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TALKS ON PLANNING

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PREFACE

During the last six or seven years I have spoken or written on various aspects of planning in India mostly as addresses or broadcasts; only one note, "The Draft Plan-frame" for the Second Five Year Plan, which was submitted to the Government of India in March 1955, was a connected study. As there is still some demand for reprints, it has been decided to publish these notes and lectures in a collected form in the present volume. It is inevitable that there should be many repetitions of both facts and arguments for which I hope to be excused. A paper called "The Approach of Operational Research to Planning in India" was published in *Sankhyā : The Indian Journal of Statistics*, in 1955; this is somewhat technical in nature and is not included in this volume.

Shri Jawaharlal Nehru, Prime Minister of India, initiated the movement for economic planning more than thirty years ago. I have included, as an introductory article, a brief study of his role in Indian Planning which was published in 1959 in "A Study of Nehru" with the permission of the publishers.

I offer my thanks to my colleagues in the Indian Statistical Institute for the help they have given me in preparing the press copy and printing this volume.

P. C. Mahalanobis

Calcutta, 15 May 1961.

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HERALDING A NEW EPOCH

This article was contributed to the book *A Study of Nehru* published by the Times of India on the occasion of Shri Jawaharlal Nehru's 70th birthday on 14 November 1959.

1. To speak of Nehru as a planner, one has to go back thirty years. In May 1929, the All-India Congress Committee passed a resolution stating that "in order to remove the poverty and misery of the Indian people and to ameliorate the condition of the masses, it is essential to make revolutionary changes in the present economic and social structure of society and to remove gross inequalities." This was not acceptance of socialism but indicated an approval of the "socialistic approach".

2. In March 1931, the Congress at its Karachi session passed an important resolution on fundamental rights and its economic programme in which, among other things, a clear statement was made to the effect that "the State shall own or control key industries and services, mineral resources, railways, waterways, shipping and other means of transport." The Congress continued to give strong support to the *swadeshi* movement and in the election manifesto issued in August 1936, put great emphasis on agrarian reform and the improvement of the condition of industrial workers.

3. This was a time of rapid changes outside India. For the first time, economic planning at a national level had started in the U.S.S.R. in 1927, which must have created a strong impression on Nehru at the time of his first visit to Moscow in 1927. On the other hand, a fascist government had been established in Italy in the middle twenties and a nazi government in Germany in the early thirties. It was a time of conflicting movements which found expression in the civil war in Spain.

4. These developments exercised a powerful influence on political thought in India. Events in the U.S.S.R. gave new meaning and significance to the socialist movement and this was reflected in the emergence of an influential group of socialists even within the Congress. At the same time, the record of spectacular achievements of the nazi government of Germany and the fascist government of Italy gave rise to growing interest in and a lurking admiration for the political economy of fascism in certain quarters. Jawaharlal Nehru was deeply conscious of the dangers of following the path of fascism, notwithstanding its transitory gains, and it was his constant endeavour to direct political and economic thinking in India along the channels of integrated national planning on socialist lines as suited to the needs and genius of the Indian people.

5. The Congress won the elections in India in 1936 and formed Congress Governments in most of the provinces. On the initiative of the Congress President, a conference of Ministers of Industries was convened in Delhi in October 1938 which was of the opinion that "the problems of poverty and unemployment, of national

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defence, and the economic regeneration in general cannot be solved without industrialisation." And, on its recommendation, the National Planning Committee, with Jawaharlal Nehru as chairman, was set up by the Congress President in October 1938. This gave a decisive turn to thinking on economic problems in India.

6. It is well known that the intellectual lead had come from Nehru. In the midst of his political activities, he gave a great deal of time to the work of the National Planning Committee. Between December 1938 and September 1940, he presided over seventy-one of a total of seventy-two meetings of the Committee, had informal meetings with secretaries of sub-committees and issued notes and instructions for the guidance of the members. In his very first note of December 21, 1938, he clarified the Congress policy regarding industries. Referring to resolutions of the Working Committee and the Congress he pointed out that although the Congress desired actively to support cottage and village industries, it had never made any decision against large-scale industries. It was not only open to the National Planning Committee to consider the whole question of large-scale industries in India but it would be failing in its duty if it did not do so. He said: "There can be no planning if such planning does not include big industries, but in making our plans, we have to remember the basic Congress policy of encouraging cottage industries."

7. In a memorandum dated 4 June, 1939, he quoted the Karachi resolution of 1931 that "the organisation of economic life must conform to the principle of justice to the end that it may secure a decent standard of living" and stressed that a plan of national development must cover all branches of material and cultural life of the people, each part of the comprehensive programme, fitting into the others.

8. He was quite conscious that national independence was an indispensable preliminary for the implementation of a plan of this kind. But he had the vision to get ready for the future of a free India, without however relaxing for a moment from involvement with constructive efforts under existing circumstances.

9. It was impossible for him to think of India's problems in isolation from the rest of the world and he pointed out: "It is possible that in the event of the formation of a world union of free and equal nations, this sovereign authority might be voluntarily limited to some extent by each component unit in the interests of world planning and co-operation. But such development would not come in the way of national planning. If it takes place on right lines, it might even help planning within a nation."

10. When war broke out in Europe, he decided that the work of the Committee must nevertheless continue and emphasised its educative value in these words: "The National Planning Committee itself represents many viewpoints, and while we must endeavour to bring them together and agree as far as possible, the possibility of disagreement need not frighten us. A discussion of these different approaches and points of disagreement will be helpful to us as well as, later on, to the public at large. This in itself has importance as the ultimate policy of the State will necessarily depend on public opinion, and the more informed this public opinion is the better it will be for us. It may be desirable, when our report stage arrives, to consider fully these differing viewpoints."

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11. The aim was to build a free and democratic state in which the fundamental rights of the individual and the group — political, economic, social and cultural — would be guaranteed. The State would be progressive and would utilise all scientific and other knowledge for the advancement of the people as a whole, and for the promotion of their happiness and their material as well as cultural and spiritual well-being. It would not permit the exploitation of the community by individuals or groups to the disadvantage of the former and to the injury of the nation as a whole. To realise the social objective the State must plan and co-ordinate the various activities of the nation so as to avoid waste and conflict and attain the maximum results.

12. The principle of state ownership or control over key industries and services, minerals, public transport and defence industries was clearly accepted with possibility of extension to all public utilities and large-scale industries; but there was no general programme of nationalisation of existing industries and it was recommended that fair compensation should be paid if a private enterprise is taken over. The cottage industries were to be encouraged and protected, and competition prevented from large-scale industries. Planning was to deal with production, distribution, consumption, trade, social services, income and investment and other forms of national activity which act and react on each other. Big decisions were thus taken, in principle, in 1940, which are now influencing action.

13. I had known Nehru socially for many years and met him several times when he came to see Rabindranath Tagore. But it was in early 1940 that I had my first contact with him in matters of planning. He had heard of my interest in statistics and, realising that statistics would be required for planning, had asked me to let him know if I ever happened to be in Allahabad. A little later, I spent one day with him in his Allahabad home when I had gone there to attend a committee meeting. We were both busy during the day. After the day's work was over, we started talking and after dinner we sat up till after two in the morning. He said that he was afraid he was still rather in a minority in Congress circles and it seemed to him sometimes that the Planning Committee had been set up as if only to humour him.

14. Sixteen final and ten interim reports were considered and tentative resolutions taken by the National Planning Committee in September 1940. A little later Nehru was arrested and further action was suspended. It was, therefore, not possible to co-ordinate and integrate the separate decisions into a comprehensive national plan. In the next few years, some of the leading industrialists became convinced of the need for planning and took the initiative in preparing "a plan of economic development for India", which was published early in 1944 and is often called the "Bombay Plan".

15. Much had happened in India and the whole world by the time Nehru was released in June 1945. At the session of the National Planning Committee held in September 1945 it was considered necessary to prepare a factual statement of the changes that had taken place in the country and outside, and their effect on any scheme of planned economy to review the previous recommendations "to speed up

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production and organise distribution in such a way as to bring about a maximum increase in the standard of living within a minimum period of time". The Committee gave detailed consideration to food, clothing and housing, and emphasised the important role of cottage industries in regard to consumer goods and employment. It also emphasised the need for a rapid expansion of the social services, public health, education, public utilities, and social and cultural amenities. By 1945 there had been great progress in the thinking on a planned economy in India.

16. In September 1946, the "Interim Government" was formed and Nehru immediately set up a planning advisory board for a rapid review of the projects which had been prepared by various government departments and the report of the board was submitted in December 1946.

17. Then came independence in August 1947 and Jawaharlal Nehru became Prime Minister. Although the country was in the midst of the difficulties caused by partition, Hindu-Muslim tension and the influx of refugees, one of his first tasks was to have an economic programme committee with himself as chairman appointed by the Congress in November.

18. The A.I.C.C. stated in a resolution : "Political independence having been achieved, the Congress must address itself to the next great task, namely, the establishment of real democracy in the country and a society based on social justice and equality. Such a society must provide every man and woman with equality of opportunity and freedom to work for the unfettered development of his or her personality. This can be realised only when democracy extends from the political to the social and economic spheres. Democracy in the modern age necessitates planned central direction as well as decentralisation of political and economic power in so far as this is compatible with the safety of the community as a whole. Our aim should be to evolve a political system which will combine efficiency of administration with individual liberty, and an economic structure which will yield maximum production without the operation of private monopolies and the concentration of wealth, and which will create a proper balance between urban and rural economies. Such a social structure can provide an alternative to the acquisitive economy of private capitalism and the regimentation of a totalitarian state."

19. This is how the principle of a middle way in economic development came to be formulated. The economic programme committee submitted its report on 25 January, 1948, and together with many detailed proposals, recommended the appointment of a permanent Planning Commission. At first Nehru's idea was to keep out of it but, when the Commission was established in 1950, he was persuaded to become its chairman. This was a wise decision as little progress would have been possible in strategic issues without his leadership and guidance.

20. The First Five-Year Plan (1951-52 to 1955-56) was based broadly on the projects which had been already prepared and some of which like the Damodar Valley Corporation and the Chittaranjan Locomotive Factory had actually started. The

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emphasis was on agriculture and there was little or no provision for basic industries. India was producing at that time only about one million tons of steel, although the country had the largest reserves of high quality iron-ore in the whole world. A provisional decision had been made for the installation of a second million-ton steel plant but this was dropped. An acute shortage of steel, however, soon developed and the Prime Minister became convinced of the urgent need for increasing the production of steel and necessary action began to be taken from 1953-54.

21. It became increasingly clear that the outlook of planning must have a wide time-horizon of fifteen or twenty years or more. After a full discussion in the Planning Commission in September 1954 on long-term objectives, it was decided that the aim must be to lay sound foundations for a continuing increase in the level of national income and the level of living to get rid of the fear of unemployment (if possible, in ten years), and to bring about increasing equality of opportunities and the lessening of great disparities of income and wealth.

22. Nehru initiated the joint studies by the Planning Commission, the Finance Ministry and the Indian Statistical Institute, which led to the formulation of a draft Plan-frame in early 1955. There was a new approach. Emphasis was to be placed on the rapid development of heavy machine building, heavy electricals, steel and non-ferrous metals, and energy to supply a sound foundation for economic self-reliance. Attention would also be given to the required expansion of consumer goods, as much as possible through cottage and village industries, which would create a great deal of additional employment. There was greater appreciation of the close interlocking of progress in industry and agriculture. Industrial development was essential to provide an increasing supply of fertilisers, pesticides, machinery and equipment for agriculture, irrigation, drainage and land improvement. An increase of agricultural production was essential to supply additional food and raw materials for industrial progress. There was need for increasing the supply of scientific and technical personnel and expanding facilities for training them. Nehru gave strong support to the basic policy and to the proposal of having a Plan with an outlay in the public sector of about Rs. 4,500 crores in five years or something roughly double the size of the First Five-Year Plan. The fundamental change of outlook in the Second Five-Year Plan could take place once because of the lead given by Nehru.

23. In scientific matters, Nehru's leadership has been very clear and definite. He has always been taking a keen interest in scientific research and the progress of science and technology in general. It was due to his personal interest that a large number of national laboratories have come into existence and large resources have been made available for the development of atomic energy and the exploration and exploitation of oil and minerals in the public sector. His intervention was decisive in the acceptance of the decimal coinage and the metric system. It was again because of his leadership that increasing attention is being given to the training and expansion of scientific and technical manpower.

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24. The functions of the Planning Commission have never been quite clear. Its recommendations are advisory in character and important policy decisions have to be made, quite properly, by the Central Cabinet. At the same time, the Planning Commission gradually acquired the responsibility of examining a large mass of detailed schemes and projects and of giving or withholding its approval. It is not possible for the Prime Minister to attend to these details as the Chairman of the Commission. It, therefore, became necessary to create the post of a Deputy Chairman to look after the detailed work. The situation being what it is, this has been a convenient arrangement. It has left the Chairman free to concentrate on strategic issues.

25. This is a task which suits Nehru. He has a full appreciation of the scientific revolution which is transforming the world. The content of science changes every day. The spirit of inquiry and the search for truth give science its enduring value. Nehru realises that continuing economic and national development in India would be possible only through the advancement of science and technology. He attaches equal importance to human values and art, literature, music and such other things. This makes it possible for him to take a view peculiarly suited to Indian needs and traditions. His aloofness from details has served to preserve an openness of mind and the ability to take a broad view of the problems.

26. The Nehru approach to planning may, perhaps, be called the middle way. It is an attempt to achieve rapid economic progress in a manner in which political and economic democracy would be reconciled. He has great faith in persuasion which stems from his sense of democracy. In his speeches on planning, one can continually feel how he is trying to present the whole case, both for and against, hiding nothing. Sometimes, one gets the impression as if he is thinking aloud and trying to get a balanced view of the whole matter. In discussions also, he tries to understand and appreciate the opposite points of view. In important matters, he always tries to reach an agreed solution. If differences of opinion persist, he will adjourn the meeting and resume the discussion another day rather than reach a quick decision. Sometimes, it seems as if the educative process itself is of supreme importance to him, that is, as if the meeting of minds is more important than the decision itself.

27. This is why he is extremely reluctant to use his personal influence in any way. Persuasion must be achieved through the right way of thinking and not by personal pressure. He does, of course, have individual discussions from time to time but these are also kept at an impersonal level. This partly explains the fact that he has never built up a group of his own men, so to say, in any committee or organisation. As the leader of the ruling party he is obliged, of course, to use the party majority in Parliament, but even this he does, I should think, from a conviction that he enjoys the confidence of the people of India. In fact, the bigger the group with which he is discussing a proposal, the greater is his confidence of being able to carry conviction to them.

28. Nehru has strong convictions regarding aims and objectives and firm faith that the right way would ultimately prevail. His attitude of mind is, therefore,

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essentially constructive and he would always like to do whatever may be possible in existing circumstances. That is why in 1940 in the midst of all the uncertainties of war and rapidly deteriorating political conditions in India, he could proceed with the task of national planning with supreme confidence. He does not believe that it is ever possible to have or start with a "clean slate". One must make the best use of whatever is available. This leads to what is sometimes called "compromise". It does not matter what it is called, but it is important to recognise that there is no surrender of basic aims or values but only an attempt to make the best possible advance under existing circumstances instead of standing still, waiting for more favourable conditions.

29. His flexibility of approach can be easily appreciated, for example, by his attitude to foreign aid. In the National Planning Committee, he had taken a strong stand against foreign capital because it meant alien influence in economic affairs. Now that India is independent, he would have no objection to foreign loans provided these are intended to assist economic development and are given in a form which would not give rise to any foreign influence in Indian affairs. Consistent with the Nehru policy in international affairs, he would welcome such economic aid from all friendly countries. What of the future? Before answering this question it would be useful to classify problems of planning, or rather of implementation, into two classes: one, which may be called the "concentrated" sector, in which decisions can be made by a small group of persons and can also be implemented by a small group of persons and the other, which may be called the "diffused" sector, in which the implementation would depend on the concurrence and participation of a very large number, may be hundreds of millions of persons. A typical example in the concentrated sector is establishing a million-ton steel plant and in the diffused sector, organising village co-operatives. This is an oversimplification, but it is a convenient classification to understand the present situation in India.

