formation in Underdeveloped Countries*, Oxford, Basil Blackwell, 1953. Gunnar Myrdal, *Asian Drama: An Inquiry into the Poverty of Nations*, Pantheon, NY. G.A. Edmonds, *Labour Substitution in Construction: A Case Study of Nigeria*, Unpublished Ph.D. Thesis, Leeds University, 1975.
3. The International Labour Organisation and World Bank have undertaken several studies during the last two decades, which lend support to the use of labour-intensive technologies. Following two documents elaborately discuss the several studies undertaken by each organization.
 - (1) International Labour Office: *World Employment Programme — Appropriate Technology For Water Control and Irrigation Works in Developing Countries*, prepared by M.I. Hussain of the Technology and Employment Branch and presented to the UN Water Conference, Mar del Plata, Argentina, 1977.
 - (2) World Bank, *An Approach for Selection of Labour vs. Capital-Intensive Technologies for Water Resources Development Projects*, prepared by Inder Sud and presented to the UN Water Conference, Mar del Plata, Argentina, 1977.
4. I.D. Carruthers, *Irrigation Development — Planning Aspects of Pakistan Experience*, Agrarian Development Studies Report No. 2, Economics Department: Wye College, Ashford, Kentucky, 1968, Pages 43-45.
5. H.W. Singer and D. Preiblat, *Infrastructure Development and Employment Promotion in Developing Nations* ILO Management Series No. O.H.W. Irvin, "Roads and Redistribution, Social Costs and Benefits of Labour-intensive Road Construction in Iran", ILO, Geneva, 1975.
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7. I.D. Carruthers — *Op. Cit.*
8. Mazhar Ali, "Role of Manual Labour on irrigation Works in the Ex-Sind Area" Symposium on Utilization of Manual Labour in Major Civil Engineering Projects, Institution of Engineers (Pakistan), Lahore, May, 1966, p. 47.
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16. S.M. Rizwan Abidi, "The Role of Manual Labour in Link Canal Projects", *Indus* (VIII), July 6, 1966, p. 6.
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18. M.I. Hussain, *Op. Cit.*, has elaborately discussed these factors and their impact in his paper. Inder K. Sud has also examined a number of these factors and discussed their impact in his earlier mentioned paper.



* A paper presented to the Annual Conference of the American Water Resources Association in Lake Buena Vista on November 8, 1978.

IN A review of the last book of Schumacher, *A Guide to the Perplexed*, published just before his death in 1977, while paying a merited tribute, Theodore Roszak stresses the inadequacy of even the wisest comment of life when it does not begin by squarely confronting the vast negations of our times, when it has not looked into "the heart of darkness and seek the horror". He adds: "It is naive to summon us to self-knowledge without acknowledging that the deepest self-knowledge of our time begins in the experience of radical absurdity and cosmic abandonment. Self-knowledge for us must go through Nietzsche, Kafka, Sartre, Beckett, not around them." At some in the drama of the modern world, "the vertical dimension failed to provide a sure purchase upon the need for personal autonomy."

Actually, before regaining the freedom to be free to realise fully the potentialities of our being, all the possibilities of an integral humanism, we have to confront not only Beckett and comparable others, but also the reductionist reading provided by every specialised discipline from physics to psychology and sociology. This is because the fundamental question that can be asked regarding the world, man and man's destiny was met with an answer which was very limited right from the beginning and, when it was illegitimately extended, gave rise to fatefully disastrous consequences.

This is the question: what is that which, when known, will make all things known?

Antiquity had raised this question. And it is because the most important aspect of the answer it had framed was lost sight of when the query was taken up in modern times that mankind in our age has been steadily slipping down a gradient towards nihilism in thought and possible annihilation in a nuclear holocaust.

Krishna Chaitanya

Recovering an Integral Humanism

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Five or six centuries before Christ, the philosophers of Ionia, the Greek settlement in Asia Minor, raised this question. They sought the primordial matter from which by condensation, rarefaction and combination, all the plurality of the world, its material forms and their vicissitudes, could be derived. But it was always affirmed that primordial matter was psychophysical. Soul was held to be the principle of life, motion and sense perception. And the atoms of Leucippus and Democritus, the ultimate indivisibles of divisible matter, were held to have the intrinsic powers of animation, motion and sensation.

As in Thales, Anaximenes and Heraclitus of ancient Greece, water, air or fire is tried out as the primordial element in the Brhad Aranyaka, Chhandogya and Katha Upanishads. But whatever the element may be, it is held to be psychophysical. The Kaushitaki starts by positing Prana or air as the primordial element. But very swiftly, Prana is identified with life, with consciousness and with the self itself. Thus, Prana, which is originally a form of matter, becomes identified with life from the biological point of view, consciousness from the psychological and the self from the metaphysical points of view. A similar movement of thought is seen in the Taittiriya also.

But when the modern age took up the quest again, it missed the old insight and also its tremendous importance for an integral humanism. Galileo nullified the brilliance of his analysis of matter by the dogmatic assertion that only the quantitative aspects of matter were real. The extension of matter is real; sensations are illusory. An erroneous world-view was thus launched on a conquest of all disciplines of knowledge, physics or the science of matter being the vantage ground from which the attack began. Galileo studied the behaviour of material

bodies on earth; Kepler studied extensive agglomerations like planetary systems; Newton integrated both and enunciated universal laws whose implications were that matter was dead and insentient, had no capacity for self-movement, and moved only when it was pushed or pulled by external force. And this went for everything made of matter, and man is also made up of matter.

There was fantastic amnesia, and worse, here. Science is the creation of the mind which collects facts, forms hypotheses for explaining them, confirms them by testing. But, as the exploration of the reality "out there" gathered momentum, the self behind the quest and the exploration was at first forgotten and, later, denied. The denial emerged from the hardening of the picture of the world as a machine which necessarily made man a robot. Cicero said long ago that there is no nonsense so crazy that some philosopher or other would not have sententiously pronounced it some time or other. Science wrested from philosophy the doubtful honour of being the target of this irony. But the danger now was immensely greater. Contrary to the fond beliefs of philosophers, nobody takes them seriously. But science established its empire over mankind in its aspect of technology. And even if people did not bother about scientists when they philosophised, they were deeply affected by technology which derived its momentum and orientation from the basic outlook of science. And these led in the direction of the dissolution of man.

As Hans Jonas has put it, scientism brought out thinking under the ontological dominance of death. Deadness became the natural thing, life and consciousness became problems to be explained. The physicalist thinking based on a theory of matter which regarded it as dead and inert made man

incomprehensible and the world normatively empty. There were glaring contradictions in this stance. For instance, if there is no such thing as consciousness, what precisely is the status of science as an epistemological system elaborated by consciousness? But a fantastic ability to ignore such contradictions was displayed. The classical example is the behaviourist who uses this consciousness to elaborate a theory that there is no consciousness. But let us not be too vociferous in marvelling at this stupidity. For prestigious philosophical traditions which, in a similar way, denied the reality of both the world and the psychophysical self which tries to understand itself and the world, have flourished for long, in East and West alike.

From physics, the basic discipline of matter, the anti-humanistic world-view started its conquest of all disciplines and coloured all phases of man's life and activity. The result has been that the ontological domination of death, instead of remaining safely confined to highbrow theorising, has become a terrible incarnate apparition right in our midst threatening the physical survival of mankind. The nuclear arsenals of the nations today have accumulated enough potential to kill every living thing in the world, flora, fauna and man, ten times over. This real threat to the survival of mankind and the world has stemmed directly from the amplification by a runaway technology of the libertinism of thought that denied all value in man and the macocosm.

Redeeming ourselves from the predicament is not going to be easy. Perhaps that is putting it appallingly mildly and may really amount to a sick joke, for there is a very real chance of man being destroyed by the colossal energy that was safely locked up in the heart of matter and which he unleashed without the ability to control it. This ability

is fundamentally a moral ability, the self-discipline in integrity. That sounds like a neat, simple formula. But it is no copy-book maxim. Analyse its terms and you will find that for its exegetical clarification, you need to recover the commanding perspective which philosophy gains by integrating all the disparate disciplines of knowledge. Self-discipline in integrity: Is there then a self, an awareness of awareness? How does one establish it in view of the undeniable fact that man has evolved from organic evolution which in turn was a continuation of an inorganic evolution, and in view of the claim of behaviourists and others that since matter lacks the capacity for awareness, man too lacks it as he is structured out of matter? Self-discipline: This assumes the volitional freedom of the self (once you can prove that there is a self) to work not only on the world, but on itself for its own growth. How does one establish this freedom when science claims to have established that nothing in the world has the power of self-movement but moves only under the irresistible pull or push of a force external to itself? Integrity: In a normatively empty world, what possible meaning can this word have when it envisages the self-disciplining itself in harmony with the truth of things and the imperatives that stem from its own truth or authenticity?

Here people may be sorely tempted to take the line that such questions are all academic and of interest only to philosophers who love endless and pointless disputation, and that one can easily solve all these unreal problems by returning to the simple good life prescribed by traditional religion. This is a pathetic illusion. For one thing, the negative world-view has entrenched itself deep in the life of mankind and prescribes its behaviour in every field. The full clarification of this will need considerable space. But briefly: Psychology reads man as

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motored by instincts, drives, rationalisations, all riveting his personality to a low, unenlightened level of self-interest; economics enshrines this self-interest, leaving it to an invisible hand to produce concord out of this basic discord like a magician producing rabbits out of a hat; politics believes that power should be captured first, since only force is effective; communication theory has narrowed down to the view of human groups as target groups who can be conditioned and manipulated. This ambience cannot be wished away by a return to traditional religion. And let us be honest with ourselves: have not religions played a tragically divisive role, splattered the pages of history with blood? The good people will now hasten to point out that the blame here should be attributed, not to religion, but its misunderstanding. But what

would that mean except that religion should become self-critical and clear its tremendous overburden of impurities if man is to be redeemed? And once you concede the need for radical critical reevaluation, one can claim that science too can be redeemed from scientism by similar cleansing.

As the Gita said, man needs for his redemption both Vijnana (Knowledge: Basically Science), and Jnana (Intuition: basically religious inner illumination). If integral humanism is to be realised, it is this integration which men of all temperaments, intellectual or religious, analytic or intuitive, have to take up. And immediately too, for we are running against the atomic clock.

(Reputed Columnist, R14, *Hauz Khas Enclave, New Delhi.*)



Nem Kumar Jain

Mathematics and Astronomy in India

THE HISTORY of the development of mathematics and astronomy in India is as old as the civilization (Indian civilization has now been realized as the oldest civilization) of its people. The growth of mathematical and astronomical sciences is the most glorious chapter of Indian science. Now it is an internationally accepted fact that the numerals 1 to 9, zero '0' (शून्य) and decimal place value notation are unique Indian contributions to the world of science.

The development of mathematics and astronomy begins with the rudiments of metrology, computations and the number system used in India, in prehistoric times. Some fragmentary evidence has survived to this day.

The sacred literature of the Vedic Hindus — the *Samhitas*, the *Kalpasutras* and the *Vedangas* — contain enough material. The *Sulbasutras* which form a part of the *Kalpasutras* contain varied informations about enumeration, arithmetical operations, fractions, properties of rectilinear figures, the so-called Pythagoras theorem, surds, irrational numbers, quadratic and indeterminate equations etc. The *Brahmanas* and some *Sutras* contain interesting material concerning progressive series, permutations and combinations.

Of the various religious sects that attained prominence in the closing phase of the Vedic period, the Jainas deserve special notice for their interest in the cultivation of mathematics. Their canonical literature lays great emphasis on various topics such as number reckoning, fundamental operations, geometry, mensuration, fractions, equations, permutations and combinations. Their canonical texts include *ganitanuyoga* (principles of mathematics), *samkhyana* (arithmetic) and *jyotisa* (astronomy).

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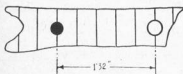
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In 1921 archaeological excavations conducted at the sites of Mohenjodaro in Sindh and Harappa in Punjab revealed a developed civilization — The Indus Valley civilization. It brought to light developed cities in seven different layers of buildings which has been assigned the period 3225 B.C. to 2750 B.C.

It is reasonable to believe that the builders of the Indus civilization developed a good degree of skill in their measuring and computational techniques. Without these it is difficult to comprehend their town-planning and architectural proficiencies and various other aspects of their civilization. As to metrology, we have the evidence of seals with pictographic inscriptions and numerous stone weights unearthed at Mohenjodaro and Harappa. Some of the pictographic inscriptions have not yet been deciphered. Most weights appear to be fractions or multiples of the *uncia* (one *uncia* = 27.2 gm.)

An interesting specimen of the Indus scale has come down to us among the finds from Mohenjodaro in the form of the fragment of a scale measuring 6.62 cm. in length by 0.62 cm.



Sketch of an Indus scale.

The scale shows nine parallel lines cut with a fine saw. One of these lines is marked by a fine circle and the sixth line from it by a dot. The measurement of these five intervals shows 1.32 inches. This can be called the 'Indus inch'.

Indus seals and inscriptions (archaeological excavations, 1921) as found in Mohenjodaro, show that the numbers were represented by vertical strokes arranged side by side or in lateral groups.

1 = III	IIII	III II
(1 2 3	4	5)

No evidence have survived so as to say how far ancient Indians went in representing higher numbers. Some of these strokes survived in the *Kharosthi* and *Brahmi* numerals. The epigraphic records of numeral notations in India, of both non-place and place value are summarized in Table I and Table II.

Nasik

Table II shows numeral forms used in decimal place-value system and those were found in stone as well as in grant-plate inscriptions.

A circular symbol for zero appears in the Gwalior inscription (as shown in column 4 of Table II) pertaining to the reign of Bhojadeva in which the verses were numbered from 1 to 26 in decimal figures. The Gwalior inscriptions provide the earliest palaeographic record so far known in India of the use of zero in a decimal place-value system.

To attempt for locating still earlier dates we have to turn to the Hindu colonies of South-East Asia. Decimal place-value numerals with a point (*śūnya-vindu*) as well as a circular symbol for zero have been discovered in the seventh century inscriptions—two at Palembang in Sumatra and one in Banka. These give the Śaka dates 605, 606 and 608 in figures. Still another old Śrīvijaya inscription found in Samtôr

TABLE I

Numerals without place-value

	Kharajki	Brāhmī				Kharajki	Brāhmī		
		ŚAKA PARTHAN KUSĀNA	ŚAKA Inscriptions	Nāśik Inscriptions			ŚAKA PARTHAN KUSĀNA	ŚAKA Inscriptions	Nāśik Inscriptions
1	I	I	—	—	20	3333	𑀘		
2	II	II	=	=	30				
3	III	III	≡	≡	100	𑀓I	𑀓I	𑀓I	𑀓I
4	X	+	𑀓𑀓	𑀓𑀓	200	𑀓II	𑀓II	𑀓II	𑀓II
5	IX		𑀓𑀓	𑀓𑀓	300	𑀓III	𑀓III	𑀓III	𑀓III
6	II X	𑀓𑀓	𑀓	𑀓	400		𑀓𑀓	𑀓𑀓	𑀓𑀓
7	III X		?	7	500			𑀓𑀓	𑀓𑀓
8	XX		𑀓𑀓	𑀓𑀓	700		𑀓𑀓	𑀓𑀓	𑀓𑀓
9			𑀓	𑀓	1000		𑀓	𑀓	𑀓
10	7		𑀓𑀓𑀓𑀓	𑀓𑀓𑀓𑀓	2000			𑀓𑀓	𑀓𑀓
20	3		0	0	3000			𑀓𑀓	𑀓𑀓
30					4000			𑀓𑀓	𑀓𑀓
40	33			𑀓	6000		𑀓𑀓	𑀓𑀓	𑀓𑀓
50	733	𑀓𑀓			8000		𑀓𑀓	𑀓𑀓	𑀓𑀓
60	333		𑀓		10000		𑀓𑀓	𑀓𑀓	𑀓𑀓
70	7333			𑀓	20000		𑀓𑀓	𑀓𑀓	𑀓𑀓

Intermediate numbers were written on additive principle as follows:—

22	74	122	274
113	X7333	113𑀓I	X7333𑀓II
(2 + 20)	(4 + 70)	(2 + 20 + 100)	(4 + 70 + 200)

Nānāghat

100	400	700	1000	4000	6000	10,000	20,000
𑀓I	𑀓𑀓	𑀓𑀓	𑀓	𑀓𑀓	𑀓𑀓	𑀓𑀓	𑀓𑀓

Nāsik

100	500	1000	2000	4000	8000
७	७५	९	९	९५	९९

TABLE II

Numerals with place-value

Value	GURJARA Gems. (A.D. 395)	BALUKA Inscriptions (A.D. 837)	GWALIOR Inscriptions (Bhojdeva) (A.D. 875)	GWALIOR Inscriptions (Bhojdeva) (A.D. 876)	MAHARAJA Inscriptions (A.D. 917)
1			१	१	
2			२		
3	३		३	३	
4	४	४	४		४
5		५	५५	५	५
6	६		२		
7			७७	७	७७
8			८८	८	
9		९	९	९	९
0			०	०	०

gives the Śaka date 605 in figures. Sample drawings of some of these figures are:

६०५

605

Khmère inscription
of Sambôr

६०४

608

Inscription of Kota
Kapur (Banka)

७३५

735

Inscription of PO
Nagar (Champa)

The word-numerals and their use in a decimal place-value arrangement represent another unique development in India.