30. The Prime Minister has been generally more effective in decisions in planning in the concentrated sector, for example, in regard to industrialisation. Very soon five million tons of steel would be produced in India every year and the production is likely to go up by ten or twelve million tons in another six or eight years. Heavy machine building, heavy electrical and other basic industries are being developed, and with a clear lead from the Prime Minister, more and more capital goods would be made in the country and would make Indian economy self-sufficient, self-reliant and self-accelerating. With increasing production of fertilisers, agricultural implements, machinery for irrigation, etc. the production of food and agricultural raw materials should also increase to keep pace with industrialisation.

31. In recent years, Nehru has started giving increasing emphasis on institutional changes and social reorganisation such as the development of village co-operatives, state trading, community development and family planning. There is urgent need for an equalisation of opportunities for education and care of health. All this falls in the diffused sector. Implementation would depend on the acceptance of

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the programme by the common people, and would have to be spread over the whole country or over large regions, and wise variations will have to be made to suit local needs and conditions. Nehru has been acting as a great teacher and educator to put across these ideas in a simple language and homely style to millions of the common people all over the country whom he meets in the course of his frequent and far-flung tours. He is also continually stressing the need for decentralisation and delegation of executive powers and responsibilities. This is where the position is still weak.

32. Most of all, there is need for greater coherence and unity of purpose in the whole social organisation. This is ultimately a question of growth, of wisdom and responsible awareness of the needs of the nation as a whole. This is what Nehru has called emotional integration without which a big country like India cannot hold together. Wider diffusion of education is necessary but cannot by itself guarantee social and political maturity. Administrative decentralisation is essential and much would depend on the extent to which this can be achieved in practice. There are many intangibles and it is difficult to speak with certainty.

33. Under the leadership of Nehru, India has made big advances. He initiated the thinking on planning in India. Through his speeches and through planning committees and the Planning Commission, he has exercised a profound educative influence and made India conscious of the need for national planning. Through the Congress Party and the Government, he has made planning an instrument of national policy on the biggest scale outside the communist countries, and has persuaded India to accept socialism as her goal. He has brought to Indian planning a full appreciation of the scientific revolution which is transforming the world, a sensitive awareness of human values and cultural traditions, an inherent sense of democracy and an international outlook.

34. One thing can be said with complete certainty. Jawaharlal Nehru has carried India into a new epoch. Whether there is a smooth transition or whether India has to pass through storms on her way to progress, it will be impossible to go back to a stagnant economy. Through his leadership, he has brought about profound changes in social and productive forces which will continue to influence the course of events in India in the most decisive way.

NATIONAL INCOME, INVESTMENT, AND NATIONAL DEVELOPMENT

Summary of a lecture delivered at the National Institute of Sciences of India, at New Delhi, on 4 October 1952.

1. The gross national product of any country is the total value of all final goods and services produced in any given year together with provision for the consumption of capital assets. The provision for consumption of capital must be used for the repair and replacement of all real physical assets (lands, factories, machinery, buildings, transport and communications, etc.) in order to keep intact the total wealth or means of production. Unless this is done the national product would inevitably fall off. Subtracting the amount required for making good the wear and tear of the real physical assets (usually called the depreciation) from the gross national product one gets the net national product or income and the average share of each person is the per capita net national income. The value of the net national income in India is at present something like 9,000 crores of rupees or Rs. 90 *abja* (one *abja* = 100 crores = one milliard = one billion = 10^9). Dividing by the total population of 36 crores (= 360 millions), the per capita national income is about Rs. 250 per year. These are not exact estimates but will be used as convenient dimensional figures in round numbers for purposes of numerical illustrations.

2. The net national product or income is thus the total value of goods and services which are available for consumption or for the creation of new physical assets. Economic development means increasing the total net production of goods and services. The increase must also not only keep pace with the growth of population but must be at an appreciably faster rate in order that the average share of each individual, that is, the per capita net national income (η) may increase from year to year.

3. The national income may, of course, be increased to some extent by an increase in the average productivity per person. But the only long range way of increasing the national income is to create new physical assets, i.e. new means of production in the form of factories, machines, buildings, transport, etc. The rate of economic development would, therefore, ultimately depend on the amount of new physical assets or means of production which is created every year, that is, on the proportion of the net national income which is not consumed but is set apart for investment or capital formation in real physical assets for future production.

4. The rate of such net new investment (which may be called α) in highly industrialised countries like the U.S.A., the U.K., Sweden and Switzerland during the last generation or two, appears to have been something between one-tenth and one-eighth (that is, between, say, 10 per cent and 13 per cent) of the net national

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product. The rate of net investment or new capital formation, of course, fluctuates from year to year but the average rate over a large number of years is fairly steady. In the U.K. during the period 1870–1913 the rate of net investment was 10.8 per cent per year; and its value exceeded 15 per cent and was 15.2 per cent only once in 44 years. In the U.S.A. the average rate of new capital formation was 12 or 13 per cent over several decades and exceeded 16 per cent over a decennial period only on two occasions during the period 1879–1948. In Sweden the rate over a long period before the war was about 11 per cent; and during the post-war period about 13 per cent. In Switzerland in recent years it has been probably something like 10 or 11 per cent. The rate of net investment in India is not known accurately, but one may, perhaps, adopt something like 5 per cent or so of the net national product, or roughly about Rs. 450 or Rs. 500 crores in round figures per year for purposes of numerical illustration. This is roughly half or less than half the rate of investment in the industrially advanced countries mentioned above.

5. There is a second important factor, namely, the addition to the national product which is generated, on an average, per unit of the net new investment. This may be called (β) the national income coefficient of net investment. From rough calculations it seems that the numerical value of this coefficient was roughly between one-fifth and one-third (that is, between, say, 20 and 33 per cent) in the above 4 countries during the period under review.

6. It must be emphasized that the income coefficient of investment (β) is not something like the financial return or profit on investments in individual enterprises. For example, an iron and steel plant may give a dividend of 5 or 6 per cent to the owners or share-holders. The value generated or added to the national income at the plant would be much greater, possibly 12 or 14 per cent. In light engineering or in agriculture, the value generated by one unit of investment would be still higher and the income coefficient of investment may be 50 per cent or even 100 per cent in particular sectors, so that the average income coefficient of investment for the whole national economy may have a value of the order of 20 or 30 per cent. A second point is also of great importance, namely, that the total increase in the national income due to new investment is scattered over the whole of the national economy and cannot, therefore, be segregated in any way except in so far as the additional income (at the level of business profits) accrues to the socialized sector of the national economy.

7. The rate of investment (α) and the national income coefficient of investment (β) would naturally fluctuate from time to time depending on the pattern of investment, but it is not improbable that over a number of years their average values would remain fairly stable. Thus, both the rate of investment (α) and the income coefficient of investment (β) may perhaps be treated, over a number of years, as characteristic parameters of a particular economic system.

8. The numerical values of the rate of investment (α) and the income coefficient of investment (β) given above are admittedly rough but can be used to

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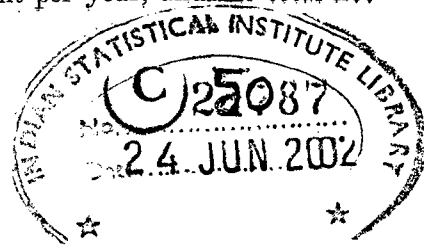
make illustrative calculations of the rate of increase of national income (γ) which is given simply by multiplying together these two figures (that is, $\alpha\beta$). For example, in the U.S.A. the average rate of net investment (α) during the period 1861–1938 was about 12 or 13 per cent; and the average income coefficient of investment (β) was about 30 or 33 per cent. Multiplying the two (α and β) together one gets from 3.6 per cent to 4 per cent or, say, 3.8 per cent as the average rate of increase of net national income (γ) in the U.S.A.

9. It is also necessary to make allowances for the rate of increase of population (which may be called ρ). Population in the U.S.A. was growing at an average rate of roughly 2 per cent during the period 1861–1938. Subtracting 2 per cent ($=\rho$) from 3.8 per cent ($=\gamma$ = rate of increase of net national income) one gets the rate of increase of the per capita net national income per year (that is, $\eta = \alpha\beta - \rho$). This agrees reasonably well with an observed rate of 1.9 per cent per year over the same period. It will be noticed that if the three coefficients (α , β and ρ) remain reasonably constant, then the per capita net national income would increase in accordance with the rule of compound interest, that is, $\eta_t = \eta_0 (1 + \alpha\beta - \rho)^t$, after t years.

10. Some fairly reliable material is also available for the United Kingdom for the period 1870–1913. The rate of net investment (α) was about 10.8 per cent and the coefficient of net investment (β) about 22 per cent. Multiplying together the two figures, one gets 2.38 per cent as the average rate of increase of net national income per year (γ) and subtracting the rate of increase of population (ρ) of 0.95 per cent per year (arithmetic average of the decennial increases) one gets 1.43 per cent per year against an observed value of 1.34 per cent per year, over the period under review. The agreement is, again, not unsatisfactory. In the case of Sweden and Switzerland also the numerical values show broadly similar features.

11. The value of the national income coefficient of net investment (β) in India is not known. But assuming that it is as high as 30 or 33 per cent (as in the U.S.A.), and also assuming that the rate of net investment (α) is about 5 per cent, the growth in total national income would be something of the order of one-and-a-quarter (1.25) or one-and-a-half (1.5) of one per cent per year. Population is growing at present roughly at the rate of one-and-a-quarter per cent (1.25%). Subtracting 1.25 per cent from the rate of increase of total net national income (1.25 or 1.5 per cent), the rate of increase of per capita net national income comes out as practically nil or about one-fourth of one per cent ($\frac{1}{4}\%$) per year. This would seem to indicate that there has not been any deterioration in the national economy but the per capita net national income in India has probably remained more or less stationary or is growing at a very slow rate. This is in keeping with general impressions.

12. If it is desired to double the per capita income in India in, say, 35 years (with population continuing to grow at the present rate) then the per capita net national income must increase at the rate of 2 per cent per year, and the total net



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national income must increase at the rate of at least three-and-a-quarter per cent (3¼%) per year. To attain this rate of growth it would be necessary to make new investments at the rate of something like 10 or 11 per cent of the net income per year, that is, the rate of investment must be roughly of the order of Rs. 900 or Rs. 1,000 crores per year. This means that there must be additional investments to the extent of something like Rs. 400 or Rs. 500 crores per year over and above what is being invested at present. The figures given above are, of course, extremely rough and are only dimensional in nature. In fact, the approach in the present discussion has been definitely of the type of operation research, and numerical values have been given primarily with a view to indicating the magnitude of the quantities involved in national development in India.

DISCUSSION

[*Note*—The lecture was followed by a discussion during which the speaker was asked whether he had made any study of the position in socialized economies. He replied that he had collected some fragmentary information about Poland, Czechoslovakia, Hungary, East Germany and U.S.S.R. which, as time was short, he thought might be discussed more conveniently on another occasion. As he received subsequent enquiries on this point he sent a brief note on 6th October, 1952, which is given below.]

In socialized economies the rate of net investment (α) is stated to be definitely higher and possibly of the order of something like 15 or 16 per cent or more. The income coefficient of investment (β) also appears to have a much higher value, namely, of the order of 50 or 60 per cent or even more so that the rate of economic development (as measured by the increase in the per capita net national income) would be much faster under socialized production. If the claims made by the socialized countries are substantially correct then there would seem to be three distinct bands of economic development. One with a rate of new investment of 5 or 6 per cent as in pre-industrial countries like India; another with a rate of investment of 10 to 12 per cent (or nearly double that of the first level) as in West Europe and the U.S.A.; and the third with a rate of investment of roughly from 15 to 18 per cent (or three times that of the first level) as in socialized countries. The income coefficient of investment (β) also may have two broad levels of value, namely, something between 15 or 20 and 33 per cent in capitalistic or mixed economies and roughly twice as high or more under socialized production. It is also possible that there is a still lower level of development in purely agricultural countries in which economic conditions remain stationary, and net national income can increase only by bringing new lands under cultivation. There is no doubt that the above account gives an extremely oversimplified picture. It is being presented here merely to indicate possible trends of economic development and to draw attention to the need of a careful study of these problems in connexion with national planning in India.

STUDIES RELATING TO PLANNING FOR NATIONAL DEVELOPMENT

In 1953-54 an Operational Research Unit (ORU) was established in the Institute to undertake, on a small scale, technical work relating to planning. In September 1954 the Institute was asked by the Planning Commission to undertake jointly with the Central Statistical Organization (Cabinet Secretariat) to study the possibility of solving the problem of unemployment in 10 years and at the same time to increase national income at a reasonably rapid rate. This address was delivered on 3 November 1954 when Prime Minister Jawaharlal Nehru inaugurated studies relating to planning for national development in the Indian Statistical Institute.

1. At the desire of the Planning Commission the Indian Statistical Institute in collaboration with the Central Statistical Organization has set up study groups to examine the problems relating to planning for national development. The Planning Commission is interested, for example, to know whether it is possible to eliminate unemployment, say, in 10 years with an annual rate of investment of the order of 10 per cent of the net national product. In a fully planned economy it is sufficient to state the target in the form of maximizing national income with the assigned rate of investment because it is always possible to use a part of the planned profits to create enough jobs to eliminate unemployment. In a mixed economy there is some advantage in emphasizing the need of attaining full employment with the understanding that it would be desirable, of course, to increase national income at the same time as much as possible. The emphasis on employment is essentially a short range consideration; the long term objective must be such maximization of income as is capable of being realized under any given socio-political conditions.

2. Different models of economic growth are being constructed and studied on the basis of different sets of relations (sometimes expressed in a mathematical form) between relevant varieties. The object of making different models is to explore a wide range of possibilities which would give some guidance in the choice of the basic approaches. A brief explanation is given in this note of one type of approach. It is convenient to use numerical examples to explain the general procedure. But the figures given here are used purely for purposes of illustration and no special significance should be attached to them. In fact, the aim of the group studies relating to planning is to make realistic estimates of these figures.

3. We assume that the net output of the economy is 100 of which 94 is consumer goods and services and 6 is capital goods. We desire to increase the share of capital goods to an average of 10 per cent. This would have to be done gradually. In the beginning, we may have to import much capital goods from abroad. But it would be clearly more economical to manufacture capital goods within the country. (For example, we are at present importing machinery from abroad to build factories for the production of steel. It is obviously desirable to construct a sufficiently large workshop to build factories for steel production). This means developing the capital

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goods industries, that is, increasing the production of investment in capital goods enterprises as much as possible. At present only a small portion, possibly less than 10 per cent, of all investments goes to capital goods industries. From preliminary studies it seems that this proportion would have to be increased to, say, 30 per cent to double the national income in 20 years. From the long range view point, it would be still better to push up the share of heavy industries to 40 or even 50 per cent but this may be too difficult of accomplishment and too great a sacrifice of the present for the benefit of the future. We may, therefore, adopt 30 per cent as the share of capital goods industries for purposes of illustration—this means an allocation of 3 per cent of net national income or about Rs. 300 crores for investment in capital goods industries every year.

4. Having allocated 30 per cent of the investment to capital goods industries, we may proceed to give, say, 20 per cent to investments in large factories to manufacture consumer goods, 25 per cent to agriculture and small industries, and 25 per cent to services. On the basis of an initial investment rate of Rs. 600 crores per year allocated in the way mentioned above it is possible to study the changes in the national economy in 10 years. We shall assume that the ratio of new income generated to capital investment is one-fourth in the case of large scale enterprises to produce both capital and consumer goods, half in the case of agriculture and small industries, and one in planned services. We also assume for purposes of illustration that the average amount of investment required per engaged person is Rs. 10,000 for capital goods industries, Rs. 7,500 for consumer goods factories, and Rs. 1,000 for agriculture, small industries and services. On certain plausible assumptions (and using a particular form of a model of economic growth) it seems that at the end of 5 years the rate of investment would increase to about Rs. 860 crores per year; national income would increase by 17 per cent, and new jobs created every year would be so large as nearly 48 lakhs. The rate of development would, however, become more rapid as time progresses.