Numeral	Meaning	Words
0	Emptiness, void etc.	Kha, akasa, ambora, śunya
1	Earth, Moon	kriti, dhara, prithivi, indu, candra
2		vama, asvin, dasra, aksi
3		rama, guna, agni
4		veda, samundra

The Vedic Hindus had the proficiency in developing scientific vocabulary of the following number system (sources; *Yajurveda Samhita*, *Taittiriya Samhita*, *Pancavimsa Brahmana*) in which the principles of addition, subtraction and multiplication were conveniently used:-

- (1) The first nine digits, e.g. *eka*, *dvi*, *tri*, *cature*, *panca*, *sat*, *sapta*, *asta*, *nava*, (i.e. एक, दो, तीन, चार, पांच, छः, सात, आठ, नौ.)
- (2) The zero '0' (शून्य = *Sunya*) and the place value notation (the decimal system).
- (3) The second group of nine numbers obtained by multiplying each of the digits in (1) by 10, e.g. *dasa* (दस) *vimsati* (बीस) *trimsat* (तीस) *catvainsat* (चालीस) *pancasit* (पचास) *sasti* (साठ) *saptati* (सत्तर) *asiti* (अस्सी) and *navati* (नब्बे)
- (4) The third group of eleven numbers beginning with 100, e.g. *sata* (सैकड़ा = 100) *sahasra* (सहस्र = हजार) *ayuta* (दस हजार) *niyuta* (लाख) *prayuta* (दस लाख) *arbuda* (करोड़) *nyarbuda* (दस करोड़) *samudra* (अरब) *madhya* (दस अरब) *anta* (खरब) and *paradha* (दस खरब = 10^{12})

The name of Medhatithi, a mathematician of Vedic times, is associated with numerous verses in the *Rig*, the *Atharva* and the *Yajur Vedas*. He enumerated numerals upto 10^{12} .

Bakhshali Manuscript :

The earliest evidence of the use of the place value notation has been formed in Bakhshali Manuscript (BM). This was unearthed by a farmer in May, 1881, in a small village called Bakhshali near Peshawar (now in Pakistan). Written on birch barks in *Sarada* script, the manuscript has survived in about 70 leaves, some of them in mere scraps. It was presented to the Bodleian Library, Oxford by Dr A.F.R. Hoernle in 1902. The period* of composition of BM is placed in the range 200-400 A.D. Zero was represented by a dot in BM. An item of great historical importance in BM is the *sutra* (formula) for computing the square-roots of non-square numbers. M.N. Channabasappa, in his research paper published in *IJHS* (Vol. 11, No. 2, Nov. 1976), asserted the following correct version of the *sutra* :

अकृते स्लिष्टकृत्युनात् शेषच्छेदो द्विसंगुणः ।

तद्वर्गदलं सस्लिष्टहृति शुद्धिकृति धयः ॥

(*akrte slista krthyunat sesa chedo*
dvisangunah
tadverga dala samslistha hrti suddhi krti
ksayal)

$$\sqrt{A^2+b} = \frac{A^2+b}{A} = A + \frac{b}{A} = A + \frac{b}{2A} + \left(\frac{b}{2A}\right)^2 + 1\left(\frac{b}{2A}\right)^3 + \left(\frac{b}{2A}\right)^4 + 2\left(A + \frac{b}{2A}\right)$$

$$A + \frac{b}{2A} - \left(\frac{b}{2A}\right)^2 + 2\left(A + \frac{b}{2A}\right)$$

$$\text{i.e. } \sqrt{Q} \equiv \sqrt{A^2+b} = A + \frac{b}{2A} - \left(\frac{b}{2A}\right)^2 + 2\left(A + \frac{b}{2A}\right)$$

* (i) B. Datta : The Bakhshali Mathematics, BCMS, 21, 2-3, 1929.

(ii) Levey, Martin and Petruck, Marvin. Translation of Kushyar Ibn Labban's Principles of Hindu Reckoning (*Kitab Fi Usul Hisab al Hind*). The University of Wisconsin Press, Pp. 6-7, 1965.

(iii) *IJHS*, Vol. 11, No. 2

This formula occurs in connection with an algebraic problem in BM. It was an independent Indian discovery. It is better than Heron's formula :

$$\sqrt{Q} = \sqrt{A^2 + b} = A + \frac{b}{2A}$$

(The Greek mathematician Heron lived in the second half of the first century).

Baudhayana Sulba Sutra :

A vast literature on ancient mathematics is available in the monumental works ranging from the **Sulba Sutras* of Baudhayana (800 B.C.) to the work of the 12th century mathematician Bhaskaracharya. During the Vedic times, performance of a variety of sacrifices formed a major part of religion. These sacrifices used to be performed at certain pre-calculated times, and in altars of special sizes and shapes. This provided a ground for the growth of astronomy and geometry. Among the literature of *Sulba Sutras* (manuals for the construction of altars), only seven have survived. They are named, after their authors -- Baudhayana, Apastamba, Katyana, Manava, Maitrayana, Varbhha and Vadhula. Baudhayana *Sulba Sutra*, is said to have

been composed around 800-600 B.C. by Baudhayana. It gives a glimpse of the existent knowledge of geometry. It describes important geometrical propositions necessary for the construction of various altars. It contains a very important result :

दीर्घचतुरस्रस्याक्षयारज्जुः पार्श्वमणि त्रियङ्ग-
मणि च यन्मूयक सूते—कुरुतस्तदुभयं करोति ।

(*dirghacaturasra syaksnayarajjut passvamani
tiryanmani ca yatprthagbhute
kurutastadubhayam karoti*)

"The diagonal of a rectangle produces areas which its length and breadth produce separately" i.e. the square described by a diagonal of a rectangle has an area equal to the sum of the areas of squares described on its two sides. Baudhayana says : (See diagram given at the bottom)

Baudhayana himself, makes it clear at many places that he was not the first to propound all these methods and mentions his indebtedness to the earlier works and acknowledges their authority, in particular, of *Taittiriya Samhita*, a much earlier composition. *Satapatha Brahmana* contains a statement meaning : "The transverse chord of a rectangle produces, by the construction of a

$$3^2 + 4^2 = 5^2$$

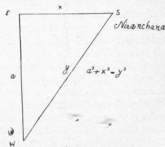
$$12^2 + 5^2 = 13^2$$

$$15^2 + 8^2 = 17^2$$

$$2^2 + 24^2 = 25^2$$

$$12^2 + 35^2 = 37^2$$

$$15^2 + 36^2 = 39^2$$



**Sulb* or *Sulv* = to measure; *Sutra* = short rule.

square on itself, what the length and the breadth produce separately". Unfortunately, this theorem is usually attributed, without any justification to Pythagoras (540 B.C.) of Greece.

The tradition attributing the theorem to Pythagoras is due to Cicero (C. 50 B.C.), Diogenes Laertius (second century A.D.), Athenaeus (C. A.D. 300), Heron (third century A.D.), and Proclus (C. A.D. 460). *Junge pointed out that the Greek literature of the first five centuries after Pythagoras contained no mention of this or any other important geometrical theorem by the great philosopher by Pythagoras. He further pointed out uncertainties in the statements of Plutarch and Proclus.

Baudhayana described methods for construction of geometrical figures, combination and transformation of areas, measurements of areas and volumes, squaring the circle and vice-versa, making of similar figures with different areas and a variety of other related problems. The value of square-root of two has been mentioned in the *Sulba Sutra* as 1.4142156.

Ancient Astronomy

Lagadha was the first Indian known to have summarized the available astronomical knowledge (*Ganita-jyotisha*) of his time (900 B.C.). *Jyotisha Vedariga* was composed by Lagadha but its improved text now available seems to belong to the first century A.D. The elliptic path of the earth round the sun was supposed to consist of 27 divisions each equal to $13^\circ, 20'$, corresponding to 27 *nakshatras* (constellations). A five-year luni-solar cycle constituted a *yuga*. At the beginning of the *yuga*, the sun and the moon lie at the starting point of the *nakshatra*, *Dhanistha*. There were ordinarily 12 months

in a year, each consisting of 30 days. An extra month of 30 days was used to be interpolated during the period of one *yuga*. The year consisted of 6 seasons. A solar-day (sunrise to sunrise) consisted of 30 *muhurtas*, each of 2 *nadikas* and a *nadika* = $10\frac{1}{2}$ *kalas*, 1 *kala* = 124 *kasthas* and 1 *kastha* = 5 *aksaras*. The time was used to be measured with the help of water-clocks (a vessel with a hole at the bottom and placed on a tub full of water) and sun-clocks. In short, one quinquennial cycle consisted of 5 sun's revolutions;

67 moon's sidereal revolutions or months;
62 moon's synodic revolutions or months;
1,830 *savana* or civil days;
1,835 sidereal days;
1,800 solar days;
1,860 lunar days or *trithis*.

In the *Jyotisha* we also find for the first time the rule for determining the length of the day between two solstices (summer solstice = उत्तरायण सूर्य, कर्क संक्रांति; winter solstice = दक्षिणायन सूर्य, मकर संक्रांति; Solstice being the point at which the sun is farthest from the equator and appears to pause before receding). The shortest day is given as 12 *muhurtas* at winter solstice and the longest as 18 *muhurtas* at summer solstice. Therefore, the daily increase or decrease of the day length works out to $6/183$ *muhurt*.

The concept of *mahayuga* or *chaturyuga* is the central feature of the Indian astronomical *siddhantas*. It is a period at the beginning of which well planetary bodies are in conjunction, during which they perform integral number of revolutions. Therefore, at the end of *mahayuga*, all planetary bodies are again in conjunction. According to Aryabhata, a *mahayuga* is divided into four equal parts or *yugapadas*, each containing 10,80,000 years.

*A Concise History of Science in India, INSA, p. 149

In the modern *Surya Siddhanta*, a *mahayuga* is subdivided into four mundane ages:

The <i>Kṛta</i> or <i>Satyuga</i> (golden age)	17,28,000 solar years
The <i>Tretayuga</i> (silver age)	12,96,000 solar years
The <i>Dwaparayuga</i> (Brazen or copper age)	8,64,000 solar years
The <i>Kaliyuga</i> (iron age)	4,32,000 solar years

Total : 43,20,000 solar years

and G.P. series, square and cube roots of numbers, discovery of trigonometric sine,

The present *Kaliyuga* started at the midnight between February 17 and 18, 3102 B.C. at the meridian of Ujjaini. Therefore, *Kaliyuga* was 5079 years old on the midnight between 17 and 18, 1977 A.D.

Aryabhata and His Aryabhatiya :

On the occasion of 15th anniversary of the renowned astronomer Aryabhata, the French astronomer Dr. Roger Billard said, in New Delhi, "I think the history of Indian astronomy to be as a whole the most extraordinary monument of history of sciences, a very epistemology by its very self and perhaps the most enlightening knowledge of man's search for knowledge. In particular, the new history of Indian astronomy leads us to discover how and why Aryabhata was the leading astronomer of the scientific astronomy in India and furthermore how and why he will soon be a great figure in the history of astronomy in general. Aryabhata's work was more accurate and advance than that of Claudius Ptolemy". Regarding the year of Aryabhata's birth, he himself said in his famous treatise *Aryabhatiya*, "60 yugas of 60 years and three *yugapadas* (*Satyuga*, *Treta*, *Dwapara*) have gone by while he has been of 23 years". According to this (the only information available about his birth), he was born in 476 A.D. at *Pattiputra*. Aryabhata asserted that the earth rotates round its axis as well as round the sun. His other scientific contributions include : evaluation of π as 3.1416, evaluation of A.P.

accurate calculation (upto seventh decimal place) of days in a solar year. It is better than Ptolemy's calculation.

Aryabhata said that the eclipses were not caused by *Rahu* but by the shadow of the earth and the moon. He discovered the causes of solar and lunar eclipses, predicted the duration and extent of eclipses. He said that the moon was essentially dark and was illuminated by the sun. There are indications that he had written one more book (apart from *Aryabhatiya*) but it is not available. It is being thought that the book might have contained description of astronomical instruments used in his time.

Varahamihira and His Panchasiddhanta:

Varahamihira, born in 499 or 505 A.D., referred to the five astronomical systems in vogue in ancient India in his *Panchasiddhanta* — *Paulisa*, *Romaka*, *Vasishta*, *Surya* and *Paitamaha Siddhantas*. Four of these five *siddhantas* are not available in the original form now and we know about them only from the *Panch Siddhanta*. *Paitamaha Siddhanta* was probably written in 78 A.D. very much on the line of *Jyotishavedanga*, *Vasishta Siddhanta* (probably compiled by Vishnuchandra) strove to locate celestial bodies by dividing the sky into 12 parts of 30° each. *Paulisa Siddhanta* was written on the basis of work by Paul of Alexandria-*Romaka Siddhanta*, written by Srisena was on the basis of Roman or Alexandrian

sources. The originality of *Surya Siddhanta* is controversial. Some say that it was compiled before 400 A.D., some credit it to Aryabhata and some credit it to Varahamihira. *Surya Siddhanta* describes several astronomical instruments — the armillary sphere, simple gnomon or canku, clepsydra etc. In *Surya Siddhanta*, the Indian meridian was fixed at Ujjain. This contains discussion on equinoxes, solstices, eclipses etc. This mentions the distance between the moon and the earth to be $30\frac{1}{2}$ times the diameter of the earth.

The most awakening topic in *Surya Siddhanta* is the *sine-table*, which is the oldest in the world. The concept of *ardhaja* (or semi-chord) was borrowed in Arabic as *jaib* (or curved inlet) and then in medieval Latin as *sinus* (or a curve) from which a final term 'sine' emerged. In the same text, there are references to *Kotijya* (cosine) and *Utkaramajya* (versed sine) also. Dr. Bina Chatterjee said, "the trigonometrical ratio of 'sine' was unknown to Ptolemy, whereas the Hindus made constant use of it." (Journal of the Royal Asiatic Society of Bengal, Vol. XV, No. 2, 1940, article on "Hindu Astronomy"). B.K. Sarkar observes : "The mathematicians of India devised (1) the table of sines (2) the table of versed sines. The term sine is an Arabic corruption from Sanskrit term *Shinjini*".

Brahmagupta was born in 598 A.D. near Multan. He flourished in Ujjain. He wrote the astronomical treatises : *Brahmasphutasiddhanta* in 628 A.D. and *khandakhadyaka* in 664 A.D. He extensively dealt with the properties of cyclic quadrilateral, trapezium and the relation between their sides, diagonals and areas.

Mathematics

Besides Brahmagupta, several others viz. Lalla, Prthudaka, Mahavira (850 A.D.), Manjula (932 A.D.), Sripati (1039 A.D.),

Sridhara (1020 A.D.) and Bhaskaracharya advanced the growth of mathematics in India.

Bhaskaracharya (born in 1114 A.D.), the last astronomer-mathematician of repute in ancient India, wrote *Siddhanta Siromani* in 1150 A.D. This remarkable work consisted of four parts : *Patganita* (arithmetic) or *Lilavati* (name of Bhaskara's daughter), *Bijaganita* (algebra), *Grahaganitadhaya* (motions of the planets) and *Goladhya* (calculations concerning the sphere). The entire treatise is a happy blend of poetic literature and prosaic scientific thoughts. It covers a variety of topics. Some of the illustrations are:

- (1) कः पत्यन्विज्जो विहृतः त्रिषष्ट्या
सत्तावशेषो ऽथ स एव राशिः ।
दशाहतः स्याद् विहृतः त्रिषष्ट्या
चतुर्दशाग्रयो वद राशिमेनम् ॥

(Lilavati 266)

(What quantity is it which multiplied by five and divided by sixty-three, gives a residue of seven and the same multiplied by ten and divided by sixty-three, a remainder of fourteen. Declare the number). Answer 14.

- (2) "Out of a swarm of bees, one-fifth part settled on a blossom of Cadamba; one-third on a flower of Silindhri; three times the difference of those numbers flew to the bloom of a Cutaja. One bee, which remained, hovered and flew about in the air, allured at the same moment by the pleasing fragrance of a jasmine and pandanus. Tell me charming woman the number of bees." Answer 15.

The Arabians came in the field of mathematics in the 8th century A.D. In Arab, mathematics was called *Ilme Hindasa* (knowledge from Hind). The word 'zarb' (strike) for multiplication, was later adopted by the Arabs. The original words for multiplication, used in India, were *ghaat* (घात)

and *haet* (हृत्). The mere user of some Greek terms in Hindu mathematics by later scholars does not establish the originality of mathematical processes involved. For example, from the Greek word *kona* and *trikona*, angle and triangle have been formed. But it must be carefully noted that in the *sulbasutras* which are more ancient works, we have the word *prauze* (प्र-उण) for a triangle.

The eminent mathematician J.R. Newman has said, "India has from time to time produced mathematicians of great power. But judged by absolute standards of greatness of among all mathematicians of the East, the genius of Ramanujam appears to be supreme". Because of his poor English, Ramanujam (1887-1920) failed in Intermediate examination. He displayed unbelievable talent in mathematics, even before he reached high school. Financial difficulties compelled him to discontinue his college studies. With great difficulty, he got a clerical job, where his employer Sir Francis Spring quietly sent some problems worked out by him, to Prof. G.H. Hardy. Highly impressed by his talents, Prof. Hardy arranged for him a scholarship at Cambridge. Within five years of his stay

there, he published 21 papers. He contributed research papers on the theory of numbers, Riemann's Zeta function, mock theta function, modular equations, theories of continued fractions, elliptic function etc. He was made a Fellow of the Royal Society in 1918. Because of acute TB, he was advised to return to warm climate of India, where he died on April 26, 1920.

Venkatraman Saraswati (1884-1960) was another remarkable scholar. He passed M.A. examination in eight subjects at the age of just twenty years, securing highest honours in all. He became Swami Bharati Krishna Maharaj. He was installed as Shankaracharya of Sharada Peeth in 1921, and of Goverdhan Math, Puri in 1925. After many years of research on mathematics in ancient Vedic texts, he constructed sixteen mathematical formulae and wrote a volume on each. Unfortunately, the manuscripts got lost from the house of one of his disciples. In 1957, in his old age, he wrote a summary of the voluminous work. It was published in 1965 under the name '*Vedic Mathematics*' by the Banaras Hindu University. The application of these formulae to most of the classical mathematical problems gives astonishingly short solutions.

Illustrations :

- (1) The solutions for changing $1/19$ to decimal form, by *Ekdhikena purvena sutra* (एकधिकेन पूर्वणे) is :

$$(1) \frac{12X^2+9X+7}{3X+4} + \frac{12X^2+X+3}{4X-1} = \frac{24X^2+14X+3}{12X+1} + \frac{5X^2+6X+2}{X+1}$$

can be solved by *Sunyam Samyasmuccaye* as :

$$\begin{aligned} \frac{3}{3X+4} + \frac{4}{4X-1} &= \frac{12}{12X+1} + \frac{1}{X+k} \quad (\text{By Paravartya}) \\ \frac{12}{12X+16} + \frac{12}{12X-3} &= \frac{12}{12X+1} + \frac{12}{12X+12} \quad (\text{By Sunyam}) \\ 24X+13 &= 0 \\ X &= -13/24 \end{aligned}$$

(Lecturer in Mathematics, P.G.D.A.V. College, University of Delhi, New Delhi.)

B. N. Sur

Education, Democracy and India

AN OPEN Democracy is not simply a government 'of the people, for the people and by the people'. A democratic society functions at all levels democratically, *i.e.*, decisions are allowed to evolve from below and never imposed by an external agency whether individual or group. This social system assures the maximum growth of an individual. The central assumption in a democratic society is that men are neither devils nor gods, but that they are capable of approximating both provided forces without allow. And since personal growth is most secured in a democratic pattern of society and since the basic aim of education is to help the growth of an individual, the democratically organised educational system in a democratic social system is congruous. Moreover, although education is a life-long process, we cannot belittle the functional importance of an educational process, which catalyses the process of democratic socialisation. Democracy is a way of life.

Can Democracy Survive ?

India is the biggest democracy of the world in terms of people involved but she has to go a long way to assert herself as the greatest democracy on this earth. Many hurdles are to cross. Unfortunately, an apprehension has crept into the minds of some responsible people as to whether democratic system of government can survive in India?

May not survive unless the alarming gap between the rich and the poor is narrowed forthwith, unless the monopoly of knowledge, which is the key to a whole family of powers — political, social and economic is broken ruthlessly. Any society, which wishes to build up a system based on freedom, equality and justice must distribute knowledge universally amongst its constituents. In a democratic set-up of education, each and every individual should have access

to the benefits of educational facilities available. Thus, the right to education becomes the common property of everyone and by extension, throwing open the doors of education from primary to university level, we should democratize the right of access to knowledge.

Almost centuries ago, Swami Vivekananda prescribed education as the only medicine to improve the fate of the Indian masses after his analytical observation of Western civilization of his time. This is still valid.

Now, we can raise some pertinent questions. Is our educational system elite? Is educational facility available to all and if available, are the majority people benefited by these? Is our educational system democratically organised? Is the educational system responsive to the needs and aspirations of the people? Is the system coherent and functional? Can we call our educational system democratic if it does not allow those involved in it to participate in the decision-making bodies? Whether our educational system is urban-oriented or rural-oriented? And many more questions could be put.

Criminal Assault on the Poor

The present Indian educational system might be qualitatively competitive to other countries but do we need, at this stage of social reconstruction, the education, which is qualitatively rich but cannot reach the entire population? Do we need or afford sophisticated institutions, the breeding ground for academicians-lords? The resources, which are being poured into such criminal assault statelike institutions is nothing but on the poor people, who are the majority. By depriving them their due share, we cannot expect them to participate in the making of a new society. Cannot we divert the resources to build up schools in the far

away villages or in the interior strategic areas, to improve the pecuniary conditions of the miserable school teachers, to provide material help to the needy students and moreover, to revolutionise primary education by introducing simple technology?

The primary level of education should be common and qualitatively equal to entire mass of the people. There is pathetic difference between a school in the village and in the metropolis. Do you think there is insurmountable problem to equalise, thus, democratize the primary level of education, at least? Vested groups might resist such step else their dominating role in all spheres of life is challenged. The formative period of a person is grossly lies in between his childhood and when he crosses high-school training. Thus, we can socialise the educational system by bringing the entire primary education on the same footing qualitatively.

Moreover, at this stage of primary education democratic values could be injected among the boys and girls, who are more receptive than overaged persons. The content of the school-level education should be thoroughly checked and remodelled. Our education does not make us fearless, truthful nationalist or good citizen. The basic features of a democratic open society should be vivid to them. Alas! Our present education does not provide any such content. Since education is evidently a cultural instrument and its functions are threefold—one of conserving, transmitting and renewing culture, therefore, a national culture on Indian tradition could be manufactured by restructuring the content of primary education. A sort of political-education is the need of the hour. Also, a society cannot function purposefully without skilled and knowledgeable persons. And, all these requirements could be satisfied if we consider primary education as the processing plant of an

educational industry. If, at all, democratic values are to be preserved and transmitted, then, this stage of childhood is most productive. Democratic character is to be built up from childhood.

The clerical adoption of a democratic political system in our country is not natural outgrowth of prior political conditions. We have no historical experiences of a democratic political system of administration at the central level, although our civilisation is the product of an open and democratic society. We should not fear that the entire society would be in the grip of undemocratic functionaries, in case, the political administration, which is democratic collapses for inefficient and dishonest political leaders. But the democratic political system should be guarded and stabilised. And this is possible, to some extent, by changing the incoherent, biased and authoritarian educational system prevailing in our country. We said, "to some extent", because, education, of course, is not a cure for all the ills in our society, any more than it is responsible for causing them. Education, at least, has as its disposal only limited time and means for satisfying all the expectations that individuals and society bring to the educational process. Other systems such as economic, political, customs and behavioural pattern in the society should be looked into.

Secondly, personal ambitions should be subservient to the need of the society. The capacity of our educational system should be tailored to produce sufficient quantity of trained personnel for all levels. A highly professional officer is handicapped with untrained or sub-standard subordinates. We may not just now require more nuclear scientists but quantitative distribution of educational fruit among the masses would create a healthy atmosphere, for future

growth of personal excellence. Our social system has failed to guarantee us a bread-earning job. Then, why sophistication and why window-dressing?

This is also true that an individual, who is not given opportunity to fulfil the mission of his life, may condemn the educational system as undemocratic. Because he should have access to the education, he needs for his personal growth. A hedonist of such type is not fit for democratic system of society.

Equality and Quality

Another problem, which encounters us is, how to reconcile equality with quality in a system of society, which is democratic in nature. Can we be equal and excellent too? An open-door policy in education guarantees equality but a selective educational policy beneficial to the privileged few is undemocratic and elitist in character. But can we afford misuse of resources, which is inherent in an open-door admission policy or whether we will be the party of a social conspiracy to monopolise knowledge by an elitist group? This conflict could be resolved by giving extra weightage to socially, economically and spiritually backward students, when considering their cases along with other candidates coming from glorious families. Selective method with such considerations does not either discriminate one social group with another or protect any interest.

Delinking of degree from job criteria, inclusion of some social problems in the curriculum ensuring base-level education common to all, to take informal education to the door of those, who cannot attend formal educational facilities, introduction of political education at the base-level stage and to orient educational pattern to the

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need of the people are some of the aspects
of a democratic educational system. It
should be also considered that the change in
educational system is a continuous process.
But continuous revolution in a society
should be well-directed to the eternal aim of
carrying higher level of consciousness.

In fine, the sharp increase in popular aspira-
tions for pursuing formal education, which
is a world-wide phenomenon and which has
laid siege to existing schools and universities
should be constructively directed for the
making of a democratic society. Otherwise,
as France on the eve of the Revolution,

Russia at the end of the Tsarist regime and
China during the Cultural Revolution illus-
trates, how a ruling class is incapable of
assimilating social change and reinterpreting
their tradition. A culture, thus, having
explosive ingredients cannot assure the
making of a great civilization. In all the three
cases, bloody revolution followed by the
establishment of entirely new systems of
education. To avoid bloodshed in India, a
revolutionary educational change is
unavoidable.

(Jawaharlal Nehru University, New Delhi
110067).



Om Prakash
and
Shitala Prasad

Indian Labour Movement—II

First Phase

Dr S.D. Puneekar regards the movement of trade unions from 1875 to 1917 as the period of social welfare.⁷² Dr Rajni Kant Das has divided the first phase (from 1875 to 1918) into two parts. He regards the first part viz. from 1875 to 1891 as the 'regulating period' during which laws were passed with regard to women and children working in the factories. The second period of this phase viz. from 1891 to 1918, is regarded by him as a 'closing period' when the evil system of sending Indian labourers to the foreign countries came to an end.⁷³

From the middle of the 19th century, Indian labourers migrated in search of work to Africa, Burma, Ceylon, Fijiland, and other countries. Their condition in those countries was very pitiable. The reformers in the country, off and on, carried on the movement for improving their condition. Consequently, the Government had to stop the migration of labourers to other countries in 1917 and the system of indentured labour was discontinued in 1922. In India too the condition of employees working in plantations of tea and coffee was not very good. Afterwards, in 1916 Mahatma Gandhi carried on the passive resistance movement in Champaran (Bihar).

In 1884, Srinarayan Meghji Lokhande first tried to rally the labourers so that their demands may be put forth and in a meeting convened at Bombay a number of resolutions were passed. These covered weekly holidays, recess of half an hour between the working hours, suitable compensation in case of accidents, and regular payment of wages etc. A memorandum embodying these demands was submitted to the Indian Factories Commission, and in 1890, another such memorandum was put up before the Millowners' Association. The Millowners

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granted the demands of weekly holidays. Encouraged by this, Mr Lokhande organised the first Trade Union in 1890 under the name "Bombay Millhands Association". In order to propagate the aims and methods of work of this union, and to convey their demands to the authorities concerned, the publication of a paper under the appellation of 'Dinabandhu' (Friend of the poor) was started. This trade union had neither a constitution, nor had any regular membership. It had even no regular fund. It may, therefore, be regarded as an institution for social welfare.⁷⁴

In 1881, the first Factory Act was passed in India. Due to low wages and more hours of work the production of textile output was cheaper here than in England. The factory owners of England felt great concern on account of this situation and they made every effort to bring about a change in the working conditions of the factory employees in India. In November 1888, the Manchester Chamber of Commerce passed a resolution that the employees in the Indian textile mills had more working hours, so that articles of the British Factory Laws should be made applicable to the women and children working in the Indian textile mills.⁷⁵

The original demands of the Indian labourers were regulation of working hours, holidays, provision of recess during the working hours, regular payment of wages and to put a stop to the ill-treatment to labourers by the management.⁷⁶

According to the Royal Commission on Labour, there were very few strikes prior to 1918-1919.⁷⁷ Dr R.K. Das states that during the period from 1882 to 1890, twenty-five strikes took place in different parts of the country.⁷⁸ The employees of the Empress Mills of Nagpur struck work in 1877, in opposition to the then prevailing

rate of wages. In Ahmedabad the weavers struck work in 1895 as the fortnightly payment of wages was changed to weekly payments by the management, but they did not get any success. Some strikes took place in Bombay during the year 1897. In Madras, there was a strike in the Government Press on the question of overtime work without any wages. In 1905, the employees of the Government Press, Calcutta struck work for about a month. In 1907, there was a strike in the Samastipur Railway Workshop on the question of enhancement of wages.⁷⁹ During this period these strikes were not conducted in an organised manner and were simply resorted to temporarily to resolve the existing problems that faced the workers. The workers returned to their homes in the countryside during these strikes and did not actively cooperate in strikes.

Mr Buchanan has given the following opinion with regard to the progress of the trade unions upto the year 1908. "There was only sporadic and irregular concerted action among Indian labourers, even on the scale of individual shop. When occasionally, there was united action, it was rather that of a mill mob aroused over a particular, temporary, purely local and often personal grievance, than that of a business-like trade."⁸⁰

In Bombay, the Kamgar Hitvardhak Sabha (an institution for the welfare of the labourers) was established in 1909 and in 1911, the social service league came into being. The Kamgar Hitvardhak Sabha took active part in the field of social welfare, and occasionally, held talks with the employees. The social service league did praiseworthy work in connection with the education and welfare of the employees. In the same way another institution known as "Workingmen's Mission" was established

in Calcutta in 1878 by the Brahma Samaj. This institution conducted night schools for the benefit of the workers. In 1905, one more institution known as "Working Men's Institution" was formed in Calcutta.⁸¹ In consideration of the low wages, infernal condition of living and heavy burden of work etc., some philanthropists made efforts to create a social awakening among the workers.

During this period some other trade unions came into being, among which was the Amalgamated Society of Railwaymen of India and Burma, which was formed in 1897. This society was registered under Indian Company Act. This union worked mainly as a mutual insurance society. The Printers' Union was formed in Calcutta in 1905, and Postal Union was constituted in Bombay in 1907. These are very important links in the development of the trade unions in India. After the birth of these institutions, the Factory Act was revised in 1911.

In this period, the Swadeshi movement had a remarkable influence on the trade union activities. Many political workers took up the work of trade unions as well and shouldered the responsibility of securing the benefits for the workers. Between the years 1905 and 1909 the Indian labourers had undertaken many important conflicts. This was the time when the bugle for Indian Independence had been blown. In 1908, there was a general strike in Bombay to express indignation at the imprisonment of Lokamanya Tilak. This was the first exhibition of impact of the labourers on political problems. The labour was gradually getting organised in different parts of the country.

Madras Labour Union was the first organisation established in 1918 on the basis of the

present trade union principles, by the efforts of Mr B.P. Wadia. The Madras Labour Union soon became very popular. Mr Lokanathan has stated that every labourer of the textile industry in Madras became a member of this union which in a short time became very powerful.⁸² The membership fee of this trade union was only one anna per month. During those days the labourers had to work for twelve hours a day and their wages were very low. The labourers put forth their demands on these points and struck work but the employers declared a lockout. A case was filed by the employers in the court of law against Mr Wadia for compensation and a decree was passed against him. This created a great commotion among the Indian workers. The British labour party made efforts to attract the attention of the Secretary of State for India, but nothing could be done in this respect owing to the absence of any enactment on the trade unions.

Along with the Madras Labour Union, workers unions were equally formed in many other places. In 1918, two unions in Bombay, one in Calcutta, and four in Madras were established. Next year ten unions of the kind came into being, namely five in Bombay, two in Madras and one each in Bengal, United Provinces and Punjab. Among these the M.S.M. Railway Employees Union, Madras and the Cement Union in Bombay deserve mention. By 1920 a number of trade unions sprung up which included the Textile Labour Association of Ahmedabad. Seven provincial branches of the All India Postal and RMS Association were opened in 1919-20, which had in all a membership of 20,000 workers.⁸³

Second Phase

As a matter of fact, the history of the trade union movement in the country begins

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the efforts of the Labour Union. Mr. Lokar, a labourer, became a member of the union. The membership of the union grew to one anna a day and the labourers put up points and demands. The employers of the union, Mr. Wadia, were passed over the head of the union. The British government, which had been in India, was respected in this respect.

Labour Union, formed in two unions in 1904 and four in 1905. The union was formed into being, Madras and provinces and M. Railway and the Cement Union. By 1920 the union was up which association of branches of the union had in all workers.⁸³

history of the country begins

after the end of the First World War. There are a number of factors which influenced the Indian trade union movement. Due to the economic condition of the country, the prices of articles increased, but the wages of the labourers did not rise in proportion to it. Consequently, the feeling of dissatisfaction spread among the labourers and the workers began to swell the membership of the trade unions, in order to be united. The movement, for national independence also strengthened the workers movement. Due to the atrocities committed in the Jallianwala Bagh, the leaders of the nation attempted to amass the labourers through organised trade unions and to lead them to fight the Government unitedly. Lala Lajpat Rai, Pandit Jawaharlal Nehru, Shri Subash Chandra Bose and other leaders, led the workers, with a view to improve their condition along with the political reasons.