5. At the end of 10 years, the rate of investment would rise to over Rs. 1200 crores, national income would increase by 42 per cent, and employment by nearly 70 lakhs of jobs. (In fact such an increase of employment may not be even necessary in which case the investment in small industries may be fixed at a lower level.)

6. In addition to the planned or directed investments (through, for example, the existing control over capital issues) it is assumed that there would be an unplanned sector; and also that it is possible to work out the relation and interaction between the planned and the unplanned sectors. On the basis of such interaction it would be possible to make a rough estimate of the total increase in national income and the portion available for consumption.

7. At this stage it is necessary to consider the distribution of the increase in income among the population. In principle, the distribution of income can be

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controlled to some extent through taxation and other financial measures. It is, therefore, possible, in principle, to lay down certain targets in the distribution of income. (This in fact is one of the important responsibilities of Planning Authorities).

8. Once the desired distribution of income is settled, it would be possible to consider the change in the demand of consumer goods and services. Purchasing power would increase with rising income; and the demand for goods and services would increase in a definite way depending on the nature of the commodities or services. Intensive studies have been started on the basis of the data collected by the National Sample Survey to find out how the consumption of particular commodities or services actually changes with increasing levels of per capita expenditure. For example, it seems that if the income increases by 30 per cent, the consumption of salt may increase by only 8 per cent, of cereals by 12 per cent and of cotton textiles by 25 per cent. (These are illustrative figures and should not be taken as actual estimates).

9. The above change in consumption with increasing income refers, of course, to different households or individuals at the same point of time. It is not unreasonable to assume that, as a first approximation, a similar change would take place when the income of the same household or individual increases over time. On this assumption and with any given (desired) distribution of income it is possible, in principle, to make a rough estimate of the total increases in demand of different consumer goods and services. This gives a basis to settle the supply of goods required to meet the increased demand. But it is not necessary to accept the figures exactly as estimated. It is possible, within certain limits, to make suitable adjustments from social or administrative considerations. For example, the supply of certain luxury items may be deliberately kept low or the supply of certain items like, say, education or health services may be increased. (Such adjustments would be naturally the responsibility of the Planning Authorities.) After such adjustments, the requirements of consumer goods would become available.

10. At the same time it would be necessary to decide the requirements of capital goods which would naturally depend on the programme of investment. Consideration would be also given to imports and exports. It may be decided, for example, to meet certain portions of the requirements (of both capital and consumer goods) through imports. It would be necessary at the same time to settle what additional quantities of which commodities would have to be produced and exported to meet the cost of imports. In this way the final planned bill of goods (to meet estimated requirements of consumption, investment, and export) which would have to be produced in the country, would become known.

11. Next comes the crucial step of examining whether the required additional bill of goods and services can be in fact produced and supplied with the help of the investments of different types for which allocation had been actually made.

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It would be necessary at this stage to consider the detailed breakdowns of production of commodities and the supply of services. The economic and technological relations between investment, income, and employment in different industries would have to be used at this stage for which intensive studies would be indispensable. (Work on a small scale has been already started.) If the desired requirements of goods and services can be supplied through appropriate investments in different industries within the limits of the allocated resources, then a solution would have been reached. It would be then possible to proceed with the detailed planning within the broad frame of the solution adopted by the Planning Authorities.

12. Further problems would arise as the programme of investment and production becomes more and more concrete. One industry would sell its products to various other industries. Also it would get its needs from other industries. For example, to produce one additional million ton of steel it is necessary to produce (or import) two additional million tons of coal, two additional million tons of iron, and additional quantities of many other materials such as manganese ore, dolomite, magnesite, fluxes, refractories, etc. Moreover, fixed and working capital requirements of one industry would be supplied by many other industries, and its own product would be used as fixed and working capital in other industries. Thus the whole industrial structure is closely interlocked, and in order to conceive of a change in the level of production of one commodity it is necessary to give consideration to the change in output of many other industries. When an approximate allocation of investments is ready, the anticipated consumer expenditure is known, and the requirements of final flows of consumer goods have been settled, it would be necessary to work out the total output of the different industries (inclusive of all intermediate products and consistent with the bill of final goods). This can be done with the help of inter-industry relations (some time called input-output tables). Work is already in progress in 12 sectors (that is, a 12×12 table); and arrangements are being made to prepare a 90×90 table. Later on, it is proposed to consider the inter-relation and two-way distribution of fixed and working capital.

13. In the present approach the essential aim is to adopt a pattern of investments which by developing the capital goods industries would make available a larger and larger supply of capital goods produced within the country and thus make it possible to increase progressively the rate of investment and hence the rate of economic development in the desired way. A larger rate of investments would mean an increase in employment and in salary and wage payments leading to an increase in purchasing power which in its turn would create a larger demand for goods and services. One aim of planning must be to meet the increase in demand by a commensurate increase in the production of the required goods and in the supply of the required services. If this is feasible, a possible solution at the technological level would be available (which may or may not be acceptable depending on other considerations). If the expected requirements cannot be met by the anticipated production, then changes would have to be made in the investment plan until this

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condition is broadly satisfied. The acceptable solution must also satisfy, as far as possible, the condition of attaining full employment in, say, 10 years. If there is more than one solution satisfying the two basic conditions mentioned above, it would be possible to introduce supplementary conditions relating to the increase of income or the distribution of income.

14. One condition in the aggregate is, of course, that the total production of consumer goods should equal the total personal income after tax deductions together with current payments by public administration other than transfers and factory incomes. It is desirable that this balance should be maintained year by year, and not merely reached at the end of the plan period. It would be difficult to attain this balance during periods of large scale capital construction because the new capital stock realised is not consumable. Gaps between demand and supply would no doubt sometimes emerge and short range correctives (in the way of price controls, rationing, etc.) may be necessary from time to time.

15. It is necessary but not sufficient to work out a plan in physical terms; the financial counterpart must also be worked out. The most important question here is to find financial means to increase investment from, say, 5 or 6 to 10 per cent of national income. It is possible to use the investment plan itself to help in this matter. For example, new investments can be made entirely or mostly in the public sector so that "profits" or the surplus can be utilised for further investments. (Ploughing back of profits in existing private enterprises can be permitted to the desired extent to enable production being increased at marginal outlay.) Excise duties can be levied at the point of production in large scale industries in the private sector and the proceeds used for national development. Further expansion of large scale manufacture of such consumer goods as can be produced through handicrafts or small industries can be discouraged or prohibited for some time which would make available more resources for capital goods industries and other sectors. Factory production of consumer goods may, however, be arranged, preferably in the public sector, in the case of essential commodities, or goods for export, or finally, "luxury" goods on which it is possible to earn very high profit.

16. The model described here, however, definitely contemplates a large increase in small industries to supply as much as possible the increasing demand in the short run. After full employment has been attained, and the capital goods industries have been developed fairly well, it would be possible and desirable to increase the rate of industrialization by drawing away labour from agriculture and small industries. At this stage there would be no danger of creating unemployment through the expansion of large scale factory industries.

17. It would be probably desirable to give immediate attention to increase production to full capacity in both large and small industries, and also to increase productivity by all other means such as working 2 or 3 shifts, because all this can be

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done with a very small outlay of capacity and also because this would create a good deal of employment. The question of surplus production would emerge which may require government purchases on a large scale to build up inventories which would be used to meet the increase in demand later on. Government trading may be of help in this connexion and may also be useful in earning profits to be utilised for economic development. Suitable excise duties at the point of production and planned profits at the stage of distribution can serve the dual purpose of securing resources for investment and of promoting an equalitarian level of living by imposing higher differential duties or profits on luxury goods.

18. In dealing with the programme of industrial production one most important question would be an adequate supply of trained personnel at all levels. This may indeed prove to be a serious bottleneck. Attention would, therefore, have to be given to estimate the requirements of trained personnel and to make necessary provision to give training to the required number in each field. Input-output tables in respect of man-power would be of help in this connexion. Studies are also being started in this field. In addition, suitable provision will have to be made to ensure an adequate supply of services personnel (including health, education, research, etc.).

RECOMMENDATION FOR THE FORMULATION OF THE SECOND FIVE YEAR PLAN

Prime Minister Jawaharlal Nehru inaugurated the studies relating to planning for national development in the Indian Statistical Institute on 3 November 1954. The work on economic planning was then organized and carried on with the active collaboration of the Central Statistical Organization, the Economic Division of the Planning Commission and the Department of the Economic Affairs of the Ministry of Finance. On the basis of four agency co-operative studies the 'Draft Plan-Frame' was prepared and submitted to the Prime Minister on 17 March 1955. The Panel of Economists, Planning Commission examined the 'Draft' in April 1955 which was then accepted by the National Development Council in May 1955 as the basis for the formulation of the Second Five Year Plan of India.

INTRODUCTION

1.1. The Second Five Year Plan is due to begin on April 1, 1956. The approach in the Second Five Year Plan is to take a perspective view of development over a long period of years, and at the same time to solve immediate problems like unemployment as quickly as possible. Planning would be, therefore, flexible and would always keep a wide time horizon in view; and at the same time detailed annual plans would be prepared and necessary adjustments made at shorter intervals in the light of experience.

1.2. Proper attention must be given to the physical aspects of the Second Five Year Plan. The requirements of each project must be estimated in real terms at the stage of planning and must be forthcoming in right quantities at the right time at the stage of implementation of the project. Also, the products and services resulting from the completion of a project must be fully and promptly utilized to further the execution of other projects and the progress of the plan as a whole.

1.3. A plan in a mixed economy must be comprehensive and cover both the public and the private sectors. To achieve a balanced growth, the activities of the private sector must conform in a general way to the programme of production of the plan as a whole. In an expanding economy the private sector would have an assured market which would facilitate decisions by reducing risks and uncertainties. Also, the over-all programme would be laid down in broad aggregates so that there would be wide scope for adjustments in details at the discretion of the private sector.

1.4. The physical targets of production must also be balanced in terms of money. Incomes are generated in the very process of production; and supplies are utilized through market operations. Planning requires that aggregate incomes should be balanced with expenditure, savings should match investments, and the supply and demand of individual goods and services should be balanced in terms of money so as to avoid any inflationary rise of prices or undesirable shifts in prices. Physical and financial planning are different aspects of the same reality.

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2.1. The paper contains chapters on main aims and objectives; provisional targets of production; investment and development expenditure; expected changes in employment and income; finance and foreign trade; and planning organization and administration to supply a tentative frame-work for the formulation of the Second Five Year Plan.

2.2. It is requested that the Central Ministries, State Governments, and other project-making authorities should use the provisional figures given in the paper as a general Plan-frame for the formulation of schemes and projects taking care to make estimates in both physical and financial terms, and to forward them to the Planning Commission as they become ready.

2.3. When the individual schemes and projects have been received in the Planning Commission, the aggregate balances would be examined and adjusted as necessary until an integrated plan is evolved which will be internally consistent and balanced in both physical and financial terms. Estimates of demand and supply are bound to be approximate to begin with; and would have to be worked and re-worked to secure a proper balance.

2.4. It is recognized that while projects are being prepared there would be need of a two-way flow of information as well as of consultations between project-making bodies and the Planning Commission. The present recommendations would supply the initial base for such consultations and discussions.

3.1. The programme for the first year (April 1956—March 1957) of the Second Five Year Plan must be completed by October 1955. This first year's programme would contain much carry-over from First Five Year Plan and some new items for which projects are ready or are in an advanced state of preparation. It is requested that projects for 1956-57 (including the carry-over from the First Five Year Plan) should be sent to the Planning Commission.

3.2. The Second Five Year Plan must be ready (in outline form) by March 1956. Projects for the remaining period of Second Five Year Plan should therefore be sent to the Planning Commission.

4.1. Some of the projects would have to be submitted necessarily in a general form at the present stage; and working details would be prepared after it is decided that they would be included in the plan. Nevertheless, it is essential that preliminary information should be given in the prescribed form even if the estimates are of an approximate nature because a technical examination of the projects would not be possible in the absence of such information.

4.2. The Planning Commission would be glad to supply further information in this connection and help in the preparation of schemes and projects.

CHAPTER ONE

GENERAL AIMS AND OBJECTIVES

1.1. *The First Five Year Plan* : At the beginning of the Five Year Plan the country was still dislocated by war and partition. There was shortage of food and raw materials. There were signs of inflationary pressures after hostilities had started in Korea. In this situation it is understandable that the targets of the First Five Year Plan were kept modest. Judged in this context, the progress achieved so far may be regarded as satisfactory.

1.2. There are, however, disquieting features. Agricultural prices are declining. Unemployment, especially in urban areas, is increasing. Even the modest expenditure targets in the First Five Year Plan have not been fully achieved on account of delays in preparing projects, inadequate administrative organization, and lack of sufficient facilities to give training to technical personnel.

2.1. *The need for a bold plan* : The population of India is increasing roughly at the rate of 4.5 million per year. With a proportion of about 40 per cent in the labour force, about 1.8 million persons enter the labour force every year. In addition, a large number of persons are without employment in urban areas and a great deal of under-employment exists in villages. Planning must be bold enough to provide new work for about 1.8 million new entrants into the working force every year; and also to offer more work to the large number of persons who are without jobs or who are under-employed at present.

2.2. The level of living is extremely low. Expenditure on consumer goods per person is about Rs. 22 per month of which about Rs. 13 is spent in cash and about Rs. 9 is the value of consumption of home-grown food and home-made articles. Housing is primitive in villages and extremely short in urban areas. The supply of nutritive foods is meagre although nearly two-thirds of the total expenditure is spent on food items. The expenditure on education is only about four annas per person per month and on health less than seven annas.

2.3. The above estimates are for all classes taken together. The position of the poorer section is much worse. Half the population of India or 185 million persons spend less than Rs. 13 per month on consumer goods and possibly half of this amount is consumed in kind or in the form of home-grown food and home-made articles. Of children in the school-going age, less than half attend at the primary stage; and less than one-fifth at the secondary stage. There is probably less than one qualified physician per 30,000 inhabitants in the villages.

3.1. *General objectives of the Second Five Year Plan* : There is a large pool of idle man-power, and many are without jobs; also about 1.8 million persons would be added to the working force every year. The country has large resources of water for hydro-electric and irrigation projects; coal, iron ore and other important minerals; forests, fertile land and cattle. The aim of planning must be to utilize these resources to increase rapidly the level of production and thus of national income.

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3.2. Conditions are favourable in many ways. There is economic stability and confidence in Government. Unemployed man-power and unexploited resources can be brought together to increase both consumption and investment simultaneously. India's prestige is high at the international level. Finally the Congress Party and Government have decided that the time has come for economic development on a socialistic pattern.

3.3. The Second Five Year Plan is therefore being formulated with the following objectives in view :

(1) to attain a rapid growth of the national economy by increasing the scope and importance of the public sector and in this way to advance to a socialistic pattern of society;

(2) to develop basic heavy industries for the manufacture of producer goods to strengthen the foundations of economic independence;

(3) to increase the production of consumer goods as much as possible through the household or hand industries; and to provide an adequate market for the products;

(4) to develop factory production of consumer goods in a way not competitive with hand industries;

(5) to increase productivity in agriculture; and to speed up agrarian reforms with an equitable distribution of land to peasant cultivators so as to stimulate the increase of agricultural production and of purchasing power in rural areas;

(6) to provide better housing, more health services, and greater opportunities for education especially for the poorer sections of the population;

(7) to liquidate unemployment as quickly as possible and within a period not exceeding ten years;

(8) and as the result of such measures to increase national income by about 25 per cent over the plan period and achieve a more equitable distribution of income.

3.4. The basic strategy would be to increase purchasing power through investments in heavy industries in the public sector and through expenditure on health, education, and social services; and to meet the increasing demand for consumer goods by a planned supply of such goods so that there would be no undesirable inflationary pressures. Planning would be thus essentially a feed-back process of matching a continuously increasing (planned) demand by a continuously increasing (planned) production giving rise to a steadily expanding economy.