Many Indian soldiers had visited foreign countries, where they had a chance to observe the condition of workers. These soldiers, on their return to motherland, described the enviable condition of the foreign workers, their rights and convenience, which incited the Indian workers to desire and aspire for same better conditions, rights and facilities for themselves. The end of the Czar rule in Russia had a very healthy effect on the Indian working class movement. The revolution in Soviet Russia lent a political ideal and point of view to the Indian workers.

The establishment of International Labour Organisation in 1919 had also a very salutary effect on the Indian trade union movement. India has been a member of the ILO since its inception. In addition to the Government representatives, the ILO included members of the management, and the labour, elected in accordance with the recommendations of their central organisations. As there was no

central trade union organisation in India the necessity for it was felt for recommending labour representatives to the ILO. Consequently, in 1920, the first central organisation of labour known as the All India Trade Union Congress was constituted. The credit for giving birth to this central organisation goes indirectly to the ILO. The first session of the All India Trade Union Congress was held in 1920 under the presidency of Lala Lajpat Rai. At that time, 64 trade unions with a total membership of 1,40,854 were affiliated to the All India Trade Union Congress.⁸⁴ The AITUC (All India Trade Union Congress) being the only central organisation of labour, got the right to recommend labour representatives to the ILO.

According to Dr. Punekar, in the year 1920 there were 125 trade unions in the country having 2,50,000 members.⁸⁵ These were the days when trade unions were organised to make certain demands, and when their object was achieved they became inactive and gradually defunct. There were exceptions also, among which numbered the Ahmedabad Textile Labour Association, the Postal and the Railway Workers' Union, which are still doing useful work for their members.

With the efforts of Shri Shankerlal Banker and Anusuyaben, the employees of the textile mills at Ahmedabad founded in 1920 a textile labour association under the appellation of 'Majoor Mahajan'. The need for a trade union in Ahmedabad had been felt in 1918 to conduct a strike. In 1917, the Millowners at Ahmedabad had begun to give a plague allowance to the employees, but they wanted to discontinue it in 1918. In place of the plague allowance, the labourers wanted to get an increase of 50 per cent in their wages, due to the high prices of commodities prevailing at that time.

Through the efforts of Mahatma Gandhi a solution was found. As a matter of fact, this trade union had an occasion for a healthy growth under the aegis of Mahatma Gandhi, who commanded a great influence on the Millowners, the Millhands and the general public. There were always cordial relations between the Millowners and the labour on account of his presence and counsel. The trade union of Ahmedabad kept itself aloof from the central trade union organisation of the country and carried on the work of solving the problems of the labour peacefully.

During the period under reference, there were a number of strikes in the country on the question of wage-increase and such other problems. In 1919, lakhs of employees of Bombay textile mills took part in a strike and succeeded in obtaining their demands. Next year, there was again a strike on the employees' demand for a ten hours working day. Nearly two lakhs of employees took part in it and before an amendment in the Factory Act was brought the hours of work for the textile millhands had been reduced. In 1919, there was a strike at Kanpur and the railway employees of Jamalpur also struck work. In 1920, the employees of textile mills at Bombay, Ahmedabad, Madras and Sholapur, as well as those of the jute mills in Calcutta struck work. The railway employees of Bombay carried on their strike for nearly five months. Most of the strikes of this time succeeded in achieving their demands.

In connection with the non-cooperation movement also, there were strikes at many places. In accordance with the decision of boycott taken by the Indian National Congress, the railway employees of the North Western Railway struck work at the time of the arrival of the Prince of Wales in India. In 1921, the workers of the tea plantations

in Assam, went on strike and began to return to their homes in Bihar, Orissa and other provinces. The employers desired that they should not leave their place of work. The police lathi-charged the innocent workers. The employees of the Assam Bengal Railways and the steamers also declared a strike in sympathy with the workers of the tea plantations.

The Indian National Congress was always conscious of improving the conditions of the workers. At its 35th session at Amritsar in 1919, it adopted a resolution, asking the Provincial Congress Committees to try for the social, economic and political uplift of the workers. Next year at Nagpur, a sub-committee was formed which included Lala Lajpat Rai, Shri C.R. Das, Anusuyaben and others. They were entrusted with the work of ameliorating the conditions of the workers. In 1922, at the Gaya session of the National Congress, it was decided to give every help to the All India Trade Union Congress and a resolution was passed to the effect that in the opinion of the Congress Indian workers should unite in order to improve their condition, to obtain their rights and to free themselves from exploitation. It welcomed the efforts of the All India Trade Union Congress and Kisan Sabha, for uniting the Indian labourers and appointed a committee consisting of Messrs C.F. Andrews, J.M. Sen Gupta, S.N. Haldar, Swarni Dena Nath, D.D. Sathe and M.S. Ingarvelu Chettiar, to assist the executive committee of the All India Trade Union Congress, in its work of uniting the industrial and agricultural labourers.³⁶ As a result of this resolution the congress workers voluntarily took part in the work of trade unions and their work proved to be of great assistance.

Much guesswork has been done, in respect of the membership of the trade unions,

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between the years 1921 and 1925. According to Dr R.K. Das in 1921 there were 77 trade unions, with a membership of one million. The All India Trade Union Congress holds that there were 68 trade unions having 2,23,337 members in 1924. According to Dr Loknathan, the number of trade unions was one hundred and their membership was 1,30,000.⁸⁷

Third Phase

During the years 1924 to 1927 there was not much progress in the Indian trade union movement. The employees formed trade unions whenever required. In 1927, the number of trade unions was 164 with a membership of 1,98,000. Of these, 68,000 were members of the employees unions of mines and industries, 75,000 of the transport and 50,000 of public undertakings.⁸⁸

After the War, there was a slump in the industries which had a great effect on the demand for consumer goods.

When the materials of War were no longer required, many factories were closed, resulting to the increase in unemployment. During this period, there were a number of strikes most of which could not succeed. In 1924, about a hundred and fifty thousand millhands struck work in opposition to the cut in their wages. After a year, the management began to deduct 20 per cent from the dearness allowance paid to the employees. Consequently, there was another strike which ultimately proved successful. The Government withdrew excise duty and the

management gave up the idea of cut in the wages. Strikes took place in the workshops at Gorakhpur and Kharagpur also.

In accordance with the Government of India Act of 1919, nine seats were reserved in the provincial legislatures to represent labour. To fill in these seats, appointment of labour representatives was made, as follows :-

Three in Bombay, two in Bengal, and one each in Assam, Bihar, Orissa, Central Province and the Punjab.

Meanwhile, a number of legislations were passed in the interest of workers. The Factory Act was amended in 1922 stipulating 60 working hours in a week, 11 in the day. In 1923, the Indian Mines Act was passed and also the Compensation Act to provide for compensation to the workers. In 1926, Indian Trade Union Act came into being, affording security to the office bearers of the trade unions, in their activities. This Act provided for the registration of trade unions, and made it compulsory for the trade unions to observe certain rules and to submit an account of income and expenditure, under this Act. Registration of trade unions was not obligatory but the trade unions realising the importance of registration got themselves registered voluntarily.

The All India Trade Union Congress regularly held their annual session every year. The following table shows their activities from 1921 to 1927:⁸⁹

Year	No. of Session	Place of Session	President
November, 1921	2	Jharia	Mr J. Baptista
March, 1923	3	Lahore	Mr C.R. Das
March, 1924	4	Calcutta	Mr C.R. Das
February, 1925	5	Bombay	Mr D.R. Jhengadi
January, 1926	6	Madras	Mr V.V. Giri
March, 1927	7	Delhi	Mr Chandrika Pd.
December, 1927	8	Kanpur	Mr Diwan Chaman Lal

This shows that among the presidents of the All India Trade Union Congress, there were some top leaders of the Indian National Congress. It shows that the Indian National Congress had its impact upon the trade union movement. Shri N.M. Joshi was connected with the Indian trade union movement from its very inception. In the year 1925, he was elected Joint Secretary of the AITUC and after two years its General Secretary. He continued to work as such till 1929. Provincial branches of the AITUC were opened and their provincial sessions were initiated. The 'Trade Union Bulletin' began to be published. A number of resolutions used to be passed at the annual session of the AITUC. A number of times, different opinions were expressed with regard to the affiliation of the AITUC to the International Trade Unions, but a sort of unanimity was evolved and independent position of the AITUC was maintained.

In addition to the AITUC, another organisation known as "the Labour League of India" was founded in 1923 at Calcutta, with the efforts of Shri K.C. Roy Chaudhari and some other leaders. The Government of India deputed Shri K.C. Roy Chaudhari to Geneva as a representative of Indian labour. After this period nothing is known of the activities of this organisation. In 1925, once again efforts were made to form a labour party, and a sub-committee was appointed at Delhi, with Lala Lajpat Rai as president, and Shri D.P. Sinha, as convener to draft the constitution and rules of the party. In 1925, Shri D.R. Thengdi president of the AITUC, made efforts for founding the Labour Party which aimed at constitutionally looking after the interests of the labourers in the provincial legislatures. In 1928, a labour representation committee was formed in Bombay to safeguard labour interest in the central and provincial legisla-

tures as well as in the local corporations,⁹⁰ but as no details of their activities are available, it may be presumed that this party had become defunct.

In 1921, at the second session of the AITUC at Jharia, the Red International of Labour Unions expressed its good wishes and invited the AITUC to join it on the basis of equality. At this session of the AITUC resolutions were adopted to express sympathy with the Russians, and to help the labourers of the world.⁹¹

After the end of the Czar rule and the Russian revolution, a few Indians were attracted to the communistic way of thinking. Communist literature also influenced to some extent the Indian intelligentsia. Shri M.N. Roy started the publication of *Vanguard and the Masses*. Shri S.A. Dange began to publish the weekly '*Socialist*' and Shri Mujaffar Ahmad started the publication of the Bengali weekly '*Jan Vani*' from Calcutta. Thus communist ideas were propagated by these papers.

The British Government was conscious of their activities and was quite alert. In 1924, a conspiracy case, known as 'Kanpur Communist Conspiracy Case', was instituted in a court of law against Messrs. S.A. Dange, Mujaffar Ahmad, Shoukat Usmani and others and they were sent to prison. Shri M.N. Roy was the principal accused, but as he was in Europe at that time, he could not be prosecuted. However, the imprisonment of these leaders did not much affect the propagation of communist views.

Shri S.A. Dange and Shri Mujaffar Ahmad were released in 1925. Due to their release, the communist activities expanded to some extent. A weekly '*Kranti*' started its publication with Shri S.A. Dange as the editor. In 1924, the fifth congress of the Communist

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International counselled the Communist Party of India to handle their influence on the Indian trade unions and to reorganise them as a class.⁹² Shri Dhundi Raj Thengdi was elected in 1925, as president of the fifth session of the All India Trade Union Congress at Bombay. He was a strong supporter of communist thinking. In 1927, a well-known communist worker named Shri S.V. Ghate, was appointed secretary of the AITUC. These people tried to sever connection of the AITUC from the International Federation of Trade Unions and affiliate it to the Red International of Labour Unions. The other leaders, including Shri N.M. Joshi, Diwan Chaman Lal and V.V. Giri did not favour this move and had a leaning towards the British Trade Union Congress and the British Labour Party. Though the communists did not succeed in this move, they had gradually a growing influence in the affairs of the AITUC.

The Indian National Congress had decided to boycott the Simon Commission. The communist leaders as well as the trade unions under their control were also opposed to the Simon Commission. The communists gradually began to get an entrance in the trade unions in Bombay, as well as in Bengal, U.P. Punjab and Madras. After the verdict in the Kanpur conspiracy case, the communist leaders began to organise unions under various names such as 'Nav Jawan Sabha', 'Youth league', Kirti Kisan Party' etc., and tried to maintain their control over them. In 1928, a long strike was organised under the leadership of the communist leaders on the question of standardisation scheme and it lasted from April to October. In the month of October, the Government appointed the Fewcett Committee to examine the scheme and to recommend how it could be applied without causing any disadvantages to the labour.

A great dissatisfaction existed among the employees of the jute mills in Calcutta. The employees of the Lilua workshop of the East India Railway was declared a strike. At Jamshedpur there was a prolonged strike lasting for 105 days. The communists had a hand in organising this strike. Thus the influence of the communists on the trade unions effected the industrial set-up also. The number of industrial disputes in India which was 127 in 1926 and 129 in 1929 rose to 203 in 1928.

In 1929, the British Government instituted a case against the communist leaders on the charge of overthrowing the Government. It is known as the Meerut conspiracy case. Under this charge, almost all the communist leaders were arrested. They were Messrs S.A. Dange, R.S. Nimbkar, K.N. Joglekar, S. S. Mirajkar from Bombay, Messrs Mujaffar Ahmad, Gopal Baruk, Shamsulhuda from Calcutta, Shri P.C. Joshi from U.P. and three British communists, Messrs Philip Spratt, V.F. Bradley and Lester Hutchinson as well as some others. The case was decided in 1932 and all the accused were sentenced to various terms of imprisonment, on appeal the terms of imprisonment were reduced, the highest being three years. The Government tried to suppress the communist movement by repressive measures. Thus the Communist International got a good opportunity to carry on a propaganda against the policy of repression adopted by the British Government.

Due to the imprisonment of these Communist leaders, there was a deficiency of experienced trade union leaders. Shri V.T. Ranadiva and S.P. Deshpande undertook the leadership of the trade unions under communist influence. Though they were well-versed in the communist principles they had not much experience of trade union

work. The employees of textile mills in Bombay were dissatisfied with the recommendations of the Fewcett Committee. Taking advantage of this feeling the communist leader brought about a strike in the textile mills. The strike proved to be a failure and the management of the unions was thoroughly disorganised. With the result that the number of its members was reduced to only 800 in June, 1930, where as it had been 55,000 in January, 1929.⁹³ This strike affected also the trade unions in other industries and the number of their members was also pulled down. At this time the country was passing through economic crisis. The management took advantage of the situation and effected a retrenchment of the employees and also reduced the rate of wages paid to them.

The Sixth Communist International suggested the Communist Party of India that it should keep itself aloof from other parties and should work by itself. In 1930, the Young Communist International sent an open letter to the Indian youth employees and farmers which clearly expressed their views as follows:—"The Indian National Congress obstructs the revolutionary movement. It has deceived the Indian public and does not fight the British imperialism. The Communist Party should break away from the Indian National Congress, League of Independence and expose its falsehood and breach of trust. It should be made clear that it helps the British imperialism. Drive away these elements who have deceived the people."⁹⁴ The All China Labour Federation also sent a message which stated "The Indian National Congress under the leadership of Mahatma Gandhi is just a counterpart of the Chinese Kuomintang, as both are the helpers of imperialism. We should not have any misconception about Mr Gandhi and should oppose him for the success of the revolution."⁹⁵

These suggestions, greatly influenced the communist leaders and workers and they began to work under the directions of their party. In 1929, the communists made efforts in getting a number of resolutions passed, in their favour in the annual session of AITUC held under the presidentship of Shri Jawaharlal Nehru. In the session, resolutions were adopted to non-cooperate with the Royal Commission on Labour, and to get the AITUC, affiliated to the Pan Pacific Trade Union Secretariat. The All India Trade Union Congress also resolved not to cooperate with the Asiatic Labour Conference and the Round Table Conference as well as not to take part in ILO⁹⁶ All these resolutions were passed in spite of the opposition of the Moderates. The Communist Party knew very well that the Moderates had no interest in these resolutions, and they may, therefore, be compelled to dissociate themselves from the AITUC on this subject. Pandit Jawaharlal Nehru has expressed his views in his autobiography like this, "In this matter as in many others, my sympathies were with the left, especially as this was also the policy of the Indian National Congress. It seemed absurd to cooperate with official commissions, when we were carrying on, or going to carry on, a direct action struggle."⁹⁷ Thus the national leaders helped the communists to get these resolutions passed. Pandit Nehru has expressed his view in detail regarding this session in his autobiography and says: "Being a newcomer in the labour field and still feeling my way, I was a little hesitant. Generally, I expressed my views in favour of the more advanced groups, but I avoided acting with any group, and played the part more of an impartial speaker than directing president. I was thus an almost passive spectator of the breaking-up of the TUC and the formation of a new moderate organisation. Personally, I feel that the Right groups were not justified in breaking

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away, and yet some of the leaders of the Left had forced the pace and given them every pretext to depart. Between the quarrels of the Right and Left a large centre group felt a little helpless. Perhaps given a right lead, it could have curbed the two and avoided the break-up of the TUC and, even if the break came, it would not have had the unfortunate consequences which resulted."⁹⁸ As the result, the Moderates left the All India Trade Union Congress, and with them 30 trade unions with a membership of 95,797 members remained affiliated to the AITUC.⁹⁹

After the Moderates left the AITUC, Shri Subhash Chandra Bose was elected as its president and Shri S.V. Deshpande as the general secretary. The Moderates after leaving the AITUC constituted a central organisation under the name "Indian Trade Union Federation" to which were affiliated, next year, 26 trade unions having more than 50,000 members. In 1930, the communists brought about a strike of the employees of the Great Indian Peninsula Railway (Now Central Railway). The strike was a complete failure and a number of employees were dismissed. The employees of the textile mills at Bombay and Sholapur also declared a strike but it could also not be successful. The communist began openly to work against the Indian National Congress. Thus it became impossible for the congress leaders to cooperate with the communists. Frictions originated in the AITUC in 1931 over a dispute of the Girni Kamgar Union. The eleventh session of the AITUC, presided over by Shri Subhash Chandra Bose, was held in Delhi from July 3 to 7, 1931. There were two factions in the Girni Kamgar Union, one was led by Shri S.V. Deshpande and the other by Shri G.L. Khandekar. Both these factions claimed representation on the General Council of the AITUC. The AITUC recognised

the claim of Shri Khandekar faction. As a result Shri S. V. Deshpande and his supporters organised on July 6, a separate organisation under the name 'Red Trade Union Congress'. Thus there were now three central labour organisations in the country. This gave a grave setback to the labour movement. On the foundation of the Red Trade Union Congress, the famous labour leader Shri Harihar Nath Shastri expressed his views that "The people with their short-sightedness and their destructive policy, have not only separated themselves from the labouring class but also have given a rude shock to the revolutionary thought which had been making brisk progress during the last five years.