4.1. *Heavy industries* : In the long run, the rate of industrialization and the growth of national economy would depend on the increasing production of coal, electricity, iron and steel, heavy machinery, heavy chemicals, and the heavy industries generally which would increase the capacity for capital formation. One important aim is to make India independent, as quickly as possible, of foreign imports of producer goods so that the accumulation of capital would not be hampered by difficulties in securing supplies of essential producer goods from other countries. The heavy industries must, therefore, be expanded with all possible speed.

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4.2. The new producer goods industries would be developed mainly in the public sector. The private sector would continue to play an important part in the development of basic industries like cement, chemicals, etc.

4.3. The heavy industries being capital-intensive would, however, give relatively little scope for employment; and would also generate a large demand for consumer goods which they themselves would not be able to supply.

5.1. *Household and hand industries* : The increasing purchasing power and consequential demand for consumer goods must be met by increasing the supply of such goods as much as possible through the expansion of household or hand production. This would also quickly generate a large volume of work all over the country.

5.2. Construction work (roads, houses, irrigation and flood control projects, etc.) by hand would also be increased which would create a good deal of employment and generate demand for consumer goods.

5.3. The greater the marketable surplus of consumer goods in the household or hand industries the greater will be the possibilities of investments in heavy industries without any fear of inflation.

5.4. By expanding the household and hand industries and construction work, the aggregate national consumption would increase continually. Also, relatively more employment would be created among the poorer sections of the people so that a greater portion of the increase in income would go to them.

6.1. *Factory production of consumer goods* : The production of consumer goods in factories requires heavy investment of capital per engaged person and in many cases competes with the household or hand industries. Until unemployment is liquidated or brought under control, it is necessary to prevent competition between factories and household or hand industries by not permitting investments to be made in such consumer goods factories as would prevent expansion or lead to a shrinkage of employment in the hand industries.

6.2. In the immediate future the factory production of consumer goods would be expanded (where it is not competitive with hand industries) to increase the supply of essential goods (like antibiotics, fine drugs, etc.) or of goods for export to earn foreign exchange.

6.3. It is recognised that the price of hand-made goods would often be higher than the price of factory-made goods of comparable quality. Appropriate excise duties (which would be selective) would be imposed on factory products to maintain desired price parities with hand-made goods in such cases.

6.4. Once mass unemployment has gone, the aim would be to provide cheap power and small machines to the household sector and hand industries to increase productivity per worker and hence the total national product. At this stage the factory production of consumer goods would also be increased.

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7.1. *Agriculture and allied pursuits* : The fixation of ceilings and procedural arrangements for the redistribution of land to peasant cultivators must be decided at an early date in each State in accordance with general principles and standards settled on an all-India basis, and the redistribution must be completed by 1958. This would make visible important structural changes in the economy resulting in stimulation of agricultural production and provision of a large market for the growing output of industry and handicrafts; and would also transfer a part of the national income from recipients who use it largely for luxurious consumption to recipients who will use it for productive purposes and for raising their low standard of life.

7.2. The National Extension Service Blocks (and Community Projects where possible) would be extended all over the country to help and speed up the improvement of living conditions in rural areas.

7.3. Because of the urgent need of increasing the production of foodstuffs and raw materials, the highest priority would be given to the setting up of a State Bank, as recommended in the Report of the Rural Credit Survey Committee, for the supply of agricultural credit.

7.4. The same or an associated system would be used for the supply of credit, raw materials, and marketing facilities to the household and hand industries through an organization of co-operatives with the support (or the direct participation or partnership) of Government.

7.5. As an increase in the caloric value is not enough for a balanced diet, concerted efforts must be made to increase the supply of food of higher nutritive and protective value such as fruits and vegetables, milk and milk products, eggs, fish, meat etc.

7.6. Continuing efforts must be made to increase the production of milk products by improving the quality of cattle through the introduction of better breeds, by increasing the production of fodder crops and cattle feed, and by providing better veterinary services by increasing the number of trained veterinary surgeons and veterinary assistants.

8. *Health* : There must be a rapid increase in the care of health. A national health service would be established in the rural areas with paid health assistants in charge of a group of villages who would work in contact with fully trained physicians. The number of dispensaries and hospitals, and facilities for medical training would be increased in urban areas.

9.1. *Education* : There must be a rapid increase in literacy, improvement in the pay of teachers, and better organization of education at all levels.

9.2. On the basis of merit, able students, at all levels and in increasing numbers, must be provided with adequate living and educational expenses to enable them to receive education up to the highest standard according to capacity without regard to sex, creed, caste, or social status of the parents. Special educational scholarships and facilities must also be provided for women and backward groups and communities.

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10.1. *Social security and welfare* : Existing social security schemes such as Employees State Insurance and Provident Fund schemes would be expanded. A scheme for unemployment benefit in the form of paid attendance at training centres with placement facilities would be introduced in urban areas.

10.2. There must be increasing provision for the social welfare of children (foundling homes, crèches, nursery schools, health and recreation centres, etc.), of women (houses for widows, destitute and deserted women; maternity, health, and family planning centres), of juvenile delinquents (remand homes, schools, after-care hostels, etc.), of the handicapped (homes, schools and workshops for the blind, the deaf and the dumb, the crippled, and the mentally deficient or ill, and homes for the aged and the infirm).

11. *Sports and cultural pursuits* : Increasing facilities must be provided for sports and health activities, educational and cultural broadcast and cinema; and the promotion of literature, music, drama art and other cultural pursuits.

12. *Housing* : Better housing must be provided especially for factory workers and poorer sections of the people in urban areas.

13. *Social overheads* : Expenditure on housing, health, education, social security and welfare, sports and cultural pursuits would necessarily increase purchasing power and create additional demand for consumer goods which must be met by increasing the production of additional consumer goods through household and hand industries in the first instance.

14.1. *Balanced development and controls* : With the stepping up of production of both producer and consumer goods, it would be necessary to provide for adequate increases in the supply of electricity and fuels, irrigation, transport, and communication. Proper balances must be maintained between sectors so that production is not hampered by bottlenecks.

14.2. The aim of planning would be to avoid shortages giving rise to inflationary pressures on the one hand and over-production with falling prices on the other. In the case of falling prices, especially of consumer goods, the demand would be stimulated promptly by increasing purchasing power through investments in the public sector and through expenditure on social services and by open market operations by Government.

14.3. Government would acquire and keep adequate reserves of foodgrains and important raw materials produced by agriculture to provide against emergencies of short crops in bad years and to maintain prices profitable to peasants in years of exceptionally plentiful crops. This would maintain a minimum level of peasant incomes, stimulate production, and promote the welfare of both peasants and the working class in urban areas.

14.4. Shortages may, however, develop in the short run which would be dealt with as they arise by appropriate methods such as Government intervention in the

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market, Government trading, physical controls, rationing and similar measures. Also, the production programme would be adjusted as necessary to restore equilibrium between supply and demand as quickly as possible.

14.5. Rationing of foodgrains, clothing, and similar essential commodities would be avoided. Control over consumption, when necessary, would be related to the shortages of specific physical resources.

15. *Regional development* : Special attention must be given to regional development to reduce disparities in economic opportunities and the level of life between different States.

16.1. *Technical training and scientific research* : A bold plan will require a rapidly increasing technical staff to prepare the various projects as well as to implement them. Training facilities must be expanded sufficiently quickly to turn out technical and scientific personnel in adequate numbers at all levels.

16.2. Scientific and technological research would be expanded and oriented to serve the needs of national development in an effective manner. The National Laboratories, Universities and other scientific institutions and organizations must undertake coordinated researches in accordance with national needs.

16.3. Fundamental research as well as training in research must also be encouraged at the same time to foster the accumulation of basic knowledge and skill for the expansion of applied and technological research.

16.4. The survey of natural resources, especially prospecting for oil and minerals, must be greatly and rapidly increased through State Organizations.

17.1. *Expansion of the public sector* : Key industries would be established and developed in the public sector generally in accordance with the Industrial Policy Declaration of 1948 as interpreted in December 1954. Government would also take up the factory production of certain consumer goods which are of strategic importance for the growth of the national economy.

17.2. The public sector must be expanded rapidly and relatively faster than the private sector for steady advance to a socialistic pattern of economy. In order to make available large capital resources for investment and national development and to facilitate the implementation of the Plan, Government will be prepared to enter into such activities as banking, insurance, foreign trade or internal trade in selected commodities.

17.3. Government would also promote enterprises in partnership with the private sector so that, although Government would hold a controlling share, initiative can be left to private management subject to policy decisions by Government.

18.1. *The private sector* : A large majority of the population would be engaged in household production in agriculture, in hand industries and in various services which would continue to remain private.

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18.2. As the planned demand would have to be matched by the planned production, it would be necessary for the private sector to conform in a general way to the overall programme of production as provided in the Plan. The private sector would be helped by Government by the supply of credit, raw materials and marketing facilities to undertake production in accordance with the Plan.

18.3. Inducements (such as tax exemption or preferential permission for capital issue) would be given to channel the profits of the private sector into desirable forms of investments in both private and public sectors or in Government bonds and securities.

18.4. The private sector would enjoy the advantages of an assured and growing market in an expanding economy, and thus of reduced risks and uncertainties.

19.1. *Finance and foreign exchange* : Large financial resources would be required for the Second Plan. A small portion would come from sterling balances or foreign loans and aid; and the bulk of the resources must be found from within the domestic economy.

19.2. The tax system would be directed to collect an increasing part of the growing national income in order to permit greater capital formation in the public sector and to finance an expansion of social services.

19.3. The public sector would be extended to industrial and commercial activities where necessary for raising resources for public purposes.

19.4. Deficit financing would be undertaken on the scale necessary to bring about the greatest possible expansion of production without introducing permanent and all-embracing rationing of essential commodities.

19.5. Conspicuous consumption would be discouraged by graduated excise duties; and a more equitable distribution of income would be assured by taxes on property and unearned income.

19.6. Excise duties would be levied to raise additional resources and also to maintain desired price parities between different sectors.

19.7. Steps would be taken to promote exports; and the import of non-essential and luxury goods would be discouraged by heavy duties in order to release foreign exchange resources for more urgent needs.

CHAPTER TWO

TARGETS OF PRODUCTION

1.1. The targets of production (mostly in physical quantities) of some important items are shown in Table (1). The physical unit is given in col.(2) and actual production for 1950-51 and 1953-54 in cols. (3) and (4) respectively. Estimates for 1955-56 and planned target for 1960-61 together with the estimated increase (in percentage) during the plan period are shown in cols. (5), (6) and (7) respectively.

1.2. The above targets are provisional. Estimates of requirements and likely supplies have been examined in a general way on available information. The next task is to carry out a detailed check and make necessary adjustments on the basis of projects to achieve internal consistency in the form of a balanced supply and demand of material and labour resources. Such balancing must also have a proper phasing over time so that neither serious bottlenecks nor excessive supplies emerge at any stage of the Plan.

1.3. Explanatory notes are given on some (but not all) of the items mentioned in Table (1). The number shown within brackets after each item gives the serial number of the same item in Table (1).

2.1. *Electricity* (1) : Planned electrification must be a main link in economic development in India. The hydro-electric projects started in the First Plan must be continued on an increasing scale in the Second Plan.

2.2. Regional grid-systems combining both thermal and hydel power stations must be planned to secure the best of local fuels (low grade coal, lignite, etc.) and of installed capacity by large consumers (electric-intensive industries like aluminium, alloy-steels, etc.) keeping in view the development of a future super-grid for India as a whole.

2.3. Small power stations (hydel and diesel) would also be developed for urgent requirements in small towns and rural areas.

2.4. The use of electricity for small-scale and household industries, irrigation by tube-wells, etc., must be steadily increased.

2.5. The production of electricity must forestall the growth of industrial production; and the installed capacity must increase from 2.8 million kilowatts in 1953-54 to 6 million kilowatts in 1960-61, that is, must be more than doubled. Also, the utilization of capacity must be increased.

3.1. *Coal* (2) : The production of coal must be increased from 37 million tons in 1955-56 to 60 million tons in 1960-61 (an increase of about 62 per cent) which would be difficult to achieve but should not be impossible.

3.2. There is great wastage at present of high grade coking coal of which supply is short. Necessary Government action must be taken without any delay to prevent such wastage and to promote better conservation.

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4.1. *Synthetic petrol and products* (3) : India is short of petrol and meets most of its requirements by imports. In addition to increasing oil-prospecting as quickly as possible, a State plant to produce about 300,000 tons of synthetic petrol must be installed during the Second Plan, and future production must be increased as necessary.

4.2. The above plant must also be used to establish a base for the development of associated chemical industries.

5.1. *Steel* (4) : India has vast resources of iron ore; and increasing production of steel must be made an important link in economic development. The installed capacity would be increased to 6 million tons and production to 5 million tons by 1960-61.

5.2. Necessary action (in the way of establishing a heavy machinery industry and promotion of metallurgical research) must be taken in the Second Five Year Plan to build up the base for the future expansion of the installed capacity of steel by at least one million ton per year from 1961.

5.3. Increasing production of steel would supply a secure foundation for the fabrication of plants and machinery of all kinds, expansion of construction work and of railways and transport generally. If necessary, steel can also be exported to neighbouring countries which are in urgent need of it.

6.1. *Aluminium* (7) : India has large reserves of bauxite and the production of aluminium must be rapidly increased to take the place of copper which is in short supply and mostly imported. Increasing production of aluminium would, in its turn, facilitate electrification; and the production of both electricity and aluminium must be continuously increased at the same time.

6.2. The production of aluminium should be increased from about 5 to 40 thousand tons during the plan period. One or more aluminium plants must be established in the public sector for this purpose.

7. *Manganese ore* (8) : The extraction of manganese ore must be increased and some of the ore must be converted into ferromanganese before export so as to retain a part of the value created by semi-manufacture.

8. *Cement* (9) : The production of cement must be increased from 4.6 to 10 million tons or more than doubled during the second plan period. The production of other building materials must be increased proportionately to avoid shortages and bottlenecks in construction work.

9.1. *Fertilizers* (10) : The production of nitrogenous fertilizer must be increased by about three times by establishing at least three more factories of roughly the same capacity as Sindri.

9.2. Fertilizer production must also be steadily and continuously expanded along with irrigation to secure a rapid increase in the outturn of agricultural crops in future.

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10. *Heavy chemicals* (11) : The production of sulphuric acid, soda ash and caustic soda must be increased by 1960-61 to roughly four times the actual production in 1953-54.

11.1. *Heavy machinery* (12) : For rapid industrialization it is essential to fabricate plants and machinery at home. To instal a plant for the production of one million tons of steel per year it is necessary at present to import machinery worth about Rs. 40 or Rs. 45 crores from outside. Provision has been made for investment of Rs. 150 crores to establish large engineering workshops to fabricate machinery needed for producer goods plants. An immediate aim would be to manufacture every year most of the machinery required for installing a one million ton capacity steel plant.

11.2. Investment of Rs. 40 crores is contemplated for establishing plants for the manufacture of heavy electrical equipment.

11.3. The production of machinery for the manufacture of consumer goods (textiles, etc.) must be roughly doubled during the plan period, and an investment provision of Rs. 50 crores has been made for the purpose.

12. *Railway rolling stock* (13) : The annual production of locomotives must be increased from 100 to 400; of wagons from 7,000 to 20,000; and of coaches from 800 to 2,000 so as to attain self-sufficiency in rolling stock by the end of the plan period.

13. *Jute textiles* (14) : Immediate steps should be taken to ensure a fuller use of the existing capacity and to see that by 1960-61 the full rated capacity is utilized.

14.1. *Factory-made consumer goods* : The factory production of essential consumer goods would be increased in such a way as to prevent competition with the household and hand-industries.

14.2. *Cotton textiles* (15) : Production would be increased to 5,500 million yards per year by 1960-61, the additional production being used mainly for exports. (The remaining part of the internal demand would be met by hand-made cloth.)

14.3. *Woollen textiles* (16) : Manufacture of woollen textiles should increase by about 25 per cent during the second plan period.

14.4. *Sugar* (17) and *vegetable oil* (18) : The production of sugar must be increased (preferably through co-operatives) by about 50 per cent and reach 2.1 million tons. A rise by about 33 per cent of the production of vegetable oil will be necessary.

14.5. *Paper* (19), *bicycles* (20), *sewing machines* (21), and *electrical goods* (22) : Production must increase by roughly between 40 per cent and 100 per cent to meet anticipated increase in demand and also partly for export.

15.1. *Hand-made consumer goods* : Every effort must be made to expand the hand production of consumer goods to provide a marketable surplus to meet the increase in demand.

15.2. *Khadi and handloom* (23) : Production would be increased to 3,200 million yards (from the level of about 1,200 million yards in 1953-54).

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15.3. Production of other hand-made articles must be increased by 20 to 40 per cent.

16.1. *Agriculture and allied pursuits* : The production of *cereals* (28) must be increased from 56 million tons in 1953-54 to 63 million tons in 1960-61, and of *pulses and grams* (29) from 10 to 13 million tons. This would make the country self-sufficient in foodgrains at a somewhat higher standard of consumption than at present.

16.2. *Cotton* (32) : Output must increase by 38 per cent to 5.8 million bales so that the net import of cotton can be considerably reduced by 1960-61.

16.3. *Sugarcane* (34) : Output must increase to 7.5 million tons of raw sugar (50 per cent increase).

16.4. *Milk* (37) : Production of milk and other edible animal husbandry products should go up by about 25 per cent.

17.1. *Irrigation* (41) : In order to achieve the agricultural targets mentioned above, the total irrigated area must increase from 70 to 100 million acres.

17.2. Special attention must be given to devising suitable measures for flood control.

18. *National Extension Service and Community Projects* (42) : Vigorous organization and persistent efforts would be required for the expansion of production in agriculture and in household and hand industries. NES blocks, which can supply a convenient machinery for this purpose, must cover the entire country by the end of the Second Plan.

19. *Transport* : *Railway tracks* (43) would be increased by 3,000 miles (9 per cent increase); *passenger miles* (44) and *freight ton-miles* (45) by 30 per cent and 40 per cent respectively. *National highways* (46) would be increased from 12,500 to 17,500 miles (40 per cent increase) and *State roads* (47) from 20,000 to 35,000 miles (75 per cent increase). *Shipping tonnage* (48) would increase from 525,000 (in 1953-54) to about 1,500,000; an increase of 185 per cent.

20.1. *Education* : The number of pupils in schools between the ages of 6 and 14 would increase from about 29 million in 1955-56 to about 46 million in 1960-61.

20.2. The expenditure on *technical training, higher education and research* (53) must increase by 75 per cent.

21.1. *Health* : The number of *hospital beds* (54) must increase from 112,000 in 1953-54 to 250,000 in 1960-61; and the number of *registered doctors* (55) from 65,000 in 1953-54 to 90,000 in 1960-61.

21.2. Two new cadres of junior and senior *health assistants* (56) would be created with two levels of training of two years and four years respectively. Each junior health assistant would be placed in charge of a group of 10 villages or one NES block and one senior health assistant would be in charge of 5 such groups or 5 NES blocks together with one registered doctor in charge of two such units or 10 NES

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blocks in such a way that the whole of the rural area is covered by the end of the Second Plan.

22. *Urban Housing (57)* : The number of urban houses must increase sufficiently to provide additional accommodation for 3 million families during the Second Plan.

TABLE (1) : TARGETS OF PRODUCTION FOR THE SECOND FIVE YEAR PLAN :
1956-57 TO 1960-61

name of item	unit	actuals		provisional estimates		
		1950-51	1953-54	1955-56	1960-61	percentage increase
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>factory producer goods</i>						
1. electricity	.. m. kw.	2.3	2.8	3.5	6.0	71
2. coal	.. m. tons	32	36	37	60	62
3. synthetic petrol	.. th. tons	nil	nil	nil	300	—
4. steel	.. m. tons	1.1	1.1	1.3	5.0	285
5. pig iron (for foundries)	.. m. tons	—	—	0.4	1.8	350
6. iron ore	.. m. tons	3	4	4	13	225
7. aluminium	.. th. tons	3.7	3.8	5	40	700
8. manganese ore	.. m. tons	1	2	2	3.5	75
9. cement	.. m. tons	2.7	4.0	4.6	10.0	108
10. fertilizers						
(a) nitrogenous	.. th. tons nitrogen	9.2	61.4	90	360	300
(b) superphosphates	.. th. tons	55	66	100	200	100
11. heavy chemicals						
(a) sulphuric acid	.. th. tons	99	120	150	450	200
(b) soda ash	.. th. tons	45	56	75	200	167
(c) caustic soda	.. th. tons	11	25	33	100	203
12. heavy machinery to fabricate plants (investment)						
(a) steel and producer goods	Rs. crores	nil	nil	nil	150	—
(b) electrical equipment	.. Rs. crores	nil	nil	nil	40	—
(c) consumer goods	.. index	—	—	100	200	100
13. railway rolling stock						
(a) locomotives	.. no.	nil	86	100	400	300
(b) wagons	.. no.	1095	6892	7000	20000	186
(c) passenger coaches	.. no.	479	786	800	2000	150
14. jute textiles	.. th. tons	892	864	1000	1200	20
<i>factory consumer goods</i>						
15. cotton textiles	.. m. yds.	3718	4906	5000	5500	10
16. woollen textiles	.. m. lbs.	18	20	20	25	25
17. sugar	.. m. tons	1.1	1.1	1.4	2.1	50
18. vegetable oil	.. m. tons	1.2	1.4	1.5	2.0	33
19. paper	.. th. tons	114	137	140	200	43
20. bicycles	.. thousand	101	290	500	1000	100
21. sewing machines	.. thousand	33	68	90	150	67
22. electrical goods	.. index	—	—	100	166	66

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 TABLE (1) : TARGETS OF PRODUCTION FOR THE SECOND FIVE YEAR PLAN :
 1956-57 TO 1960-61—(Continued).

name of item	unit	actuals		provisional estimates		
		1950-51	1953-54	1955-56	1960-61	percentage increase
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>hand-made consumer goods</i>						
23. khadi and hand-loom	.. m. yds.	742	1200	1600	3200	100
24. soap	.. th. tons	—	—	28	40	43
25. footwear	.. m. pairs	—	—	80	100	25
26. food industries	.. index	—	—	100	120	20
27. metalwares	.. index	—	—	100	133	33
<i>agricultural and associated pursuits</i>						
28. cereals	.. m. tons	41.7	56.1	56	63	13
29. pulses and grams	.. m. tons	8.3	9.6	10	13	30
30. total food grains	.. m. tons	50.0	65.0	66	76	15
31. oilseeds	.. m. tons	5.1	5.6	5.6	7.0	25
32. cotton	.. m. bales	2.9	3.9	4.2	5.8	38
33. jute	.. m. bales	3.3	3.1	5.0	5.4	8
34. sugarcane (raw sugar)	.. m. tons	5.6	4.6	5.0	7.5	50
35. tobacco	.. th. tons	257	256	250	300	20
36. tea	.. m. tons	607	675	675	750	11
37. milk	.. index	—	—	100	125	25
38. wool	.. m. lbs.	—	—	40	50	25
39. timber	.. index	—	—	100	130	30
40. fish	.. index	—	—	100	125	25
<i>rural development</i>						
41. irrigation	.. m. acres	50	58	70	100	43
42. NES and community projects	.. no. of blocks	—	479	1200	5600	367
<i>transport : railways</i>						
43. mileage	.. miles	—	—	34,500	37,500	9
44. passenger miles	.. index	—	—	100	130	30
45. freight ton-miles	.. index	—	—	100	140	40
<i>roads</i>						
46. national highways	.. th. miles	11.9	—	12.5	17.5	40
47. state roads	.. th. miles	17.6	—	20.0	35.0	75
<i>shipping</i>						
48. tonnage	.. thousand	391	525	610	1,500	146
<i>social service : education</i>						
49. pupils : age 6-11	.. lakh	187	—	236	380	161
50. pupils : age 11-14	.. lakh	34	—	51	80	157
51. percentage of students in age groups : 6-11	.. per cent	42	—	50	75	50
52. " " 11-14	.. per cent	14	—	20	30	50
53. technical training, higher education and research	.. index of expenditure	—	—	100	175	75
<i>health</i>						
54. hospital beds	.. thousand	107	112	125	250	100
55. doctors (registered)	.. thousand	—	65	70	90	29
56. health assistants	.. index	—	—	100	300	200
<i>housing</i>						
57. urban houses	.. lakh	101	—	120	150	25
<i>communication</i>						
58. post offices	.. thousand	37	47	53	78	47
59. telegraph offices	.. thousand	36	39	48	70	46
60. telephones	.. thousand	168	220	300	600	100

APPENDIX TO CHAPTER TWO

COMMODITY BALANCES IN 1960-61 (*Provisional*)

1. Attempts have been made to see, in a rough way, that the targets given in Table (1) are consistent. This appendix gives relevant information for five major commodities : electricity, coal, steel, cement and heavy chemicals.

2. *Electricity* : The consumption of electricity in 1960-61 is expected to be 20,000 million kilowatt hours (kwh) which should be possible to secure from an installed capacity of 6 million kilowatts (mkw) with a slightly higher rate of utilization than the present rate. The following allocation of power in million kwh is envisaged in 1960-61 : iron and steel (2500), aluminium (1300), cement (1100), cotton textiles (1500), fertilizers (1000), all other industries (5600) and light, small power, traction and all other uses (7000)—total (20,000).

3. *Coal* : The industrial development envisaged would require at least 60 million tons of coal. The allocation in million tons in 1960-61 is expected to be as follows : railways (14.0), electricity (5.0), iron and steel (15.0), cement and bricks (5.0), cotton textiles (1.5), jute mills (0.5), paper (1.0), fertilizers (1.0), other industries (4.0), bunker and steamer service (2.0), domestic (7.5), synthetic petrol (1.5), and all other uses (2.0)—total (60.0).

4. *Steel* : The rough pattern of utilization in million tons in 1960-61 is given below : steel processing industries (1.5), railways (0.8), industrial development schemes both public and private (0.8), other Government development schemes including multipurpose and State irrigation projects (0.2), construction (0.5), industrial maintenance and packing (0.3), defence and roads (0.1), and all other uses including export (0.7)—total (5.0).

5. *Cement* : The allocation envisaged in million tons in 1960-61 is as follows: all construction (6.4), cement products (0.4), railways (0.5), roads (0.3), multipurpose and State irrigation projects (1.8), and all other uses including export (0.6)—total (10.0).

6.1. *Heavy chemicals* : Balances have been worked out for sulphuric acid, caustic soda and soda ash.

6.2. *Sulphuric acid* : The allocation in 1960-61 in thousand tons will be as follows : ammonium sulphate (60), superphosphate (110), iron and steel (90) and all other uses (190)—total (450).

6.3. *Caustic soda* : The allocation in 1960-61 in thousand tons will be as follows : soap (30), textiles (20), paper (15), aluminium (5) and all other uses (30)—total (100).

6.4. *Soda ash* : The allocation in 1960-61 in thousand tons will be as follows : glass (100), textiles (10), silicate of soda (10), paper (10), other chemicals (25) and all other uses (45)—total (200).

CHAPTER THREE

INVESTMENT AND DEVELOPMENT

1.1. *Allocation of investment* : The allocation of investment (or net capital formation) by broad sectors is shown in Table (2).

TABLE (2):: ALLOCATION OF INVESTMENT

(Rs. crores)

sector	public	private	total	percentage
(1)	(2)	(3)	(4)	(5)
1. electricity	450	50	500	8.9
2. industry	1,000	400	1,400	25.0
3. transport & communication.	850	50	900	16.1
4. agriculture & irrigation	750	200	950	17.1
5. construction	250	1,100	1,350	24.0
6. stocks	100	400	500	8.9
total	3,400	2,200	5,600	100.0

1.2. Electricity includes both hydro-electric and thermal power stations. Industry includes the household and hand industries. Construction includes residential houses, schools, hospitals, and public buildings.

1.3. Strictly comparable figures are not available for the First Five Year Plan, but the total investment in the public sector as planned was roughly Rs. 1600 to Rs. 1700 crores and the same amount was estimated for the private sector. Thus, investment or net capital formation through the public sector in the Second Plan would be about double of the planned estimates in the First Plan; and the estimated investment in the private sector would be about 40 per cent higher.

2.1. *Allocation by industries* : The breakdown of investment by important industries is shown in Table (3).

2.2. The provision for iron and steel includes expansion of capacity of existing plants; three new plants (Rourkela, Madhya Pradesh and one more); factories for the production of pig iron for foundries, and miscellaneous items.

2.3. Along with the installation of one synthetic petrol plant, necessary action must be taken to train personnel and build up experience through pilot plants for the establishment of associated chemical industries.

2.4. The production of electrical appliances would include electrical machinery (such as turbines, generators, transformers, transmission equipment etc.) required for hydro-electric and thermal projects.

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2.5. The heavy machinery industry to be established in the public sector must be able by 1960-61 to fabricate machinery required to instal every year a steel plant of a million ton capacity or plants to manufacture producer goods of roughly equivalent value.

TABLE (3) : ALLOCATION OF INVESTMENT BY INDUSTRIES

industry	investment (Rs. crores)	percentage
(1)	(2)	(3)
1. iron and steel	425	30.4
2. synthetic petrol	80	5.7
3. heavy machinery to fabricate plants for		
(a) steel and producer goods	150	10.7
(b) electrical equipment	40	2.9
(c) consumer goods	50	3.6
4. cement, chemicals, etc.	100	7.1
5. existing state enterprises	50	3.6
6. aluminium	30	2.1
7. minerals and prospecting	75	5.4
8. fertilizers	100	7.1
9. factory consumer goods	100	7.1
10. household and hand industries	200	14.3
total	1,400	100.0

2.6. The aluminium industry must be developed to make the country independent of imports of copper by 1960-61; and must continue to be further expanded in future.

2.7. Geological surveys and especially prospecting for oil and minerals by Government organization must be rapidly expanded. Mining operations must also be greatly expanded. A provision of Rs. 75 crores has been made for this purpose.

2.8. Rs. 100 crores have been provided for the installation of fertilizer plants with capacity equivalent to roughly four times the current production at the Sindri factory.

2.9. The greatest importance is attached to the expansion of the household and hand industries as this would be the principal method of liquidating unemployment and also of creating a marketable surplus of consumer goods to meet the increase in demand arising from investments in heavy industries, construction work, and expenditure on social services. Rs. 200 crores or Rs. 40 crores per year have been provided for this purpose.

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3.1. *Public development expenditure* : In the First as well as in the Second Plan certain items of current expenditure have been included in addition to provision for investment. This is shown in Table (4).

TABLE (4) : PUBLIC DEVELOPMENT EXPENDITURE

sector	second plan				first plan	
	invest- ment (Rs. crores)	current (Rs. crores)	total (Rs. crores)	percent	percent	total (Rs. crores)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. electricity	450	—	450	10.5		
2. agriculture, irrigation and rural development	750	200	950	22.5		
sub-total			(1,400)	(33)	44	990
3. industry & minerals	1,000	100	1,100	26	8	178
4. transport and communication	850	100	950	22	24	536
5. construction and social services	250	500	750	17	24	544
6. stocks	100	—	100	2	—	—
total	3,400	900	4,300	100	100	2,248

3.2. Comparable figures for the First Five Year Plan are given in cols. (6) and (7). The total development expenditure of Rs. 4,300 crores in the Second Plan is just short of double the planned development expenditure of Rs. 2,248 crores in the First Plan.

3.3. In the Second Plan there is a much larger actual expenditure for industrial and mineral development (Rs. 1,100 crores against Rs. 178 crores in the First Plan); and the relative proportion is also much higher (26 per cent of total development expenditure in the Second Plan against 8 per cent in the First Plan). The actual expenditure in the Second Plan is greater but the relative expenditure (as a proportion of the total) is less in all the other sectors.

4.1. *Total development expenditure* : In addition to the current development expenditure included in Table (4), there are current expenditures for purposes of development not included in the Plan. The position is shown in Table (5).