The Royal Commission on Labour under the chairmanship of Mr. Whitley was appointed in 1929. After a wide study of the labour problems of the country the Commission subsequently submitted its report to the Government on March 14, 1931. In 1929, the Trade Disputes Act was passed which provided for resolving industrial disputes, by establishing ad-hoc court of enquiry and conciliation boards. Consequently in 1930 and the following few years, there was a decrease in the number of workers taking part in industrial disputes and also in the number of man-days lost.

Now in 1931, there were three central labour organisations, namely the Indian Trade Union Federation, the All India Trade Union Congress and the Red Trade Union Congress. Many trade unions even did not get themselves affiliated to any of these central organisations. Labour leaders made efforts to bring unity among these central labour organisations. Shri N.M. Joshi proposed a conference of all the parties. Shri Chaman Lal was in favour of arranging a common programme for these central organisations. In 1931, the Railwaymen's

Federation arranged for a unity conference in Bombay, and in 1932 was established a 'unity committee'. Meanwhile, Shri Subhash Chandra Bose and Shri Ruikar held talks with the secretary of the Indian Trades Union Federation on the subject of unity. The Unity Committee also framed a constitution. The leaders of the All India Trade Union Congress and the Indian Trades Union Federation were invited to join the convention for unity, but this move failed. The trade unions connected with the Indian Trades Union Federation held a session in Calcutta in April, 1933 and established a new central organisation under the captain, 'National Trades Union Federation'. Forty-seven trade unions with 1,35,000 members were affiliated to it.¹⁰⁰

Meanwhile several important strikes were held at different places. The dock workers in Bombay, struck work in 1932 and received 25 per cent increment in their wages. In 1933, at its session in Kanpur, the All India Trade Union Congress passed a number of resolutions with regard to the economic and political problems of labour and on various important questions. One of the important resolutions, laid down that a big conference of textile employees be held in Bombay at the end of January, to prepare for a general strike in the textile mills all over the country.

In accordance with the decision of the All India Trade Union Congress, a big conference of the textile mill employees of the country was held at Bombay on the January 28, 1934. This conference was very important and almost all the well-known labour leaders attended it.

As decided by the AITUC in its Kanpur session, a conference was also held at Jabalpur in March, 1934 at which the socialist party was brought into being. The

object of this party was to end capitalism and in its place to establish socialism under which a committee (Panchayat) of the labourers and farmers should control the economic life of the country. Shri Harihar Nath Shastri, Shri R.S. Ruikar and Shri Shiv Nath Banerji rendered great contribution in the organisation of this conference.

In 1934, as already decided, a general strike was declared in the textile mills of Bombay in opposition to rationalisation, retrenchment, wage cut etc., but it failed. Similar strikes took place in the textile mills of Nagpur and Sholapur also. A committee was set up by the All India Trade Union Congress to probe into the causes of this failure of the strike. The committee fully examined, the subject, recorded evidence and published a report, which shows that the general strike had failed because of the destructive policy of the communists and their ways to create disunity among the workers.

On April 20, 21 and 22, 1935, the fourteenth annual session of the All India Trade Union Congress was held at Calcutta. As the session was to discuss the problem of uniformity in the labour movement, all prominent labour leaders were invited to attend it. Under its auspices a unity convention was held in which all parties took part. At last after many hours of discussion a compromise was effected between the Red Trade Union Congress and the All India Trade Union Congress on the following terms:-

1. The principle of class-conflict should be accepted.
2. Red Trade Union Congress should be abolished and the All India Trade Union Congress should be the central organisation of the labourers.

3. On the principle of one union for one industry, the trade unions under the Red Union Congress should be affiliated with AITUC.
4. There should be no connection with any foreign trade union.
5. The All India Trade Union Congress should every year decide the question of deputing representatives to the International Labour Conference, to be held at Geneva.
6. Any party or group under the All India Trade Union Congress should have the right of propaganda and criticism provided it is in conformity to the discipline of the AITUC. All the trade unions should accept the majority decision.

Like the National Congress, the All India Trade Union Congress also expressed its opposition to recommendations of the Joint Parliamentary Commission, to bring about a small constitutional change in the country. In 1936, at the 15th session of the AITUC presided over by Sushri Maniben-kara. A special invitation was sent to Shri Jawaharlal Nehru, the president of the Indian National Congress. Shri Nehru expressed his view on the problems of labourers and promised support of the Indian National Congress to the labourers. At this time the communist leaders sentenced in the Meerut conspiracy case, were released from the prison and they took up their work again. On the occasion of the session of the Indian National Congress in October, 1935, they made an appeal to organise a general strike on the Lenin day, as a token propounding the establishment of Government of the Proletariat.¹⁰²

The Bombay Government declared the Communist Party unlawful, and on the July 23, 1934, the Government of India also outlawed the Communist Party of India and

its branches. The Punjab Government declared the 'Kirti Kisan Party' unlawful. The Madras Government proclaimed the Young Workers League unlawful and the Bengal Government also outlawed 13 trade unions working under the influence of the communists.¹⁰³

The Royal Commission on Labour, emphasizing the necessity of representation of labour in the legislatures, wrote in their report that it will give a chance to the labour representatives to express the feelings and views of the working class, and it will enable them to suggest ways and means to solve the problems facing the labour. The welfare of the working class does not simply depend upon labour planning but also rests upon the tendency of the labour policy and the outcome of legal instrumentalities.

It is absolutely necessary in this connection, that for security of the well-being labour should have its due representation so that the organised labour may render its significant contribution to the nation as well.¹⁰³

In 1935 new Government of India Act was enforced by which the provincial Governments became autonomous. The following table shows the number of labour representatives in the legislatures of the various provinces:¹⁰⁴

Provinces	Seats
Bombay	7
Bengal	8
Madras	6
UP	3
Punjab	3
Bihar	3
CP	2
Assam	4
Orissa	1
Sindh	1

Fourth Phase

In 1936, after the elections, held under the Government of India Act., the Congress formed ministries in all provinces except Punjab and Bengal. As the Congress had taken over the Government, workers and employees, like their other countrymen expected a change in their condition. During the year 1937, 1938 and 1939, the number of registered trade unions as well as their membership increased considerably as shown in the table below:-

Year	Number of registered trade unions	Membership of unions submitting returns
1936-37	271	
1937-38	420	2,61,047
1938-39	562	3,90,112
		3,99,159

Although the Congress Government had in the first ministry limited powers, the Congress leaders helped to a great extent the progress of labour union movement. In a number of industrial disputes through the intervention of the ministers for labour, mutual compromise could be effected. The then minister for labour in the Madras Government, Shri V.V. Giri applying Article 144 of the Criminal Procedure Code against an employer compelled him to lift the lock-out imposed by him.¹⁰⁵

The labour leaders continued to make efforts to bring unity between the AITUC and the NTUF. Messrs N.M. Joshi, Harihar Nath Shastri, R.S. Ruikar, B. Shiv Rao and V.V. Giri published the following appeal for unity:-

"During the last four years many efforts have been made to bring unity among the different groups working in the labour

movement but owing to differences of opinion with regard to fundamental principles there could be no compromise. Those who are connected with some party, will have to acknowledge that the difference of opinion has been very detrimental to the interests of labour. The labour will have to suffer as long as there is no mutual unity. Bearing these facts in mind, we have come to a decision that although amalgamation of these parties into a new one is impossible, some such institution should be founded which will enable the different

parties to unite for collective action when the interests of labour are jeopardised. We have, therefore, to counsel all parties to form a joint committee of ten representatives from each of the party. This committee will formulate a joint programme of work, which, after being consented to by the parties concerned, will be put into action. The decision of the committee may not be settled by votes by mutual agreement and unanimity. We hope to achieve greater success by means of this system. The general secretaries of the AITUC and the National Federation of Trade Unions should be the conveners of this committee. To support this appeal, general meetings of labourers were held in different parts of the country. This created a favourable atmosphere for unity."

The joint session of the AITUC and the NTUC presided over by Shri Suresh

Chandra Banerji, was held at Nagpur on the April 17, 1938, in which the following resolutions were passed.

1. The National Trades Union Federation should be merged with the AITUC.
2. The AITUC should accept the constitution of the NTUF.
3. The merger of the NTUF with the AITUC should be only for one year.
4. AITUC should not be affiliated to any foreign trade union organisation.
5. All political problems of the labour movement and question of staging strikes should be decided by a three-fourth majority of the general council or the Executive Committee.

After the merger of the NTUF the membership of the AITUC rose to 3,66,456 and 188 trade unions were affiliated to it. Thus the rift in the AITUC was sealed at Nagpur after nine years and once again there was a single central labour organisation.

The aims and objects of the AITUC are given below:-

- (a) To establish a socialist state in India;
- (b) To socialise and nationalise the means of production, distribution and exchange as far as possible;
- (c) To ameliorate the economic and social conditions of the working class;
- (d) To watch, promote, safeguard and further the interests rights and privileges of the workers in all matters relating to their employment;

(e) To secure and maintain for the workers:-

- (i) The freedom of speech,
- (ii) The freedom of press,
- (iii) The freedom of association,
- (iv) The freedom of assembly,
- (v) The right to strike; and
- (vi) The right to work or maintenance.

(f) To coordinate the activities of the labour unions affiliated to the AITUC and

(g) To abolish political or economic advantage based on caste, creed, community, race or religion.

The AITUC shall endeavour to further the aforesaid objects by all legitimate, peaceful, and democratic methods such as legislation, education, propaganda, mass meetings, negotiations, demonstrations and, in the last resort, by strikes and similar other methods, as the AITUC may, from time to time decide.

The various congress ministries set up committees to probe the condition of the employees. With a view to examine the condition of textile employees in Bombay, a committee was set up with Sri Jayaram Das Daulatram as its chairman, according to whose recommendations, the wages of the textile mill employees in Bombay, were increased. In UP also, a committee, under the chairmanship of the well-known congress leader Dr Rajendra Prasad was constituted. It thoroughly examined the condition of the employees of the textile and woollen mills of UP and submitted their report to the Government.

To settle industrial disputes the Bombay Government passed the Bombay Industrial Dispute Act in 1938. The credit for getting

this law passed goes to Shri Gulzari Lal Nanda, the then Parliamentary Secretary in the Government of Bombay and former general secretary of the Textile Labour Association of Ahmedabad. The Act was framed on the basis of his experiences gained in Ahmedabad.

Due to the declaration of the World War II, and as India was the centre of supplying war materials, a number of new industries were started here on account of the war. The cost of articles of daily consumption shot up. Consequently, the millhands began to demand a rise in their wages. The employees of the Bombay mills were the first to start a strike in 1940 to demand dearness allowance. Strikes took place at other places also on the same demand. From the following table it is clear that the index of prices of articles of daily consumption was sufficiently high in comparison with the previous index:-¹⁰⁶

Cost of Living Index

	1939	1940	1941	1943	1944	1945
Bombay	100	107	118	219	226	227
Madras	100	109	114	180	207	228
Kanpur	100	111	181	306	314	308

Due to repeated demands for dearness allowance by the mill workers, the Bombay Millowners' Association devised a system to pay the dearness allowance in proportion to the rise in prices of commodities. In Ahmedabad also a similar system was adopted.

The employees at various place also began to demand bonus in addition to the demand for dearness allowance. While on one hand, every industry earned enormous profits,

there was on the other hand practically no increase in the real wages of the employees.

Thus the employees found it very difficult to make both ends meet. They began to demand a part of the profit as bonus. Some progressive employers began the payment of bonus to their employees, but a large number of industrialists did not think the payment of bonus justifiable. The management put forth their views that the bonus could not be demanded as a matter of right, but it was upon the will of the employers whether to pay it or not and, therefore amounted simply to charity. Ultimately, it was decided by the court of law that bonus should not be treated as charity or gift, and that the employees must get a portion of the profit as bonus, so long as they are not given living wage standard.

As a result of the demands for dearness allowance and bonus, there was a possibility

of industrial unrest, so the Government made provisions to stop holding strikes, under Section 81A of the Defence of India Rules, so that the production may not be hampered during the War, entailing impediment to the supply of war materials under the above rule, therefore, the strikes were checked and industrial disputes were thus settled by arbitration. The arbitration award on the industrial disputes after its publication in Government gazette was made obligatory on both the parties. This

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order to solve the industrial disputes was kept in force even after the end of the Second World War, and it was made permanent by incorporating it in the Industrial Disputes Act, passed in 1947. However, the strikes could not be stopped altogether, although their number was reduced considering the increased number of industrial establishments. To stop work even for a short time for included under strikes, consequently, the number of strikes increased but there was no corresponding rise in the number of lost working days.

Now the trade unions were required to plead the cases submitted for arbitration. As a result the number of trade unions increased in various industries in different parts of the country. The educated class, such as clerks etc., began to join trade unions as members, to get their complaints redressed in the proper way. Thus, trade unions began to be formed among the employees of banks, insurance companies, industrial establishments and the Government servants.

The nineteenth session of the AITUC was held in Kanpur on the 8th and 9th of February, 1942. Pandit Jawaharlal Nehru also attended it. In this session, two resolutions were proposed with regard to the Second World War. Shri Bankim Mukherji's resolution proposed unconditional and unreserved assistance to the war effort.

Shri Mrinal Kanti Bose in his resolution proposed that immediate transfer of power was absolutely essential in order to get help from the employees. None of these resolutions could be passed and they could not obtain 3/4th majority vote. Consequently no resolutions expressing the AITUC's reaction to the war, could be carried out.

On the outbreak of the Second World War Shri M.N. Roy and his supporters presumed

it to be in opposition to fascism and decided to help it. But they could not impress the AITUC with their views, so they convened a meeting at Lahore in 1941 and brought into being a new central organisation under the name of the 'Indian Federation of Labour' with Shri Jamuna Das Mehta as President and Shri M.N. Roy as chief secretary. A number of trade unions in Punjab, Bengal and Sindh which had not been affiliated to any central organisation, so far, began to be affiliated to this new one. The main function of the Federation was to carry on propaganda, for helping the War efforts, by all means, such as holding meetings, circulation of bulletins and magazines and publication of posters. No doubt it also carried out welfare activities for the workers.

Leaders of the trade unions holding communist views, resolved not to give any assistance to the War efforts. But Hitler's invasion on Russia brought about a change in their previous views and they decided to support the British Government in the War. The Indian National Congress completely non-cooperated with the War effort and peacefully and non-violently carried on the 'Quit India' movement. Strikes in sympathy, with the movement were held at Ahmedabad, Jamshedpur and other industrial centres. The congress workers, who led and conducted trade unions were arrested and sent to jail. Thus, from 1942, the communist had full control on the AITUC.

In 1942, the Government agreed to recognise the 'Indian Federation of Labour' as a representative organisation. In spite of being subsidised by the Government, it could not keep its existence, due to want of any constructive programmes and for various other reasons. Later on in December, 1948, it was merged ultimately with the Hind Mazdoor Sabha.

After the War, the index of living standard of the employees kept on increasing, owing to the constant upward trend of the prices of commodities. Taking 1939 as the base year as 100, the real index figure was 73.2 in 1946 and rose to 78.4 in 1947.¹⁰⁷ This resulted in continuous unrest among the workers and after that there were strikes and lockouts. At this time the number of trade unions also increased. In 1945-47 the number of trade unions was 1225 having a membership of 13,31,962.