4.2. The total Government expenditure is expected to increase from Rs. 1,425 crores in 1955-56 to about Rs. 2,050 crores in 1960-61; the total development

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TABLE (5): TOTAL GOVERNMENT EXPENDITURE

(Rs. crores)

item	1955-56 (estimated)	1960-61 (estimated)	total second plan
(1)	(2)	(3)	(4)
1. non-development (defence and civil administration)	625	725	3,400
2. development			
(a) not in the plan	200	225	1,100
(b) in the plan	600	1,100	4,300
3. sub-total	800	1,325	5,400
total	1,425	2,050	8,800

expenditure would increase at the same time from Rs. 800 crores to Rs. 1,325 crores; and the development expenditure included in the Second Five Year Plan would increase from Rs. 600 crores to Rs. 1,100 crores.

4.3. The total Government expenditure during the Second Five Year Plan is expected to be Rs. 8,800 crores out of which Rs 3,400 crores would be non-development (defence and civil administration). Rs. 1,100 crores development expenditure not included in the Plan, and Rs. 4,300 crores development expenditure included in the Plan.

CHAPTER FOUR

EMPLOYMENT AND INCOME

1.1. *Employment*: In India a very large number of families (comprising a majority of the population) are self-employed, many of which use their labour power only partially and thus suffer from chronic under-employment. They must be provided with opportunities of doing more work and thus increasing their income.

1.2. In the urban areas there is a large number of persons without jobs and seeking work for whom new employment must be created. New work must also be found for roughly 1.8 million persons who, on an average, would enter the working force every year (calculated on the basis of a labour force composition of 40 per cent of a net average increase in population of 4.5 million per year).

2.1. The programme of production, investment, and development (discussed in Chapters Two and Three) is expected to generate a volume of employment shown in Table (6).

TABLE (6) : ESTIMATED VOLUME OF EMPLOYMENT IN 1960-61

sector	employment (in millions)		increase	
	1955-56	1960-61	actual (in millions)	percent
(1)	(2)	(3)	(4)	(5)
1. agriculture & allied pursuits	109.5	111.0	1.5	1.4
2. mining & factory establishments	4.0	5.7	1.7	42
3. household enterprises & construction	12.0	15.0	3.0	25
4. communication, railways, banks, insurance	1.6	2.0	0.4	25
5. wholesale and retail trade, transport (other than railways), etc.	10.0	12.0	2.0	20
6. professions, services (including govt. administration) and the rest	14.9	17.3	2.4	16
total	152.0	163.0	11.0	7

2.2. If the targets of production are realized then the problem of unemployment should be brought under control by the end of the Second Five Year Plan. Because of the rapid rate of industrialization proportionately the biggest increase of employment, about 45 per cent, would occur in mining and factory enterprises. The household and hand industries, communication, transport, trade, etc., would have an increase of about 20 per cent or 25 per cent and the professions and services of about 16 per cent. Even in the Second Plan labour would not begin to be drawn away from agriculture and allied pursuits, but would increase at a low rate of the order of only 1.5 per cent, which would still mean an increase of 1.5 million persons in the labour force in this sector.

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3.1. *Income* : The net domestic output at 1952-53 prices had increased from Rs. 91.9 abja in 1950-51 (the base year of the First Five Year Plan) to about Rs. 103.1 abja (provisional estimate) in 1953-54. This represents an increase of Rs. 11.2 abja or 12.2 per cent in 4 years or just over 3 per cent per year. A part of this increase was probably due to exceptionally good agricultural crops in 1953-54 and another part possibly to a partial correction of the previous under-estimation of crops. If allowance is made for these factors the real increase would be probably about 10 per cent in 4 years.

3.2. In the Second Five Year Plan the rate of investment and development would be roughly double that of the First Plan. The rate of increase of income is also expected to be roughly double or about 5 per cent per year. The same estimate has been generally corroborated from more detailed calculations by sectors on the basis of the investment and development programme.

3.3. The expected increase in national income is shown in Table (7).

TABLE (7) : DOMESTIC PRODUCT OF THE INDIAN UNION AT 1952-53 PRICES

Rs. abja (= 100 crores)

sector	(actual) 1950-51	(estimated)		increase percent
		1955-56	1960-61	
(1)	(2)	(3)	(4)	(5)
1. agriculture and allied pursuits	45.2	52.8	63.4	20
2. mining and factory enterprises	6.6	9.0	15.0	67
3. household enterprises & construction	9.3	10.2	14.3	40
4. communication, railways, banks, etc.	3.1	3.6	4.7	30
5. wholesale & retail trade, other transport	13.4	15.1	18.8	25
6. professions, services including govt. administration and the rest	14.3	17.3	20.8	20
7. total	91.9	108.0	137.0	27
8. population (millions)	359.3	383.7	409.7	7
9. per capita income (Rs.)	256	282	334	19

CHAPTER FIVE

FINANCE AND FOREIGN EXCHANGE

1. *Rate of investment* : The planned net investment covering both public and private sectors is Rs. 5,600 crores over the period of the Second Plan. The current rate of investment is about 7 per cent; this will have to be raised to about 11 per cent of national income by 1960-61.

2.1. *Resources for the public sector* : The total expenditure of the Centre and State Governments combined is estimated at Rs. 8,800 crores for the Second Plan as a whole (Table 5). Expenditure outside the plan would increase from Rs. 825 crores in 1955-56 (estimated) to Rs. 900 crores on an average in the Second Plan. Expenditure on the Plan is expected to increase from Rs. 600 crores in 1955-56 (estimated) to an average of Rs. 860 crores in the Second Plan.

2.2. The total receipts from taxes and non tax revenue, at the current rate of intake of 8.5 per cent of national income, would bring in about Rs. 5,200 crores. Borrowings (net) from the public should yield Rs. 1,000 crores (about Rs. 600 crores from loans and Rs. 400 crores from small savings). Allowing for Rs. 200 crores for receipts from railways and miscellaneous items on capital account, the total receipts from domestic sources, at current rates, would be Rs. 6,400 crores.

2.3. This leaves a gap of Rs. 2,400 crores in the public sector. As against this, external assistance may provide Rs. 400 crores. The balance of Rs. 2,000 crores will have to be found at least in part by fresh taxation and profits of such commercial or industrial undertakings as can be started in the public sector. The aim should be to limit deficit financing to a total of Rs. 1,000 to 1,200 crores. A taxation target of 9 to 10 per cent of national income as against the present level of about 7 per cent must be attained.

3.1. The budgetary position on the above basis is shown in Table (8).

TABLE (8) : GOVERNMENT BUDGET : 1956-57 TO 1960-61
(Rs. crores)

expenditure		receipts	
(1)	(2)	(3)	(4)
1. on the plan	4,300	1. on the revenue account	5,200
2. outside the plan	4,500	2. loans from the public	1,000
		3. railways and miscellaneous funds	200
		4. foreign assistance	400
		sub-total	6,800
		5. additional taxes and loans and profits from state enterprises	800-1,000
		6. deficit financing	1,000-1,200
total	8,800	total	8,800

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3.2. A good part of the additional income in the Second Plan would be created at lower income levels. The heavy industries would take time to become profitable. Also, foreign assistance may not be realised to the fullest extent. It would be essential, therefore, to keep a stringent watch on expenditure outside the Plan; to make necessary adjustments in the price and subsidy policy of Government; to reach new strata for tapping savings; and finally, to make changes in the tax structure to raise additional resources required to finance the Second Plan.

4.1. *Finance of the private sector* : Investment in the private sector is estimated at Rs. 2,200 crores out of which Rs. 1,100 crores or about a half is for housing and Rs. 400 crores for industries.

4.2. With deficit financing of Rs. 1,000 to Rs. 1,200 crores by Government, the banking system should be able to provide the credit required for working capital. In fact, conditions of easy credit are likely to emerge.

4.3. The newly set-up financial institutions (such as the Industrial Investment and Credit Corporation) will assist the private sector. The pattern of investment in the private sector will have to be watched continuously and influenced in the desired direction through tax incentives, selective credit controls, capital issue control and similar devices.

5.1. *Foreign trade and payments* : Much larger imports will have to be made of capital goods in the Second Plan. The total needs would come to about Rs. 1,200 crores; adding Rs. 400 crores for imports of equipment for replacements, the total requirement would be about Rs. 1,600 crores for imports of capital goods.

5.2. This must be met partly by increased production of food-grains, sugar, cotton, and petrol; partly through foreign assistance and withdrawal from sterling balances; and by curtailment of non-essential imports and promotion of exports in every possible way.

CHAPTER SIX

PLANNING ORGANIZATION AND ADMINISTRATION

1.1. *Planning Organization* : Planning must be continuous and flexible. In addition to the Five Year Plan, detailed annual plans must be prepared every year. Targets, projects and policies must be continually re-assessed and reformulated to suit changing needs and conditions.

1.2. At the same time it is imperative to keep in perspective the potential growth of the economy over a long period so that decisions can be made to secure a balance between short-term and long-term objectives.

1.3. For planning on lines explained above, it is necessary to build up an appropriate planning organization. A technical organization (consisting of economists, statisticians, scientists, engineers, technologists, and administrators) must be established within the Planning Commission for the preparation and continuing examination of the national plan and for working out the various balances relating to it. Technical units must also be established in the Central Ministries, State Governments, and other agencies to prepare detailed projects and estimates and to revise them as necessary.

1.4. There must be a continual two-way flow of information. Plan targets from the top must be continually checked against possibilities of realization at the level of projects. Possibilities of development envisaged at the bottom must continuously shape the targets formulated at the top.

1.5. Information of many kinds would be continually required for the formulation and revision of the plan and of detailed projects as well as for the assessment of the progress and implementation of the Plan.

1.6. The information service and planning and project activities must be closely related. The Central Statistical Organization in association with the Indian Statistical Institute must function as an integral part of the planning machinery at the Centre. Following the same pattern, the State Statistical Bureaus must serve as focal points for statistical services in connection with planning activities at the State level.

2.1. *Administrative machinery* : Planning on bold lines with a steady expansion of the public sector and advance to a socialistic pattern of economy would require the building up of appropriate administrative machinery of a new type at all levels.

2.2. There must be decentralization, on business-like lines of the day to day management of public enterprises with large delegation of financial, administrative, and executive control to develop initiative and responsibility at the periphery so necessary for efficient conduct of business enterprises.

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2.3. Attention must be focussed on the implementation of the Plan—on getting things done at the right time—and rules of procedure must, if necessary, be revised to ensure effective action. Secretariat control of the present type must be replaced to a large extent by control by truly autonomous public corporations set up by Government or through the supply of credit by State Banks working under the general guidance of Government in matters of policy.

2.4. Administrative difficulties inherent in the existing Government machinery are likely to prove the greatest obstacle to efficient planning. To overcome such difficulties, large organizational and even constitutional changes may become necessary. The problem is urgent and requires immediate and serious attention.

2.5. Government must rally public support in favour of the Plan and encourage and help non-official organizations to promote its fulfilment.

APPENDIX

1. The paper dated March 17, 1955 was prepared as a *draft of a "draft Plan-frame"* and has been circulated as such and is subject to revision by the Planning Commission.

2. The general objectives and policy and administrative questions (which are discussed in Chapters One and Six) can be considered on their own merits.

3.1. The quantitative estimates were worked out with two chief aims in view, namely,

- (a) an increase in national income of 5 per cent per year; and
- (b) creation of new employment by way of gainful occupation or jobs for 11 million persons over the plan period.

3.2. Certain basic allocations of investments were made between investment goods and consumer goods industries. It is necessary to maintain this general pattern of investments but there is scope for adjustments in details.

3.3. The draft Plan-frame is, therefore, not rigid and can be modified; but there are inter-relations between its different parts so that a change of the target in one item may require consequential changes in other items.

4.1. Background information relating to the physical targets and financial estimates (Chapters Two, Three, Four and Five) will be found in a paper prepared jointly by the Economic Division of the Planning Commission, the Economic Division of the Ministry of Finance, the Central Statistical Organization, and the Indian Statistical Institute.

4.2. The draft of the draft Plan-frame and the above-mentioned joint paper are consistent with each other but are not identical.

4.3. The Report of the Panel of Economists dated 10 April 1955 has reference to both the papers.

5.1. Within the general pattern of investments (explained in para 3) an attempt was made to fit in the physical targets on the basis of information that was readily available in the Planning Commission and in the Ministries concerned.

5.2. The draft Plan-frame does not attempt to go into details. In some cases, information was not available; and time was short. Also, it was not necessary to make the list of targets exhaustive or complete in every respect because, as explained in para 3, there is scope for adjustments in details without disturbing the main structure of the Plan-frame.

6.1. The targets are sometimes given as equivalent aggregates within which there can be substitution of components.

6.2. Estimates of financial outlay are to be taken as *net*.

6.3. Construction costs are to be taken as the direct costs of materials, of labour, and of essential technical supervision. It is assumed that excessive margins for intermediaries and other forms of waste will be eliminated.

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6.4. It is assumed that promotional and field agencies and services would be integrated and coordinated to prevent unnecessary duplication.

6.5. It is assumed that non-official public organizations would be used wherever possible to decrease overhead expenses and stimulate public interest and participation in the fulfilment of the Plan.

7.1. If the basic approach of the present draft is approved, it is suggested that the paper should be revised as necessary and then issued in the revised form as the *draft* Plan-frame for the formulation of projects.

7.2. After the individual projects are received, further changes and adjustments should be made as necessary to get ready, as quickly as possible, a definitive plan which would be internally consistent and would be capable of attaining the desired objectives.

28th April 1955.

P. C. Mahalanobis.

APPROACH TO PLANNING IN INDIA

Based on a talk broadcast from All-India Radio on 11 September, 1955. This article explains in a general way the approach to planning recommended in the Draft Plan-frame of 17 March, 1955 which was accepted by Government as the basis for the formulation of the Second Five Year Plan.

1. Two most important problems are facing us at present—poverty and unemployment. We must get rid of unemployment and prevent unemployment in future¹. We must also continually improve the standard of living, not merely of any particular section of the people but of all sections, and especially the poorer sections². These two aims are, of course, closely related.

2. Increasing the standard of living means a bigger and better supply of food, clothing, housing, medical care, education and other amenities of life. This bigger supply can be secured only by increasing production of food, cloth and other goods for consumption; and by giving training to more teachers, doctors, and social service workers.

3. Production requires the use of tools, implements and machinery. We can no doubt increase the present production to some extent by working harder and using the present stock of tools and implements to better effect. There is, however, a limit to what we can do in this way.

4. The only permanent way of ensuring a progressively increasing production is to continuously increase our stock of tools and implements and machinery, that is, to increase what is called the capital investment. For a single factor, the production of steel probably has the highest correlation with national income in different countries.

5. Capital investments are of two types and there is an important distinction between the two. One type is used to manufacture goods for direct consumption such as the cloth mills or sugar factories. The other type is utilised for producing steel, cement, heavy chemicals, heavy machinery, coal, electricity, railways and such other things which are not directly consumed and are called “producer goods”. We may call industries of the first type “consumer goods industries”, and those of the second type “basic industries”.

¹According to the National Sample Survey there are about 5 million unemployed and seriously under-employed persons in urban areas. The corresponding figure for rural India may be another 5 millions with, however, a much bigger number of persons who remain partly idle during the year estimated at between 10 or 15 and 30 millions. In addition nearly 2 million persons are entering the working force every year.

²Expenditure on food and consumer goods is about Rs. 24 per person per month, of which only about Rs. 16 is spent in cash, rest being the value of home grown food and home produced goods which are consumed in the home. About a sixth of the population or more than 60 millions have an expenditure of less than ten rupees per person per month out of which probably only five or six rupees are spent in cash.

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6. Steel plays a key role. The larger the supply of steel, the bigger is the production of tools, implements, and machinery; and the bigger the supply of both producer and consumer goods.

7. India has three times more of reserves of iron ore of equal or better quality than the United States of America, but the Americans have 200 times more steel per person than we in India have; and therefore they have more tools, implements, and machinery; and consequently they also have a bigger supply of consumer goods and enjoy a very much higher level of living.

8. We are producing a little over one million tons of steel at present. Three new factories are proposed to be started, with the help of the Germans, the Russians and the British, each to produce roughly one million tons per year. To establish one such steel factory, the cost would be about one hundred crores of rupees. Out of this about 45 crores of rupees or nearly half the expenditure must be incurred for the import of foreign machinery made mostly of steel. If we manufacture this machinery in India all this money would remain within our own country.