There was a difference of opinion among the leaders of All India Trade Union Congress and the Indian Federation of Labour on the question of the nomination of the representatives to the International Labour Conference. The Government of India conducted an enquiry to find out the actual membership of both the organisations on the request of AITUC. The membership of AITUC was found to be 6,96,555 where as of Indian Federation of Labour 3,13,807.¹⁰⁸ As the All India Trade Union Congress represented the majority of the working class, its representatives were nominated to take part in the ILO.

The 21st session of the AITUC was held at Madras from the January 18 to 23, 1945. In the absence of its president, Shri S.A. Dange, the session was presided over by the vice-president Shri Fazal-Ilahi Kurban. Shri V.V. Giri's resolution demanding national independence, was carried out unanimously. Another resolution demanding the release of the Congress leaders from jails was also adopted. At the time of

this session the AITUC had a membership of 4,51,915.

In February 1945, the session of the World Federation of Trade Unions was arranged in London. On behalf of the AITUC Shri S.A. Dange, Shri R.A. Khedgikar and Sudhindra Pramanik attended it. The constitution of the World Federation of Trade Unions was passed in September-October 1945, and AITUC since been remained an affiliate of the WFTU.

On July 10, 1946, the employees of the Post and Telegraph Department, struck work to demand higher pay and allowance. On the assurance of the Government the strike was called off, after three weeks. In UP the primary school teachers organised a strike, which was later called off, when the minimum basic pay was fixed. Besides, there were strikes by the dock workers at Karachi, employees of the electric works at Lahore, and textile labourers in Madras. Strikes were caused in Bombay, Nagpur and Allahabad. There was also unrest among the Government employees on the question of increase in pay and dearness allowance. On May 10, 1946, the Government appointed a commission under the chairmanship of Shri Nivasvardacharya to go into the question of pay, allowance and holidays etc. The Commission submitted its report to the Government on the May 5, 1947. A large number of its recommendations were accepted by the Government and they were given effect from the July 1, 1947.

(To be continued)

72. Trade U
73. Ibid., p
74. Ibid., p
75. Indust
76. Labour
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83. Trade U
84. Ibid., p
85. Ibid., p
86. Congre
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88. Indian
89. Ibid., p
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91. Ibid., p
92. Ibid., p
93. Ibid., p
94. Comm
95. Ibid., p
96. Trade U
97. Autob
98. Ibid., p
99. Trade U
100. Ibid., p
101. Our Di
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103. Report
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FOOTNOTES

72. Trade Unionism in India, p. 56.
73. Ibid., p. 60.
74. Ibid., p. 58.
75. Industrial Labour in India, p. 70.
76. Labour Movement in India, p. 20.
77. Report, Royal Commission on Labour, p. 333.
78. Labour Movement in India, p. 65.
79. Trade Union Movement in India, p. 14.
80. The Development of Capitalist Enterprise, p. 426.
81. The Indian Working Class, p. 290.
82. Industrial Welfare in India, p. 160.
83. Trade Unionism in India, p. 78.
84. Ibid., p. 71.
85. Ibid., p. 78.
86. Congress and Labour Movement in India, p. 17-19.
87. Trade Union Movement in India, p. 20-21.
88. Indian Trade Unions — A Survey, p. 25.
89. Ibid., p. 29.
90. Trade Unionism in India, p. 296, 298.
91. Ibid., p. 91.
92. Ibid., p. 71.
93. Ibid., p. 46.
94. Communism in India, p. 140.
95. Ibid., p. 145.
96. Trade Unionism in India, p. 326.
97. Autobiography of Jawaharlal Nehru, p. 198.
98. Ibid., p. 199.
99. Trade Unionism in India, p. 326.
100. Ibid., p. 331.
101. Our Differences, p. 177.
102. Indian Trade Unions — A Survey, p. 68.
103. Report, Royal Commission on Labour, p. 462.
104. Trade Union Movement in India, p. 224.
105. Indian Trade Unions — A Survey, p. 91.
106. Trade Union Movement in India, p. 38.
107. Trade Union Movement in India, p. 48.
108. Trade Unionism in India, p. 343.

S. K. Gupta

Detection of Radioactive Substances

HUMAN eyes are penetrating, keen and versatile, but there is much that we cannot see. To extend our vision, we make use of a variety of instruments. For example, to reveal many a secret of large scale universe, we make use of telescopes. Microscopes, on the other hand, are used to study tiny objects that can hardly be seen by naked eye. In a sense, the invention of microscope opened a window to a world that man had never suspected before. It for example revealed that cells are the building blocks of larger organisms. Just over 100 years ago, a number of scientists concluded from both theoretical and experimental work, that atoms were the basic unit of matter (although no one had ever seen one). But the problem was, and is, that we cannot see an atom with visible light. We cannot put an atom on the stage of an optical microscope and look at it as we can in case of a tiny cell or a grain of sand.

But the path of a moving atom, or one of its constituent particles, can be observed and even photographed just as we can observe and photograph a meteor trail. The particle may also signal its arrival by triggering an electronic or other type of counter. If we could get close enough to a meteor, we could see it. Why can't we do the same with atoms?

One reason is that particles that comprise an atom are constantly in motion. But more important fact is that wavelength of light by which we normally see is much larger than the size of atoms. It is like trying to measure the thickness of your hair using a footrule.

An optical microscope cannot distinguish between two objects separated by a space less than 10^{-5} cm apart. This is a small distance, but still thousand times larger than the size of an atom.

A major step was taken with development

of the electron microscope in 1930. In this instrument, a beam of electrons is used to produce an enlarged image of a minute object. The electron microscope reveals objects as small as 6×10^{-8} cm, or 6 angstroms.* But the spacing between atoms in a solid is about 3 angstroms!

What might be called the ultimate in microscopes is the recently developed field ion microscope (FIM) which can actually produce an image of a single atom on a photographic film. While the FIM provides much valuable information on arrangement of atoms and molecules in various substances, it is still limited to viewing the atom as a whole.

In order to "see" the atomic nucleus and its constituents we need different techniques of observation. The nucleus is 10,000 times smaller in diameter than the atom. Since we cannot see them, we must study their effects.

For example, the nuclei of radioactive materials emit radiation — both particles (e.g. electrons and alpha particles) and electromagnetic radiation (e.g. gamma rays) — that we can study. The detection and identification of radioactive substances is, in fact, based on the study of the effects produced by the radiation emitted by such substances. In the following, I shall attempt to give you an idea of *how* scientists observe the particles that emerge from the nucleus (From now on the term "particles" will be used to mean particles and electromagnetic radiation as well). The equipments used fall into two general categories. Counters, which count each particle as it passes by and track detectors which make a photographic record of the particles' tracks.

Counters

We cannot see a moving subatomic particle, but we can observe the effect of its interaction with man-made systems. In the counter method of detection, the particle impinges on a sensitive volume or area, and the detector registers this information. By counting the number of hits per unit time we have some indication of the density of particles involved. Thus, counters are very useful as safety devices because they can warn us if an area or object is dangerously radioactive, i.e., emits more radiation than safe for living beings.

Counters cannot tell us very much about the position of a particle, except that it struck somewhere within the counter's sensitive volume. On the other hand, counters give incredibly good *time resolution*** — they can tell when a particle arrived at the counter to an accuracy of better than 10^{-9} second (a billionth of a second).

Geiger Counters

The best known of all the counting devices is the Geiger-Müller counter (also known as GM counter), developed by Hans Geiger and his student W. Müller in 1929.

As shown in the figure 1, it consists of a central thin wire inside a cylindrical metal case. By applying a potential difference between the wire (anode) and the case (cathode) the chamber is kept in an unstable (or metastable condition) almost ready to discharge through the intervening gas in the chamber.

When a charged subatomic particle, such as

*An angstrom is equal to one-hundred-millionth part of a centimeter (10^{-8} cm).

**Time resolution is the capability of distinguishing between two events, that take place almost at the same time.

electron, proton, alpha particle passes through the gas, the electro-magnetic field carried along with it rips some of the loosely bound outer electrons from the gas-atoms. The part of the atom that is left is positively charged and is called a positive ion. Although a few of the freed electrons might attach themselves to other atoms or molecules, creating negative ions, most will remain unattached for a while.

Thus the normal result of the passage of charged particle through a gas is the production of ion pairs consisting primarily of positive ions and negative electrons. The gas, originally neutral and non-conducting, can now conduct electricity.

When one or more ionising particles enter the sensitive volume of a GM counter, an avalanche of ion pairs is produced. These provide a momentary flow of current and indicate a "hit". Leftover ions are then cleared by some means so as not to start a new "avalanche", and the device is ready for another count.

Adjustment of the voltage permits the device, when used with additional electronic equipment, to discriminate between, let us say, alpha and beta particles. When used in this way the device is called *proportional counter*, because the pulses, whose height (or strength) can be measured are proportional to the rate at which ionising radiation loses energy. This rate is higher for slower particles. For a given energy alpha radiation, being heavier, is much slower than beta. This means a higher energy loss rate for alpha and so that alpha particle will give a stronger pulse and can be distinguished from beta particles.

At a higher potential, the device cannot discriminate between particles but is extremely sensitive. That is the pulses

are all alike but very large. This means that the different particles cannot be distinguished by means of the size of the pulse. The device is then operating as a typical Geiger counter. The resulting pulse may be connected to a device that makes a click for every hit, or can be connected to a visual counter. In either case the result is a generalized radiation detector that is widely used in educational institutions, industries, hospitals, scientific laboratories and in prospecting for radioactive minerals.

Scintillation Counters

The modern Geiger counter capable of seeing single particles, although widely used, does have certain disadvantages. One is its inability to measure energy of the charged particles. Most serious, however, is the fact that it takes a certain amount of time for the equipment to readjust to normal, or "recompose" itself after it has registered a count. Although modern equipment can bring this *dead time* down to 100 millionth of a second, this is long enough to introduce large errors into some experiments.

Another major class of instruments, the *scintillation counter*, gets around this problem by tapping the energy of energetic nuclear particle in a different way. Many substances have the ability to convert the kinetic energy of a moving particle into visible light. Such a material is called phosphor or scintillator. For example, if an alpha particle falls into a screen coated with zinc sulphide, it produces a tiny flash that is bright enough to be seen in the dark with the aid of a magnifying lens or microscope. The counting of these flashes of light can then provide an idea of the density of particles involved. In modern scintillation counters photomultiplier tubes are used for sensing the light flashes. A photomultiplier

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tube converts the light output of the scintillator into an electric pulse that can be counted automatically. The principle of operation is shown in figure 2. A charged particle passing through the scintillator causes a number of photons of light to be emitted. When a photon strikes the photosensitive surface of the photomultiplier tube, it causes the ejection of an electron that is attracted to electrode "A" kept at a potential difference of 100 volts. This potential difference causes acceleration of the electron until additional electrons are knocked out of the electrode. The process repeats itself. In this way a few photons can lead to the production of a large number of electrons from the final electrode. The signal can be further amplified.

The scintillation method provides other advantages, such as short pulse duration and short recovery time. Also a wide variety of materials — gaseous, liquid or solid — can be used as scintillation medium, and this permits many different applications for the system.

The electrical pulses coming from a scintillation counter can be very short — in some cases as little as few billionths of a second. Hence there is less of a problem with dead time than in Geiger counter. In many cases the brightness of the flashes can be measured by pulse height and these provide valuable information on the energy of particles or electromagnetic radiation. A special electronic device called *pulse height analyser* has been developed which, when used in conjunction with counters, can provide a great deal of information from gamma-ray emission. It is sensitive even to very feeble sources. The analyser contains a large number of channels each of which is sensitive only to pulses of a certain height.

The result is an energy spectrum of radiation that is comparable to the visible light spectrum of a light source. As in visible light spectroscopy, this spectrum provides information on the material emitting the radiation as well as on the amount present. Gamma ray energy peaks at 1,173 and 1,333 Kev* (see Fig. 3) tell us that we are dealing with radioactive cobalt-60. The height of peaks, derived from the number of counts per channel, gives an indication of the amount of ^{60}Co present.

Semi-Conductor Detectors

Although scintillation and gas detectors are still widely used, they are rapidly being replaced in the field of nuclear spectroscopy by semi-conductor detectors. The advantage of these devices is that they can measure the energy of a particle or *quantum* of radiation very accurately. The improved precision in the energy measurements occurs because the ionising particle of a given energy produces about 10 times the amount of ionisation in a solid as in gas. Thus the effect of electrical noise in the detector and the signal amplifier are proportionately reduced. The comparative spectra in Fig. 3 shows the greater resolution (sharper peaks) of semi-conductor signal.

A semi-conductor is a solid crystalline material whose electrical conduction properties lie somewhere between that of a conductor (such as metal) and an insulator (such as glass). In certain sense, the semi-conductor detector behaves like a gas counter as both ion pairs are formed when the material is exposed to energetic radiation, with a resultant change in electrical conductivity.

However, in the semi-conductor a much

*Kev stands for Kilo electron volts or 1000 electron volts.

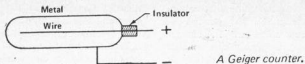


Figure 1.

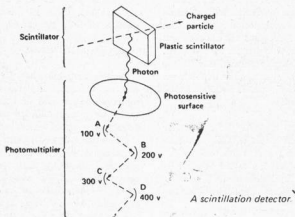
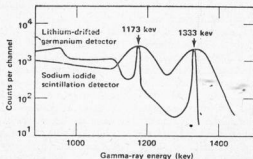


Figure 2.



Comparative spectra from scintillation and semiconductor detectors show the superior resolving power of the semiconductor type.

Figure 3.

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smaller energy is necessary to create an ion pair so that a given energy absorbed from the particle will result in many more ion pairs. It is this increase in the number of ion pairs that results in the higher resolution. As in other types of detectors, the radiation has been made to "do" something. The change in conductivity is monitored by applying voltage across the device and measuring the change.

Semi-conductor detectors consist of a block of very pure single-crystal silicon or germanium. Although major applications have been in the field of nuclear physics, the small size and high efficiency of these has led to applications in biology, medicine and space research. Counters have been developed that are small enough to be swallowed or even inserted into the body with hypodermic needles for treatment of disease. These are very useful when used in conjunction with radioactive tracers. By using radioisotopes to tag certain substances, which are taken up in specific ways by the body, scientists have been able to study a number of life processes in detail.

Precise spectroscopy using semi-conductor detectors demands rather complex apparatus. For best results, detector must be cooled to liquid nitrogen temperature and very sophisticated electronics must be used.

Cerenkov Counters

In 1934 a Russian physicist Pavel A. Cerenkov noted that an intense beam of gamma rays when passed through water produced a faint bluish-white light. He also reported that the light seemed to be given off in a cone travelling in the same direction as the beam (see Fig. 4). And finally, if water were replaced with benzene, the angle of the cone increased by a few degrees.

The explanation for this effect was given a few years later by the Russian physicists Ilya M. Frank and Igor Y. Tamm. It is based on the most unexpected observation: a highly energetic particle can traverse faster than light through a certain optical medium. This does not contradict the theory of relativity, which only states that the maximum velocity of an object cannot exceed velocity of light in *vacuum*. The velocity of light through some transparent substances (such as diamond) can be less than half its speed in vacuum. In high energy physics, on the other hand, particles often travel through material substances at speed approaching the speed of light in vacuum. The result of a particle travelling faster than light in an optical medium is a shock wave, very much similar to the one produced by supersonic aircraft that is travelling faster than the speed of sound in air. The cone of light given off is analogous to the cone-shaped sonic boom of the aircraft except that they point in the opposite direction.

The faster the particle moves through the medium, the larger will be the angle of the cone. This angle which is easily measured, provides information on the velocity of the particle. Angle Q between velocity of particle and light emitted is given by

$$Q = \cos^{-1}\left(\frac{v}{c}\right)$$

where v & c are velocities of particle and light respectively in the medium. By using different media, the experimenter can use the counter as a threshold detector, i.e., one that will record only particles whose velocity exceeds the light velocity in the medium. All particles with velocities below that value will be "ignored" simply because they will not produce Cerenkov radiation. While this may sound like a negative kind of advantage, it is a real asset: one of the major

problems in many high energy physics experiments is a profusion of particles. Anything that can cut out unnecessary particles is appreciated.

Basically, Cerenkov counter is operated like a scintillation counter, including photomultiplier tubes. Like any scintillation counter, this device is also enclosed in some kind of containers whose inner walls are silvered or painted white to reflect as much light into the tubes as possible. This is even more important in Cerenkov counters because the light given off is very feeble.

Coincidence Counters

One counting technique more must be mentioned before we go on to discuss track-forming devices. In counters, the larger the device, the less sure we are of just where the particles struck. In an accelerator experiment this may not be a problem, because we have quite good control over the beam. We cannot, however, control cosmic ray bombardment which bombards the earth from all directions.

Thus, in some very delicate experiments, where very few counts are involved, a stray hit by a cosmic ray particle could create confusion. Because counters (except for Cerenkov detectors) do not tell the angle of particles path nor even whether the particle entered from the front, rear, top or bottom of the counter, another method must be used to give us this information. A technique that has found wide use is *coincidence counting*.

Coincidence counting is a method for detecting or identifying radioactive materials and for calibrating their disintegration rates by counting two or more characteristic events, which occur together or in a specific time relationship to each other. As shown in

Fig. 5, two or more counters are lined up with their sensitive areas parallel to each other. Although counter 1 cannot tell us from which direction particle B has come, the fact that counter 2 did not register a count at the proper time after counter 1 registered a count tells us that it is an unwanted hit. Particle C presents a slightly more difficult problem. But thanks to the excellent time resolution of these devices we can tell that particle A is going in the right direction while particle C is not. Screening out the particles we do not want, is called *anti-coincidence counting*.

Track Forming Detectors

It has been pointed out earlier that counter, except for Cerenkov detectors and coincidence counting, cannot tell us very much about the position of a particle. Track forming detectors, on the other hand, make a photographic record of the particle path and are thus very useful in studying the "life history" of a radioactive particle.

Cloud Chamber

We had also noted that when a charged particle moves through a gas or other matter, the electric field carried along with it knocks electrons out of some of the atoms it encounters. As in the gas-type detectors, the cloud chamber, which contains super-saturated vapour, this trail provides convenient points of deposit for buildup of droplets (by the 'unloading' of supersaturated vapour) in the chamber. Thus a foggy line of droplets marks the passage of a charged particle through the chamber.

Bubble Chambers

The operation of bubble chamber is analogous to that of the cloud chamber, but a liquid instead of a gas is used as the

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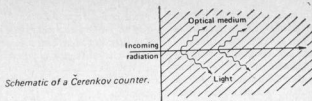


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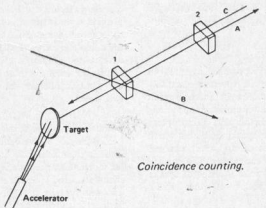


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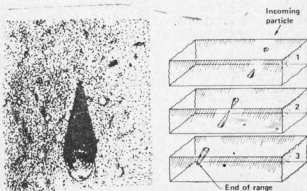


Figure 6

detection medium. Use of a liquid, because it is anywhere between 100 to 1000 times denser than a gas, increases the probability of a nuclear interaction or in other words of particle doing something inside the chamber. The liquid in the bubble chamber, in contrast to the supercooled vapour in the cloud chamber, is actually superheated. The results, however, is similar : Bubbles will form along any irregularity in the liquid and also along the ion tracks left by charged particles passing through.

Spark Chamber

Since the path of ions produced in a gas by a charged particle will conduct electricity better than surrounding gas and as a result spark can occur between adjacent oppositely charged plates along this path. This property is made use of in spark chambers which consist of a series of oppositely charged plates adjacent to each other. The particle thus leaves in its wake a series of sparks between many plates of the spark chamber.

Nuclear Photographic Emulsions

In 1896 a French physicist Henri Becquerel discovered radioactivity. The detection device he used was a photographic plate.

Although the photographic method was sporadically used in nuclear physics experiments over the next four decades or so, it was pushed into the background by the development of various other detection devices we have discussed. One of the problems with the use of photographic plates was the fact that the emulsion was very thin. As a result only those reactions that spread out within the plane of the emulsion itself were recorded. Otherwise the technique could be used to record a little more information than the fact that an

event had occurred. But even this can be useful. Employees working in a radiation environment often wear a film badge — a small square of film wrapped in black paper. Development of the badge shows the amount of radiation to which the worker has been exposed.

In order to do more than just record the arrival of particles, however, the emulsion on the plates must be thick enough to provide a third dimension. Nuclear emulsions more than one-sixth of a centimeter thick have been used, but require special developing techniques. Whereas ordinary film requires well under an hour for processing a thick nuclear emulsion may take two weeks !

Because of the high density of the material (which may be 80 per cent silver bromide), incoming particles are stopped within a far shorter distance than in cloud or bubble chambers, and one-sixteenth of an inch thickness may be enough, especially if the particle is moving obliquely through the emulsion.

The silver grains, though much finer than in an ordinary film, will be similarly "exposed" when hit by a particle. After development, the grains form a track similar to, but much shorter than, a bubble chamber track. An alpha particle from a radioactive source will travel only a few thousandths of a centimetre in the emulsion. The track is normally examined with a special binocular microscope. Alternatively, it can be blown up photographically. Under high magnification, particle tracks can be measured down to a few thousandths of a millimeter.

For high energies and long track lengths, the thickness of a single plate may not be

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sufficient. In this case a special type of film, which does not have glass backing, is used so that many can be stacked together without "blank" spaces between them. The sheets of emulsion, called *pellicles*, are then stacked. As many as 200 or 300 pellicles may be used to provide the necessary depth. The emulsions are separated before development and later recombined. These emulsion stacks are especially useful where a portable detector is required.

Plastic Detectors

A variation on this technique has recently been developed. A charged particle moving through certain solid substances leaves an actual path of damaged material a few

atoms in diameter instead of a developable image. If the material is then chemically etched by submerging it in a suitable chemical reagent (*e.g.* acid) the track is enlarged until it can be seen with an ordinary optical microscope or even by the naked eye.

Thus with the development of science and advent of modern technology immense progress has been made in the realm of detection of radioactive substances. These inventions are not merely to quench only man's thirst for finding something new but are also being applied to many a new field *e.g.* biology, medicine, nuclear physics etc.

(Physical Research Laboratory, Ahmedabad)



S. C. Gangal

India and the World

A Quarterly Review

INDIA

THE QUARTER under review from June to August 1979 has been one of the most eventful periods in recent times both in India and the world at large. For a nation — as also for the larger world community — questions relating to stability, security, norms of political behaviour, and cooperative functioning are always of the utmost importance. The major developments in India and abroad during this period acquire greater significance because they largely relate to these basic norms of questions — as for example, the eruption and continuance of an unprecedented political crisis at home, nuclear advance in neighbouring Pakistan, political settlement on Zimbabwe-Rhodesia at Lusaka, or the wide-ranging SALT II agreement between the two Superpowers (the United States and the USSR) at Vienna. Let us first look at the political developments at home.

Shortly before the beginning of June, events in India were moving in a way that portended a measure of success or fulfilment for the Janata Government. The 44th Amendment had been finally adopted which, among other things, made any future proclamation of Emergency a lot more difficult than it had been in the past — a solid guarantee against misuse or authoritarianism. By a proclamation on May 30, two Special Courts were set up to try the guilty men (or women) of the Emergency. Forces of communal violence in the country — notably in Jamshedpur and Aligarh where they had manifested themselves at their worst — had been brought under control. Both national income and industrial production had registered a record rise of over 7 per cent in the preceding year.

However, just about this time, two unfortunate developments manifested themselves : (i) the police revolt affecting several

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States from Punjab to Madhya Pradesh and the Central Reserve Police and the Industrial Security Force all over the country; and (ii) the growing rift between Prime Minister, Mr Morarji Desai, and the Deputy Prime Minister, Mr Charan Singh, in the Government and in the Janata Party High Command. The police revolt reflected poorly on the loyalty and discipline among police personnel. But it also presented the Government in very poor light — specially its leadership qualities and information and intelligence services. Thanks to the loyalty and efficiency of the army and the Border Security Force and the Government's prompt acceptance of the policemen's legitimate demand, the police revolt was brought under control before long. What could not be controlled were the ambitions and power rivalries among the political leaders — notably in the Janata Party which mattered more than the others for being the ruling party at the Centre.

An uneasy calm prevailed in the Janata Party for several months following the re-induction of Mr Charan Singh as Deputy Prime Minister and Finance Minister in the Morarji Desai Cabinet in early this year. It was surely a gesture of political magnanimity and statesmanship on the part of Mr Morarji Desai to reinduct (into the Government) and elevate Mr Charan Singh, who had called him (only a few months earlier) as the leader of an 'impotent' government. However it is notable that soon after Mr Charan Singh's return to the Cabinet, his lieutenant, Raj Narain, observed that while he will attack the Janata Government from outside, Mr Charan Singh will erode it from within. As it happened, Mr Charan Singh felt very unhappy and disappointed when his BLD group drew a blank in the Janata Parliamentary Party elections in the latter half of May. He took the opportunity to raise the

issue of dual membership at a meeting of the Janata High Command. He also alleged that the BLD group was being discriminated against in the Janata Party and gave specific instances to substantiate his charge. He also charged that he was like "a second class citizen" in the Party and complained that "all (the other groups in the Party) had united against him and that they wanted him to quit the Party". Here was the first foreboding of the crisis which, less than two months later, overwhelmed the Janata Party and the Government. Apparently the Janata Leadership was unable to read the writing on the wall. But Mrs Indira Gandhi, with her characteristic political sense, declared at a Ramlila Ground rally in Delhi (On May 16), that the Janata Government was about to fall. As she put it, "We are not doing anything to oust the Janata Government. It will fall on its own." At the same time — and even a few weeks before the fall of his Government — Mr Morarji Desai went about saying that he saw no threat to Janata unity and to the stability of his Government.

Traditionalists Vis-a-Vis Machiavellians

Manifestly, Morarji Desai's vision was conditioned by his own experiences and world-view. Surely Morarji Desai had aspired for the highest political office in the land — the office of Prime Minister — ever since the passing away of Jawaharlal Nehru. Sufficient evidence is available on the point. But there is little evidence to suggest that he worked to this end by hook or by crook. He had served as Deputy Prime Minister under Mrs Gandhi, and served loyally till he was virtually kicked out of office. He therefore presumed that his Deputy Prime Minister, Mr Charan Singh, would do likewise. And in the process he forgot that Mr Charan Singh's past political record and style pointed to the contrary direction.

Traditionally, and for Mr Desai, personal incompatibilities — are not totally divorced from each other. Maybe, with his limited learning, he was unaware of Machiavelli's well-known doctrine of dual morality. Machiavelli concedes the pursuit of traditional morality in individual affairs and lives. But (according to him) morality in politics, and for the politician, consists chiefly in the increasing acquisition and consolidation of power by any means. Most politicians, including Mr Charan Singh, evidently subscribe to the Machiavellian concept of dual morality. In practical politics (in the short run) the traditionalists are severely handicapped *vis-a-vis* the Machiavellians. This, more than anything else, explains the fall of Morarji Desai and the fulfilment of Mr Charan Singh's "life's ambition".

Mr Charan Singh has repeatedly declared that one of the main factors responsible for his defection from the Desai Government and the Janata Party was the so-called dual membership question or the erstwhile Jan Sangh leaders' connection with the Rashtriya Swayamsevak Sangh (RSS). But how genuine is this complaint? Some points deserve to be mentioned here. First, the RSS is not a recognised political party or organisation, no matter what influence it is able to exercise over a section of the country's political leadership. In many respects, it is comparable to the Arya Samaj with which Mr Charan Singh himself has had close association. Secondly, Mr Charan Singh headed, in the late sixties the SVD Government in Uttar Pradesh which had the Jan Sangh as a principal component. In 1977, he joined the Janata Party in full awareness of the RSS-Jan Sangh relationship. And for over a year after that, he never held it against the erstwhile Jan Sangh members in the Janata Party. It is well-known that he started playing the dual

membership card against the Jan Sangh elements only after the latter's refusal to support him in his confrontation with Morarji Desai in the summer of 1978. Indeed, in more than one instance, Mr Charan Singh has demonstrated that for him no holds are barred where personal ambition and the quest for power are concerned. In June 1978, at the time of his resignation from Home Ministership in the Desai Government, Mr Charan Singh had lashed out openly against the forces of authoritarianism symbolised by Mrs Gandhi and he was very critical of the Government's failure to punish her for her Emergency excesses. But just one year later (this July), Mr Charan Singh had no compunction in climbing to power with Mrs Gandhi's support. His top lieutenant, Mr Raj Narain, gave many good chits to Mrs Gandhi and declared that she had become much 'humbler' and a different person during her two and a half years out of office. He held long 'social' talks with Mr Sanjay Gandhi. On the eve of the confidence vote in the Lok Sabha — scheduled for August 20 — to test Mr Charan Singh's majority. Mr Charan Singh reportedly decided to withdraw an emergency case against Mrs Gandhi. But, alas, it was too late and too little from Mrs Gandhi's viewpoint. On the 20th morning — minutes before the Lok Sabha debate was to start — Mrs. Gandhi announced the withdrawal of her support from the Charan Singh Government. And Mr Charan Singh quietly resigned without facing the House. It was announced by the official media that Mr Charan Singh's Government — which lasted just 24 days — was the most short-lived Government at the Centre. It may appear that there is a peculiar or mysterious significance about the figure of 24 in respect of short-lived governments in India. In Medieval times, a government (in the reign of Humayun) lasted just 24 hours. The most short-lived Government

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THE WORLD

Early in June three events in or relating to the Afro-Asian world stole the limelight in international affairs, namely, the installation of the first 'Black' Government in Zimbabwe-Rhodesia, headed by Bishop Abel Muzorewa, on June 1, the adoption of a United Nations resolution (by a majority of 118 to nil) demanding "immediate and unconditional end" to the illegal occupation of Namibia (South-west Africa) by racist South Africa, and the meeting of the Coordinating Bureau of the Non-aligned States, in the first week of June, in Colombo — where India was represented by the then External Affairs Minister, Mr Atal Behari Vajpayee.

As regards the developments in Africa, it is notable that the Muzorewa Government is a 'White' stratagem to complicate and stave off the liberation of Zimbabwe-Rhodesia. The problem cannot be satisfactorily resolved without free and fair elections under independent, international auspices involving the Patriotic Front. Following the recent Lusaka Summit of Commonwealth nations (from August 1 to 7) there have been hopes about a possible turn of events in this direction. Britain (which was the ruling colonial power in Rhodesia before Ian Smith's unilateral declaration of independence in November 1965) has undertaken to initiate negotiations for a new internationally — supervised election in Zimbabwe-Rhodesia with a view to the eventual transfer of power to the African People's leaders represented by the Patriotic Front. The leaders of the frontline African States — Tanzania, Zambia, Mozambique and Angola — and other Commonwealth leaders have offered

to cooperate in this exercise. A broad agreement to this effect emerged from the Commonwealth summit at Lusaka. In keeping with its traditional policy of suggesting independence for the African peoples, India fully subscribed to this arrangement. However India suffered considerable embarrassment, and a measure of adverse publicity and isolation, at Lusaka on account of the inept handling of the question relating to the appointment of the Commonwealth Secretary General. While the other thirty-nine member-States of the Commonwealth had already agreed on a second term for S.S. Ramphal of Guyana, India's External Affairs Minister, S.N. Mishra, kicked up a row on it and even toyed with the idea of a belated Indian candidature for the post. India is one of the larger Commonwealth States. And it enjoys the reputation of being one of the foremost architects of the worldwide, multi-racial, post-war Commonwealth. India's vast goodwill in the Commonwealth should not have been staked on the trivial question of getting a berth in the Commonwealth Secretariat. Obsession with office is often rather bad at home. It may turn out to be much worse and may cause irreparable damage abroad.

Non-aligned Meet

The Non-aligned Bureau meeting at Colombo was a preparatory exercise towards the Non-aligned summit at Havana (Cuba) scheduled for early September. Two main questions came up at the meeting, namely, (i) whether to suspend Egypt — an original member of the movement — from the non-aligned group as urged by some Arab States on account of Egypt's recent treaty with Israel; and (ii) whether to allow the Pol Pot regime to represent Kampuchea at the Havana or the present regime. However there was no consensus on either question at the meeting. Ultimately both these

questions were deferred for the Havana summit. Owing to these unresolved controversies, the Colombo meeting was widely described as the most unsuccessful non-aligned meeting to-date. It revealed, according to some observers, the emergence of "non-alignment within non-alignment". And interesting development at the Colombo meet was that there was broad agreement on Pakistan's admission to the non-aligned club, subject to its giving some clarifications on its recent withdrawal from CENTO. These developments indicate that while numerically the non-aligned movement is growing, its internal unity or cohesion is weakening. On present evidence, the growing cleavages are unlikely to be healed at Havana.

A little removed from India's Afro-Asian neighbourhood, the SALT II concluded between President Carter and Mr Brezhnev in Vienna in June was a major world development. The SALT II marks an improvement over SALT I and the Valadivostok Agreement by lowering the limit of strategic missiles and bombers to 2250 in place of the earlier ceiling of 2400. Within this limit (of 2250) there are sub-ceilings for launchers with multiple warheads and heavy bombers. The numerical cuts are important. For example, it is estimated that without SALT II (and at current rates of progress) the two sides would have had (by 1985) about 3000 such weapons, instead of 2250. It also commits the two countries to begin a third round of talks (SALT III) that may produce further limitation on strategic weapons. However it must be noted that the Treaty still leaves the two Superpowers with 'overkill' capacity. Thus it makes no solid, long-term contribution to world peace. Another thing the Treaty does not do is to stop the development of new, deadlier, weapons. Moreover, it is not a disarmament measure, for it would not lead to dismantling

of present stockpiles. It only tends to put ceilings for the future. At any rate, it is a bilateral measure between the two Superpowers which makes little difference to the problems of security and prosperity over vast areas of the developing world.