9. Why do we then import such machinery? Because we have not started factories to fabricate heavy machinery needed for the production of steel, cement, etc. The capital cost required to start an integrated machine industry would be large, may be 200 crores of rupees out of which machinery worth 100 or 150 crores of rupees may have to be imported. But once we do this, and establish a heavy machine building industry we shall be able to use our own iron ore and with our own hands produce steel; and then use the steel to produce more machinery to produce more steel and tools; and also to produce machinery to make more consumer goods.

10. We will then not have to worry about foreign exchange every time we wish to start a new factory as we do now. Our dependence on foreign supplies will be greatly reduced. The main obstacle to rapid industrialization being thus removed, we shall be able to increase production and employment quickly and raise the level of living.

11. I may give another example. India is believed to be short of copper but has large reserves of bauxite from which aluminium can be produced. To develop electricity rapidly we should increase the production of aluminium progressively to replace copper as far as possible.

12. We should do our best to establish and expand basic heavy industries as fast as possible; increase the production of steel, cement, heavy chemicals, coal, electricity; expand railways and transport facilities; and, above everything else, develop a machine building industry to build machines without which there can be no rapid industrialization.

13. We must at the same time expand, as fast as possible, health and medical care, education, scientific and industrial research, social services and opportunity for sports and cultural pursuits.

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14. I may consider health services. It is believed that out of 65,000 fully qualified physicians, (basically with 6-year training) only about one-fourth, that is, fifteen or sixteen thousand live in rural areas which have a population of over 300 millions. That is, in rural areas, there is probably one fully-qualified physician for 20,000 persons on an average. Our medical colleges are training out only about 2,000 physicians per year; even if all of them go to rural areas (which is not possible), allowing for casualties it will take two centuries before there is one 6-year trained physician for 1,000 persons, the proportion already reached in some of the advanced countries of the world. It would be possible, however, to turn out every year ten or twelve or fifteen thousand health assistants who would be given training to provide elementary medical aid and to send them to the villages, which would enable every village having the services of such health assistants within 20 or 25 years. I have suggested that such cadres should be established without delay.

15. Large new investments in the basic sector of heavy industries, power and transport, and also new expenditure incurred for the expansion of the social sector would generate fresh purchasing power and give rise to fresh demand for consumer goods.

16. The resources must be allocated in such a way that the additional supply of food and consumer goods is just sufficient to meet this additional demand. This is important. If there is a shortage of essential goods like food or cloth, prices would rise. We must avoid this. The additional demand likely to be created by a given increase in income can be estimated from the observed consumption in households at different levels of income (based on the results of the National Sample Survey).

17. We must now consider the question of increasing the supply of consumer goods.

18. In the industrially advanced countries, agriculture is highly mechanised; in India it still remains essentially a household and small-scale occupation. In the advanced countries, consumer goods are also mostly manufactured in factories. In India we use both factories and small-scale or household industries for this purpose.

19. In fact, even if we exclude food (which is mostly household and small-scale production), the household or cottage or small-scale industries in India still supply more consumer goods than the organised factories do.

20. To increase the production of consumer goods in our country we have thus the choice of using either the household and small-scale industries or the organised factories.

21. In the Draft Plan-frame of 17 March 1955 we suggested that in the immediate future we should encourage the household and small-scale industries to supply as much consumer goods as possible. We also suggested that arrangements

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should be made for the supply of capital, raw materials, and marketing facilities through branches of a Government agency or through co-operatives supported by Government.

22. In order to provide an assured market for the small-scale and household industries we suggested that destructive competition from factories would be prevented by giving each sector a suitable quota so that competitive factories would not be able to expand production at the cost of the small-scale and household industries.

23. Objection has been raised on the ground that this proposal would tend to retard progress by going back to obsolete and inefficient methods of production so that cost of production would be high, prices would rise, consumers would lose the benefits of cheap mill-made goods, and there may also be inflation through a shortage of supply of consumer goods. These objections have much weight. I am convinced, however, that under Indian conditions it would be wise to encourage the small-scale and household industries. I shall now give my reasons.

24. Capital investment per person employed in basic industries is very high. It is of the order of a lakh of rupees in the case of a steel factory and is something like 20 or 25 thousand rupees in other heavy industries. The consumer goods factories, on the whole, require somewhat less capital; but even then an investment of ten or twelve thousand rupees would be usually required for one new person engaged. In view of meagreness of capital resources there is no possibility, in the short run, of creating much employment through the factory industries. The heavy industries would no doubt lead to much subsidiary industries in future but this would take 10 or 15 years or even more. The factory production of consumer goods would increase economic activity; but this also would take time.

25. Now consider the household or cottage industries. These require very little capital. About six or seven hundred rupees would get an artisan family started. With any given investment, employment possibilities would be ten or fifteen or even twenty times greater in comparison with corresponding factory industries. Production and turnover are much more rapid in small industries and, therefore, the beneficial effects would quickly accrue.

26. Another advantage of the small industries is that these are scattered widely all over the country, as a result of which the increase in production and in purchasing power would also be widely scattered and would greatly stimulate local economic activities, specially benefiting the rural areas and small towns. It will avoid the cost and difficulties of providing housing, transport, and proper social amenities to the workers, which would be needed if production were to be organised in big factories in urban areas.

27. These advantages, coupled with the need of removing unemployment as quickly as possible, provide the justification for our emphasis that as much work

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as possible should be created in the small industries; and at the same time, as much of the investment resources as possible should be utilised for laying down firm foundations of industrialization by building up the heavy industries.

28. I am, of course, aware that the price of hand-made articles in some cases would be higher than mill-made articles of comparable quality. I have suggested that in such cases, suitable parity between prices should be maintained by imposing excise duties on mill-made goods.

29. It is true that the policy of encouraging the small and household industries arises partly from the urgency of solving the problem of unemployment and partly from the meagreness of our capital resources. But, I believe, in India the small-scale and household industries can and should continue to enjoy an important and enduring position.

30. As unemployment is brought under control and as the supply of electricity increases, as our machine-building industry develops and as we have a bigger supply of steel, we should manufacture motors and small machines in large numbers; and give these to the artisans working in the small and household industries so that production per person would steadily increase. Our aim should be to increase the productivity in the small and household industries as much as possible through the use of cheap electricity and machines of the most modern type made in India.

31. The enduring place of small industries in the future economy of the country will become clear if we view industries as being of two types. In one type, production must be concentrated. For example, steel, cement, fertilizers, penicillin, locomotives, and heavy machineries must be produced in large factories, requiring very heavy capital. The direct employment would be negligibly small; and here we should prefer the most modern machinery. We should also encourage the use of as much automatic machines as possible which incidentally would reduce the requirements of highly skilled technical personnel.

32. In the second type, production in small units would be possible with the help of modern machinery and would be also economical from the national point of view, because it would avoid many economic overheads and social costs and evils of congestion in cities and slums. Such industries should continue to be developed in small and household enterprises.

33. The highly skilled artistic handicrafts must, of course, be maintained and developed in small units of production with the help of power, suitable tools, and marketing facilities. Finally, small scale production should be encouraged and should continue whenever articles can be made by local labour mainly from locally available materials for local consumption.

34. In this way, in India, we should be able to maintain a great deal of small-scale and household production which would use cheap power and modern tools and implements, and would be, therefore, basically as efficient and as low cost (at a national level) as factory production.

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35. We also envisage, of course, a steady and large expansion of factory production of consumer goods. In the Draft Plan-frame provision has been made for a large increase in the production of many factory-made consumer goods such as sugar, vegetable oil, bicycles, sewing machines, electrical goods, antibiotics and fine drugs, etc. Factory production of goods for export should also be encouraged.

36. The question of imposing production quota, that is, production ceiling arises only in the case of factories which are competitive with small-scale and household industries.

37. The basic strategy is now clear. We create demand by a planned expansion of the basic industries and of the social sector, that is, health, education, etc. We meet the demand by a planned increase in the production of consumer goods as much as possible in the small and household industries, and the rest in factories. As both production and income increase, we divert a portion of the increase in income for new investments again in a planned manner to balance new demand by new production, and the process continues. At each stage, we must be careful that the right quantity of raw materials is available at the right time for production; and the right quantity of consumer goods is available at the right time to meet the demand.

38. For example, when fixing any target for the production of steel we must remember to provide the necessary supply of iron ore, coal power or fuel, and other raw materials, besides a sufficient number of labourers and technical personnel; we must also plan for a corresponding increase in transport facilities to carry the raw materials to the steel factories. Similar arrangements have to be made for other targets of material production as well as for different services. We must take into account the fact that different sectors of the economy are interlocked through inter-industry relations. We must see that the set of targets is internally consistent in the sense that no single target of production is in disagreement with the others.

39. The system of balances, both physical and financial, has to be examined for the plan as a whole. This is of crucial importance. If there is any lack of balance there will be bottlenecks and delays which would continually hamper production.

40. I have been so far discussing the economic and technical aspects of planning. I shall now consider very briefly the social aspects. In the Draft Plan-frame we adopted a target of growth of national income by 5 per cent per year and provision of work in volume equivalent to 11 million jobs. The new investments in construction, expansion of small-scale and household production, and of health, education, etc. would mean more employment for the poorer sections of the people. This should reduce disparities in the distribution of income.

41. We have also suggested that excise duties, at different rates on different commodities, should be levied partly to maintain price parities and to collect financial resources and partly to increase the price of luxury goods and services which

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also would reduce disparities in the level of living. Personally, I am in favour of taxes on expenditure, capital gains, and wealth as such; taxes can be effectively used to collect increasing resources for national development and also to reduce disparities.

42. In keeping with the goal of 'socialistic pattern of society' the basic industries would be started and developed mainly in the public sector, that is, as Government enterprises. As the pace of development increases, Government would need larger and larger resources which can be secured only through borrowings, taxes, or profits of State enterprises. In order to secure larger profits, it would be necessary for Government to extend public enterprises so that the public sector would increase faster than private factory enterprises. In time most of the large-scale factories would be in the public sector; units of medium size would be run by co-operatives; and small-scale production would be in household enterprises. This would be in accordance with the decision of Parliament and in conformity with the policy announced by the Prime Minister.

43. It is necessary that in a planned economy organised private factories should conform in a general way to the over-all plan of production and investment. Within this frame-work they would have the fullest scope for production, an assured market arising from an expanding economy, and all possible help and encouragement from Government.

44. I may now consider briefly the question of land reform. Most of the States have acquired from the landlords the large holdings of land through legislation but no definite scheme for redistribution of such land has been yet formulated. One view is that a ceiling (depending on local conditions) should be fixed on the size of holdings; and land in excess of the ceiling should be distributed among other villagers. It is not clear that such redistribution would necessarily lead to an increase in productivity; the poorer sections may not also derive much benefit. In spite of this I should like to get the land redistribution completed by 1958 because of the social and political benefits which would accrue.

45. If, however, such a redistribution is not immediately feasible, then attempts should be made to prepare the country both psychologically and technologically for consolidation of operational holdings with some form of joint ownership of the village as a whole. Much depends on the success of the *bhoodan* movement of Acharya Bhave who is advocating joint cultivation of the village as a whole. This movement should be encouraged as much as possible.

46. When industrialization has made some progress and unemployment has decreased appreciably, attempts should be made for the consolidation of operational holdings. The important aim is joint cultivation and operation. The distribution of profits can be arranged in suitable ways.

47. The introduction of mechanized production on a large scale in agriculture must wait until we can ourselves manufacture agricultural machinery on the

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required scale. For some time, may be 10 or 15 years to come, we shall have to depend on irrigation projects, better seeds, more fertilisers, etc. to give a higher outturn in agriculture.

48. Planning must be flexible and continuous. There should be a general frame-work for five years; and detailed annual plans should be prepared every year. Targets, projects and policies must be continually re-assessed and reformulated in the light of new experience. Also, we must always keep in view the growth of the economy over a long period of 10 or 15 or 20 years, so that a balance can be secured between short-term and long-term objectives.

49. I have very briefly touched on some aspects of the approach for the Second Five Year Plan. This type of planning calls for a great deal of analysis and thinking at the physical, scientific and technical level. A very large number of technical personnel, of engineers, technologists, scientists, doctors, teachers and professional workers, would be needed both for preparing the plan and for implementing it. There will be also urgent and continuing need of scientific and technological research oriented towards solving the needs of national planning which will be a challenge to all scientists.

50. In formulating the above approach to planning in India we have tried to make recommendations which would be practicable under Indian conditions. We have always kept in view our cultural traditions and the present social and political conditions in India; and have not tried to imitate blindly the methods adopted in other countries, although, naturally, we have learned much from their experience. We believe the present approach is basically Indian and is suited to Indian needs.

51. The success of the present approach depends entirely on the efficiency of the public enterprises which would be established in increasing numbers in future. In the present system of government administration there is a great deal of delay and inefficiency due to excessive centralization, especially in financial matters. The present system depends on adherence to rigid rules which hamper initiative. This must be changed.

52. Every government official must be given more responsibility to make decisions at his discretion; and his competence must be judged on results, that is, in the case of public enterprises literally on his ability to deliver the goods. Administrative and financial procedure must be revised accordingly.

53. And finally, people's co-operation has to be enlisted at all levels and in increasing measure. We have been lagging far behind in the race of material progress; we have now to run. Let us not slacken our steps and falter on the way!

SCIENCE AND NATIONAL PLANNING

Anniversary address delivered as President of the National Institute of Sciences of India on 8 January, 1958 at Madras. Published in *Sankhyā*, Vol. 20, Parts 1 & 2 (1958), pp. 69-106.

INTRODUCTION

1. Since the Anniversary Meeting is being held separately from the Annual Meeting the tradition has been for the President to select a subject for the Anniversary Address from some branch of science of which he is a student and give a general review acceptable to other scientists. As I can not claim to have specialized knowledge of any particular subject, I looked at the Presidential Addresses of some of my distinguished predecessors for guidance. Since the inaugural address in 1935 I found a continuing concern with problems of organization of scientific research in India. The functions and responsibilities of the National Institute of Sciences have also been reviewed a number of times. Looking back I had the feeling that many of the problems are still with us in one form or another.

2. In 1938, exactly 20 years ago, Dr. Meghnad Saha selected for the Presidential Address the "Problem of Indian Rivers", and pleaded for the initiation of systematic studies to lay a scientific foundation for flood control, irrigation, and navigation. He also gave a full discussion of benefits which would accrue by generation of cheap electrical power out of the energy of running water. He had mentioned at that time; "This is a subject which is just beginning in India but its importance has not been properly realized". He referred to poverty and unemployment; and asserted that "industrialization [was] the only solution of the poverty problem". He also referred to planning in Russia, and pointed out that "when the Supreme Council of the Soviet adopted Lenin's resolution for the electrification of the country, it was the USSR Academy of Sciences, and not a committee of bureaucrats which was requested to give a plan". He concluded his address with the following words :

"If we desire to fight successfully the scourge of poverty and want from which 90 per cent of our countrymen are suffering, and lay the foundation of a strong and progressive national life, we must make the fullest use of the power which a knowledge of Nature has given us. We must rebuild our economic system by utilizing the resources of our land, harnessing the energy of our rivers, prospecting for the riches hidden under the bowels of the earth, reclaiming deserts and swamps, conquering the barriers of distance and above all, we must mould anew the nature of man in both individual and social aspects, so that a richer, more harmonious and happier race may live in this great and ancient land of ours."

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3. The picture in the mind of the scientist twenty years ago has already become real in the great river valley schemes of India. This is the task of the scientist, to see the shape of things to come, not as wishful thinking but based on the knowledge of Nature and worked out in accordance with the methods of science. The two basic problems, poverty and unemployment, mentioned by Saha still remain as acute as ever. The only way out is through rapid industrial development based on science and planning. I feel this is an appropriate subject for my address.