Islamic Bomb

For India — and for peace in Asia — the news about Pakistan's military nuclear programme is a matter of greater interest and concern than the SALT II. It is widely believed that Pakistan would be testing its first atomic bomb by November this year. In public discussion and in the press in India, this is being projected as a security threat to India. There is some point in these projections. Nevertheless it would be rash, to say the least, for India to be hustled into the nuclear race as a result of developments in a neighbouring country. Nor should India impose on itself a policy of smug complacency. Let the nuclear debate be reopened. But two points must be remembered or noted. First, India already has the nuclear capability as demonstrated at Pokhran in 1974. Thus its research and development are in good gear to deal with any eventuality at short notice. Secondly, and more importantly, the security of nations is not just a matter of bombs and missiles, nuclear, conventional or otherwise. Hence a bomb here or a launcher there should not drive us into a panic. Vital policy decisions concerning peace and war cannot be left to be decided, by military generals, sensation-prone journalists or instant researchers. Nor can they be left to those politicians who are too engrossed in the power game to be able to apply their minds coolly to matters of State.

(School of International Studies, Jawaharlal Nehru University, New Delhi)



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Book Review

The Real Nature of Mystical Experience
by *Gopi Krishna*. Price: Rs. 3. Kundalini
Research and Publications Trust, New
Delhi.

Gopi Krishna writes on mysticism and religion with a clarity and rational poise that has, perhaps, never been applied to the subject before.

His story is that at the age of thirty-four his daily practice of yoga meditation led to the arousal of a potent nerve energy in him which painfully remoulded his brain and nervous system for fifteen years until he entered the realm of superconsciousness promised in Indian scriptures. He became an enlightened yogi. Now he is working and writing to inform others of the existence and style of operation of this potent nerve energy which he equates with the traditionally known serpent power, Kundalini.

He says that the religious impulse in man is really an evolutionary imperative and that the religious teachings of all nations contain, at their core, vital instructions by which men can live in accord with this imperative. At present, man's negligence in this field poses a threat to the security of the race and as the pace of evolution increases this threat also increases. Religious feeling is a natural and necessary counterbalance to the excesses of the intellect and when it is restricted in its role cold reason takes little account of humane factors.

This is the tenth book by Gopi Krishna since he set out to share with men his insights based on his own experiences. In it he clarifies the real nature of mystical experience. He is critical of modern claims that such

experience can be stimulated with drugs and he insists that it is not a passive state of the mind nor an hallucinatory one. It is not an altered state of consciousness but an illuminating state.

He traces our difficulty in understanding this to our inability to imagine the mind of another person more evolved than ourselves, for example for a child to conceive the feelings and attitude of an adult or for an ordinary man to see through the eyes of inspired composer. He is confident that a breakthrough will come when it is accepted that religious feeling is a natural state, when the subtle element *prana* becomes accessible to instrumental measurement and when science grows out of the erroneous belief that the human brain is a sealed compartment with no further potentials to be developed. When our knowledge takes us over these hurdles sectarianism will disappear and it will become clear to us that the religious teachers of all nations came to teach all nations and that they are still able to guide us to the plane which they preached before us.

The most beautiful chapter in the book is the author's description of his own spiritual state. The language is so fluid rhythmic and clear that it leaves a deep impression of sincerity. Here is proof of Shaw's saying that effectiveness of assertion is the alpha and omega of style. There is a blend of confidence and humility in his writing at times that gets across, better than any other

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approach could, the guidance which he offers to scientists and his own central position, that of one of the most highly evolved human beings alive today.

As a religious teacher, he is balanced and reasonable: "Extreme austerity, penance, self-denial and self-mortification are man's own creation", he says, "and have no sanction from nature". But he stresses that there is no easy way to enlightenment and offers no pat formula. "The laws of heaven operate in such a way that the mortal himself rewards, punishes, absolves or convicts himself."

Gopi Krishna is much more highly acclaimed outside India than inside. Both last year and this he has addressed conferences of leading researchers in the field of consciousness in the United States and Canada and a number of research projects are being conducted under his guidance, a rare tribute to the genius of a man without formal academic qualifications. Yet not a single college library in Delhi carries a copy of one of his books. In an age which has known a plethora of prophets Pandit Gopi Krishna carries his case with basic reasoning and incisive intelligence. Perhaps they were the only tricks left in the bag of gimmicks for godman but here they have come into the hands of a man who can use them deftly. Unfortunately his own country has had such a glut of masters of other kinds of gimmick that it is not as willing to listen as his achievement deserves partly because what he says requires a change of attitude too great to be accomplished quickly, like all religious teachers he stresses that much of what we are engaged in is a waste of time. But it is a pity that in India which is the home of spirituality, this subject is treated, as abstract and of no pragmatic value. If Gopi Krishna is remembered by future generations it will be because

he has achieved the fusion of practical and ideal, spirituality and science. This is the essence of his contribution.

—Malachi O'Doherty

THE FOUR DOCUMENTS — An Emergency Enterprise by Vasant Varkhedkar, Citizens for Democracy Publication, Nagpur, Pages 44, Price : Rs. 3.00.

A unique feature of our Constitution is the enunciation in Part IV of what are called the Directive Principles of State Policy which are though not justiciable are to be reckoned within the administration of the country especially while making laws. In heydays of the Congress Party in power socialism was the proclaimed creed till 1977. Especially during 1975 and 1976 many of the leaders complained of the courts being a stumbling block in rapid transformation of society into egalitarian society, especially in the way of socio-economic reforms. In an earlier judgement in Golaknath case Supreme Court held that Fundamental Rights written in the Constitution are beyond the amending powers of Parliament. It was later observed that the Bill of Rights were not so much an impediment to bring about a socio-economic change, but the desire to do them away was more actuated with a view to arming persons in authority with more powers and to usurp the sovereign powers of the people.

'The Four Documents' — an Emergency Enterprise depicts a saga of heroic struggle of an honest intellectual against those in authority, trying to abridge people's sovereignty in the days of emergency. The documents are (1) unfurling a Charter of Man's Sovereignty issued to the President of India in October, 1976, (2) covering letter forwarding the Charter to the Secretary General, UNO followed by (3) a regular fervent

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appeal to the UNO for their intervention and (4) a letter addressed to ex-Prime Minister Indira Gandhi, forwarding all the above three documents accusing her of usurping power and sapping man's freedom. The documents, written as they are, in days of emergency reveal a vivid portrayal of days of emergency and an emotional involvement of an intellectual who had seen politics and politicians at a close quarters being in Central Information Service, Government of India for two decades. The author who as a citizen belonging to no party, shows considerable courage of conviction as he unfolds his thesis on the case of a man against all pervasive ruthless monster, the State, by reducing Parliament into a submissive serf, bowing to the wishes of what he calls the 'Supreme Whip' symbolising men in power. The author says that the 'Supreme Whip' equated itself to the people disregarding the fact that 'man had won his freedom for himself and not for those who rule them'. Therefore, man's freedom is supreme and self-respect and human dignity rested on such freedom. The author says that when Human Rights trampled at home where else a man could seek redress except at the UNO. He considers that smooth passage to 44th Amendment to the Constitution as an outrage by a captive Parliament under the orders of 'Supreme Whip'. He notes with candour, that masses are too engrossed in winning their daily bread and a few privileged, who have no such problems, are not bothered about people's freedom being sapped. The author in the same refrain says that man's life is four-dimensional resting on freedom, equality, equity and secularism. Freedom meaning freedom to grow as per his genius, equality to mean equality between State and Man before law and between Man and Man before law, equity indicative of fairness in the field of law and justice and secularism to mean freedom of creed for his spiritual well-being. The author questions

that 'when man produces his bread and the State produces mere currency why should man mortgage his freedom for false promise of bread'. He says that if the present Constitution is for the haves only and not for the have-nots as it is constantly dinned in the ears of the people, then remedy lies not in frequent Constitutional amendments, but by setting up new constituent assembly and giving in to the collective wisdom of the people. He decries subjugation of Man to a new kind of slavery in the name of progress. To quote him: 'The State playing labour against capital and fast, becoming a new species of overlord.'

The Charter of Man's sovereignty which follows the prologue, develops these noble sentiments lucidly. Briefly, the Charter stipulates, that citizen is sovereign, Governments are of people's making and ought to stay in power during the pleasure of people. Rule of law is supreme and it is the law that rules and not those who aspire for power. The Parliament is meant for review and preview the doings of State, on behalf of people. The Supreme Court is the custodian of the Man's sovereignty and will deal on equal footing the State and Man in their disputes in terms of law. No law will be held valid which contravenes Man's sovereignty. The author recalls what Indira Gandhi had declared once on the floor of the Parliament that 'I am the people' and says that personality cult was built up by the Nehrus at the cost of National Exchequer. The Charter says that President should be the Executive Head of the State and execute the laws of the land, to carry out the development and socio-economic programmes. He recalls that Dr Rajendra Prasad, our former President pleaded in vain with Nehru and the Present was the Head of the Executive and not the Prime Minister. The Charter suggests further that the Parliament will function on the principle that the represen-

tative of the people will truly represent the people who elect them and vote as per their conscience and not at the behest of political parties. Hence he pleads for doing away with the application of 'Party whip'. He further suggests in the Charter that there should be no mix-up of legislative and the Government functions. He advocates that there is no need for two Houses and the Rajya Sabha can be abolished. The Charter pleads for the abolition of systems of Ministers and Cabinets, as these have infused a false sense of values and claimed too much for themselves and pleads for Presidential form of Government. The author says that people's representatives cannot be doers and reviewers themselves. The President, Governors with the administrative machinery will be the doers as distinct from the Parliament and the Legislatures who will form the reviewers. The President and the Governors will appoint the treasury benches portfolio-wise in the Centre and the States, who are not from the Parliament or Legislature. To obviate any development of personality cult, the Charter suggests a three-year term of office for all of them instead of five years as at present. Those in office and wishing to contest for an elective post, have to resign three months before election and cease all connections with the offices. Similarly, the Houses will also be dissolved three months prior to general elections. In case of temporary vacancies of the President or Governors, Supreme Court will appoint nominees to hold temporary charge. While the Charter recognises the need for emergency, as in war, and passing of extraordinary laws in case of extreme national necessity, he cautions against its abuse, as it occurred, during the dark days of emergency, used to arm a person with power to continue to remain in power, against the Allahabad High Court decision. The author says that by 'placing Indira Gandhi safe beyond country's laws and Court

justice,' resulted in undermining the sovereignty of Man. Hence the Charter stipulates that Supreme Court will have full authority to examine the pros and cons of declaration of emergency and quash it, if it deems fit. The Charter suggests, that all emergency laws and Defence of India Rules, be withdrawn during the elections. The Charter concludes on an expression of noble sentiment, that Man being equal to the highest in office and emphasises the need to have a new constitution for India, enshrining and protecting Man's sovereignty based on the four principles of freedom, equality, equity and secularism.

The letter to the President, whose term then had not expired, pleads for restoration of Man's freedom and asks him to side with the people, whose freedom is sapped, by the coterie with the help of a captive Parliament, whose term was already over, yet claims to be the state, without any sanction or mandate from the people. The fervent appeal to the President points out the stand taken by the late President Dr Rajendra Prasad to retain the independence of the office of the President. The author says that during the last twenty-nine years, in India, the Prime Minister remained the President-maker by virtue of his or her image carved out as a 'colossus' at National Exchequer's Cost'. The letter asks the President to assert his constitutional authority and dissolve the Parliament and dismiss the Central Government and quash the amendments made to the Constitution after June 26, 1975 and restore *status quo ante* with President Rule in the country. It also calls for general elections to be held in February 1977 and convening of new constituent assembly, with a view to ensure the sovereignty of man in future.

The letter to Dr Kurt Waldheim and the representation to the United Nations bring

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succinctly the state of affairs obtaining in the country after imposition of emergency and makes out a citizens' case against the state trying to be all powerful crippling the freedom of Man. It seeks the intervention of the UNO for protection of persons held in detention without trial and also suggest modalities as to how UNO could help to enforce the Charter of Human Rights and Man's sovereignty in the United Nations Assembly. The letter to Indira Gandhi forms the fourth document, enclosing the other three documents states that 'as an accused you have a privilege to know what you are accused of' and declares a war between the state trying to be all powerful and make Man a perfect slave. The appendices contain a bunch of letters of appreciation from men of letters, politicians and lawyers etc., inclusive of letters from Smt. M. Joshi, N.G. Gorey, Justice Tarkunde, Shanti Bhushan etc.

The Four Documents in retrospect reveal that politicians of whatever colour, creed or party, display insatiable thirst for power and meddle drastically with the freedom of man, often subjecting him to indignities and humiliation. The author deserves kudos for his 'valiant enterprise', although, some of the suggestions made in the Charter like Presidential form of Government would evoke a controversy. The book contains a few useful suggestions which could be implemented straightaway in the conduct of political life in the country.

The Four Documents is a book which a student of politics, constitutional history, as well as citizens and leaders alike would like to retain and ruminate is written with conviction and candour and is moderately priced.

—H. Shankar

Marxism : Relevance and Practice, by Vaasamoorthy, Minerva Associates (Publications) Pvt. Ltd., Calcutta, Price : Rs. 40, pp. 200, 1977.

India's contribution to the worldwide anti-Marxist writings, one fears, has been as below the mark as the Indian communists' contribution to the global Marxist understanding of Indian questions.

This at any rate, is indicative of lack of serious interest in Marxism either as Marxists or as non-Marxists. One-third of the world is already red. The remaining part is by no means sure of itself, its vulnerability having been put to serious strain as in Angola and Afghanistan.

The global situation, not to speak of the urgent problems at home, calls for a serious interest in Marxism which being less monolithic — these days has assumed the seductive charm of plurality. Vaasamoorthy's *Marxism : Relevance and practice* seeks to fill this void and is, probably, one of the earliest attempt to put Marxism to a serious scrutiny in terms of its basic postulates. His assumption is that "We have to examine Marxism carefully and critically and see whether it is really scientific, and then in the light of such a study we should have our own plan of action lest we should be overtaken by communists helplessly."

Karl Marx, concedes Vaasamoorthy, was one of the greatest thinkers who discussed some significant facts and revolutionised the thinking of man in certain directions. He examines the unscientific character of Marxism which being authoritarian is violative of scientific norms. The myth of equality remains a myth. Again, "that Marxism is not scientific is positively proved by the failure of its prophecies."

Marxism unlike science is wholly

deterministic in that it assumes that "historical forces are bound to work themselves out". Not a single state which went red had had the opportunity to evolve the terms of stages as prophesied by Marx. Take the recent instance of Afghanistan. It was a feudal and, to some extent, primitive society. And the Russians of all Marxists, did not allow historical forces to work themselves out in this country. They took resort to conspiracy and strategy and engineered a coup to instal a communist military dictatorship under the infamous Tarakki.

A substantial portion is devoted to the theory of surplus value, the bedrock of Marxism.

Vaasamoorthy addressed himself mainly to this fundamental question: what is the real contribution to the development and progress of human society? Most of Marxian categories such as labour etc., are outdated, for they do not explain the complexity of development. Moorthy himself uses the term "human effort" where Marx used the word "labour". Marx's labour theory of value and the theory of surplus sought to argue that all the surplus must go to the labour that produced it and not to the wily capitalist who has been appropriating it without any part in production. Labour, argues Moorthy, is only a part of human effort and it is intelligence which plays the greater part: "Thus our thesis takes the whole man as full man as the starting point and destination too and helps in catering for all aspects of man according to their relative value and need and does not, as in Marxism, make all other aspects subordinate to one physical aspect — labour — and thus distort the real character of man and society". Looking at the usual polemics one sees around, Moorthy, in all likelihood, would be accused of favouring intellectual classes against the working class. Polemics or no

polemics Moorthy's position has assumed a tangible shape in the USSR where bureaucrats making a class by themselves have usurped extraordinary privileges over the working class. It is the present-day USSR which has confirmed Moorthy's categories. In a distinct chapter "the practice in the Soviet Union itself" he offers impressive data showing how the working class has been deprived of all fruits and how the intellectuals usurped all special privileges. This shows the utter vulnerability of Marxism.

Things are different in China now. By Marxism Moorthy means Sovietism. He, however, fears China may also take to the Soviet way sooner or later. It should, therefore, be of some interest to watch the China scene. Moorthy offers a different theory of Socialism: "Socialism based on intelligence makes it possible for a more thorough understanding of all the needs and the resources of society and for better planning".

Actually it is this socialistic theory which has shaped life and society in the USSR now. One wonders if Moorthy went into details and cared to realise the implications of his latest theorising. The upshot of Moorthy's Socialism will be a society indistinguishable from the Soviet society as at present. This is the weak point of his thesis.

Alternative to the Marxist model must be ensured a viability which eventually does not degenerate into the Soviet pattern. It is here that most of us have failed. This, again, constitutes probably the only appeal of Marxism, negatively speaking. The search for non-Marxist models must continue and to the extent Vaasamoorthy's study lays here the nineteenth century Marxist fallacies, it is a most welcome contribution to our knowledge.

—Ramavator Sharma



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