“SPUTNIK”

4. On the 4th of October, 1957, an artificial satellite “Sputnik” was launched by USSR followed in a month’s time by a second and bigger one carrying a live dog. We received this news when our Council was in session; and on the 6th October, at the desire of the Fellows of the Institute assembled at the Annual Meeting, we sent a message of congratulation to the USSR Academy of Sciences.

5. The way to outer space beyond the earth’s atmosphere was thus opened for the first time. It is a great triumph of science. Epochs of history can no longer be demarcated in terms of dynasties or war between nations but must be thought of in terms of the progress of sciences and technology.

6. The upsurge of science in what we call the West (that is, in the countries of Europe and North America) led to the industrial revolution characterized by the use of machinery driven by steam and later by electricity for the production of goods, and brought about a rapidly increasing level of living in the industrially advanced countries during the last 100 or 150 years. This increase in industrial production gave the West its superiority in armaments and brought practically the whole world under its domination. Striking developments occurred during the last fifteen years. Atomic power for bombs and for electricity, high-speed rockets, guided missiles and satellites have been developed and have great dangers; and also have much of promise for the future, if we do not get involved in a suicidal nuclear war.

7. As scientists, it is also very much our concern to understand the significance of recent events. Russia was practically an underdeveloped country at the time of the Revolution forty years ago. The launching of the Sputnik from this country became possible only because of the revolutionary progress of science and technology in Russia in the course of one single generation. In Russia, as in all other industrialized countries of the world, scientific research and industrial production have been closely coupled; progress of one has been both cause and effect of an advance of the other. It is this integrated advance of science and industry which has made it possible for USSR to attain its present leading position in the whole world.

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SCIENTIFIC RESEARCH AND ECONOMIC DEVELOPMENT

8. In all industrialized countries, we find a close association between the attention given to scientific education and research, the rate of increase of industrial production and, hence, of the improvement in the standard of living. Consider the three nuclear Powers, UK, USA and USSR, and also two under-developed countries, China and India, which have the two biggest populations in the world and much natural resources. Table (1) shows the relation between economic development and expenditure on research in these five countries. The population in each country is adopted as the basis for comparison and is given in million in col. (2). The national income, electricity (in kilowatt-hours), coal (metric tons), total energy (in terms of kwh), and production of steel ingots (metric tons) are shown, in the form of "per person per year", in cols. (3) to (7). Actual expenditure on research per year is given in rupees in col. (8), and is expressed as a fraction of the national income in col. (9); and the expenditure in rupees "per person per year" is shown in col. (10).

9. The estimates are admittedly approximate and there are well-known difficulties in international comparisons of income and expenditure. Prices and the structure of prices vary widely from one country to another. Concepts and definitions used in different countries are often different. For example, the American figure for expenditure on research includes industries. It is possible that research carried out in industrial concerns is not included in the Russian figure. Nevertheless some striking contrasts come out clearly in Table (1).

10. The three great powers have the highest per capita income, energy, steel and expenditure on research. China is way behind but has already outstripped India in all items, although only a few years ago China was less developed than India. Expenditure on research is Rs. 65 crores in China compared to Rs. 6 crores in India, or more than ten times higher. As a fraction of national income, China spends 0.4 per cent which is seven times higher than the Indian figure of 0.06 per cent. The "per person" expenditure in China is Re. 1.1 per year which is again seven times higher than the Indian expenditure of Re. 0.15 per year. In 1943 Dr. J. C. Ghosh in his Presidential Address to the National Institute had raised the slogan of "one per cent of the national income per year for scientific research". The three advanced countries are spending nearly twice as much at present; and China has almost achieved half the target while, after 15 years, India has gone only one-sixteenth of the way.

11. Table (2) shows the available number and the outturn of engineers and doctors in the five countries. Col. (2) gives the population in million to serve as a basis for comparison; cols. (3), (5), (7) and (9) give the years of reference. Col. (4) shows the estimated number of engineers available (in thousands), and col. (6) the annual outturn (in thousands). In the three advanced countries the outturn figures refer to training at University level; in China and India the figures include both graduates and diploma-holders. Col. (8) gives the available number of doctors

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TABLE (1) : ECONOMIC DEVELOPMENT AND EXPENDITURE ON RESEARCH : 1955

country	popu- lation ¹ (10)	national income ²	estimates per person per year ³				approximate expenditure on research ⁴		
			energy			steel ingots (metric tons)	actual (rupees crores)	p.c. of national income	per person (rupces)
			electri- city (kwh)	coal (metric tons)	total in terms of kwh				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
USA	165	\$ 2000	3812	2.71	8334	0.64	2550	1.8	154
USSR	220	Rubles 5000	850	1.38	3152	0.26	2200	1.8	110
UK	51	£ 300	1845	4.41	9204	0.39	430	2.1	85
China	608	Yuan 135	20	0.15	275	0.005	65	0.4	1.1
India	382	Rs. 250	22	0.10	192	0.004	6	0.06	0.15

¹ Population figures for USA, UK and India taken from *UN Statistical Year Book*, 1956; the figure for USSR taken from the *National Economy of the USSR : Statistical Returns*; the figure for China is based on statistics prepared by the State Statistical Bureau of the People's Republic of China.

² The figures of national income for USA and UK are taken from the *Statistics of National Income and Expenditure, UN Statistical Paper, Series H. No. 10*. The figure for India is taken from the *Estimates of National Income 1948-49—1955-56* (Central Statistical Organisation, Government of India). The figure for China is taken from the source given in the previous note. The figure for USSR is calculated from an estimate given in the *Economic Bulletin for Europe*, May 1957 on the assumption that one-third of the gross savings comprise depreciation. All figures have been drastically rounded off. It is interesting to note the rupee equivalent of the Russian per capita income comes considerably above the rupee equivalent of British per capita income, if the current official exchange rates are used for purposes of conversion. Conversion factors are 1 \$ = 4.75 Rs.; 1 £ = 13.3 Rs.; 1 ruble = 1.2 Rs.; and 1 yuan = 2 Rs.

³ All output figures are taken from the *UN Statistical Year Book*, 1956. The USSR steel output figure of 51.3 million metric tons relating to 1957 has been obtained from Russian sources. The figures for coal in metric tons has been converted into kwh by using the factor 1000 kwh = 0.6 ton of coal or 1 ton of coal = 1667 kwh. It may be noted that lignite production in USSR is 114.9 million metric tons as against 2.7 million metric tons in USA; this has not been considered while getting figures in col. (6). Electricity production in China and India excludes generation for own use.

⁴ Expenditure on scientific research in USA is taken as \$ 5.4 billion in 1953 on the basis of a report on "Funds for Basic Research in the United States 1953" published by National Science Foundation, USA, and briefly reproduced in *Business Week*, 23 November, 1957. It may be noted that only about 8% of the amount was devoted to fundamental research. The percentage in col. (10) for USA is computed on the basis of 1953 figures for national income.

USSR : the expenditure on scientific research is taken as 18.2 billion rubles (as reported in the *Times of India*, in a message dated Moscow, 20 December 1947). It is possible that applied research in industries has not been fully included in this amount.

UK : the expenditure on scientific research is taken as £ 325 million (*Economic Bulletin for Europe*, May 1957) : Highly qualified technical manpower in Western Europe. This source gives a figure of \$ 5.2 billion for USA.

China : the figure used is 32,7141 thousand yuan on the basis of the Finance Minister's speech on the budget for 1957 July (1957).

The Indian figure of Rs. 5.79 crores in 1956-57 is estimated from budget accounts and other sources.

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(in thousands), and col. (10) the annual outturn (in thousands); the outturn figures refer to graduates in all countries. The corresponding numbers per million of the population are given in the lower half of the table.

TABLE (2) NUMBER AND ANNUAL OUTTURN OF ENGINEERS AND DOCTORS

country	1955 popu- lation (10 ⁶)	engineers				doctors			
		total available		annual outturn		total available		annual outturn	
		year	number (000)	year	number (000)	year	number (000)	year	number (000)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
USA	165	1950	518.8	1956	26.0	1955	218.1	1955	7.1
USSR	200	1956	721.0	1956	71.0	1955	299.0	1956	20.0
UK	51	1956	78.5	1954-5	2.8	1956	85.0	1952-3	1.9
China	608	1955	80.2	1955	18.8	1955	70.5	1955	6.8
India	382	1956	71.9	1955	3.6	1955-6	70.0	1954	3.1
per million of population									
USA		1950	3144	1956	158.0	1955	1322	1955	42.5
USSR		1956	3605	1956	355.0	1955	1495	1956	100.0
UK		1956	1539	1954-5	55.0	1956	1674	1952-3	37.3
China		1955	132	1955	30.9	1955	116	1955	11.2
India		1956	188	1955	9.4	1955-6	183	1954	8.1

Note :

USA : Data on available number of engineers and doctors as well as the figure of annual outturn of doctors are taken from the *Statistical Abstract of USA, 1957*. The figure for annual outturn of engineers is quoted from "Trained Man-power, USA vs. USSR" *Monthly Review*, New York, April 1957.

USSR : Regarding engineers, both the figures are based on Soviet official statistics (in Russian). The figure of numbers of doctors available is taken from the English language publication, *National Economy of USSR : Statistical Returns* while the outturn figure is from the *USSR Reference Book*, November 1957.

UK : Both the figures for engineers are taken from "Highly trained technical man-power in Western Europe", *Economic Bulletin for Europe*, May 1957. The Annual Report of the British Medical Association, 1955-56 (Supplement to the *British Medical Journal*, April 7, 1956) gives the total membership of the Association as 68,306 on March 1956 and states that this number represents 80% of the work in profession. The available number of doctors is estimated on this basis. The figure of annual output as obtained from G.D.H. Cole : *Post War Condition in Britain*, 1956.

China : All the figures are based on the statistical returns for the People's Republic of China prepared by the State Statistical Bureau (in Chinese). However, a base figure of the available number of engineers in 1952 has been taken from Solomon Adler : *Chinese Economy*.

India : The outturn figures are based on the *Educational Statistics* of India. The available number of engineers is taken from *Manpower Studies No. 5 : Engineers in India ; Number and Distribution 1955*, (Planning Commission, October 1957). The number of doctors is based on information given by the Planning Commission.

12. The three advanced countries have much higher numbers of both "available" and "outturn" of personnel. USSR has established a definite lead over both USA and UK. The actual number and proportionate outturn of both engineers and doctors are more than double those of USA. This indicates a striking superiority in technical man-power, the effect of which is bound to be felt in an increasing

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measure in future. Scientific and technical man-power requires a longer period of maturing than basic heavy industries. In this respect USSR now occupies, beyond dispute, the leading position in the world. It is reasonable to infer that the lead has some connexion with the launching of the "Sputnik".

13. China and India are much behind the more advanced countries. The available number of engineers and doctors are roughly of the same order in both China and India but China still has appreciably fewer than India on a population basis, namely, 132 engineers per million of the Chinese population against 188 engineers per million of the Indian population with 116 and 183 per million as the corresponding figures for doctors. It must be remembered that engineering and medical education of the modern type had started several decades earlier in India. China, however, has left India behind in the outturn of both engineers and doctors. The number of engineers coming out every year is 30.9 per million in China or three times greater than the Indian outturn of 9.4 per million in 1955. As regards doctors, the outturn of China is 11.2 per million against 8.1 per million of India.

14. From Tables (1) and (2) it is clear, that scientific research and availability of scientific and technical personnel are important factors in the economic development and "greatness" of nations however it may be measured. It is also clear that India is lagging very much behind, in these respects.

ECONOMIC AND SOCIAL CONDITIONS IN INDIA Consumer expenditure

15. The two great problems of India are poverty and unemployment which are but two aspects of economic stagnation and under-development. Since 1950 the National Sample Survey (NSS) has been collecting a good deal of information on social and economic conditions in both rural and urban areas of India. Some of this material has been given in the Statistical Appendix from which much interesting and significant information can be obtained. I shall refer to a few selected examples.

16. The following Table (3) gives in cols. (1) to (4) information on the total consumer expenditure for the whole of India (rural and urban, excluding Jammu & Kashmir) during the period December 1955 to May 1956. Cols. (1) and (3) give the percentage of the population, and cols. (2) and (4) the limiting expenditure in rupees per person per 30 days (which may be spoken of as a month approximately). An example would make the position clear.

17. It will be seen from the first line, that 5 per cent of the population spends less than Rs. 3.2 per person per month; and from the second line, that 10 per cent or more than 38 million people spend Rs. 8.4 per head per month. From the bottom line of col. (2), we find that 50 per cent or *half of our countrymen, nearly 200 million in number, live on Rs. 14.6 per month or less than half a rupee per day per person,* It

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 TABLE (3) : DISTRIBUTION BY SIZE OF (a) CONSUMER EXPENDITURE : 1955-56 AND
 (b) LANDHOLDINGS (1953-54) : ALL-INDIA

by total consumer expenditure in rupees per person per 30 days ¹				by size of land-holdings in acres ²			
per cent of popu- lation	limit of expendi- ture in rupees	per cent of popu- lation	limit of expendi- ture in rupees	per cent of house- holds	limit of size of land- holdings	per cent of house- holds	limit of size of land- holdings
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
upto	less than	upto	less than	upto	less than	upto	less than
1. 5 p.c.	Rs. 3.2	55 p.c.	Rs. 15.7	5 p.c.	0.2 acre	55 p.c.	4.0 acre
2. 10 "	" 6.2	60 "	" 16.9	10 "	0.5 "	60 "	4.7 "
3. 15 "	" 8.4	65 "	" 18.4	15 "	0.7 "	65 "	5.7 "
4. 20 "	" 9.8	70 "	" 20.0	20 "	1.0 "	70 "	6.6 "
5. 25 "	" 10.4	75 "	" 22.2	25 "	1.3 "	75 "	7.9 "
6. 30 "	" 10.9	80 "	" 24.0	30 "	1.7 "	80 "	9.7 "
7. 35 "	" 11.6	85 "	" 28.6	35 "	2.0 "	85 "	12.6 "
8. 40 "	" 12.4	90 "	" 35.8	40 "	2.4 "	90 "	16.2 "
9. 45 "	" 13.4	95 "	" 44.2	45 "	2.8 "	95 "	26.0 "
10. 50 "	" 14.6			50 "	3.3 "		

¹ Based on National Sample Survey (NSS) : 10th Round, December 1955—May 1956. All-India (rural and urban) excluding Jammu & Kashmir.

² Based on National Sample Survey (NSS) : 8th Round, July 1954—March 1955. All-India rural area only.

would be also seen that 85 per cent of the population can spend less than Rs. 28.6 per month or less than a rupee per head per day; even 95 per cent of the population spend less than Rs. 35.8 per month or just above a rupee a day. The above distribution gives some idea of the poverty in which 95 per cent of our countrymen have to live.

18. Many other facts regarding conditions of living can be found from the Appendix Tables (A.1.0), (A.1.1), and (A.1.2). The rich actually spends more on foodgrains but proportionally less in relation to their total expenditure as can be seen from Table (A.1.1). However, both actual and proportional expenditures on sugar, milk and milk-products, and clothing are relatively much higher among the rich showing that these are essentially luxury items. It is interesting to observe that medical care is apparently the greatest luxury; the poor can have very little of it, and medical expenses go up very steeply as the level of expenditure increases.

LAND OWNED BY HOUSEHOLDS

19. Similar estimates are given in cols. (5) to (8) of the same Table (3) in respect of the size of the holding of lands in acres owned by any assigned percentage of households who own 0.1 acre or more of land. (Households owning less than 0.1 acre were omitted to exclude landless labour and non-agricultural households). It is seen from this table that 20 per cent, or one-fifth of the households, have 1 acre

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or less; fifty per cent have less than 3.3 acre; 75 per cent have less than 7.9 acre; and 95 per cent less than 16.2 acre. Most of the households in the rural area own very little land.

TABLE (4) : CONCENTRATION CURVES OF (a) CONSUMER EXPENDITURE : 1955-56 : AND (b) LAND OWNED BY HOUSEHOLDS
1953-54 : ALL-INDIA

(a) persons or (b) households	consumer expenditure on all items by persons		total land owned by households	
	lower	upper	lower	upper
(1)	(2)	(3)	(4)	(5)
..... cumulative percentages				
1 upto 5 p.c.	1.5	18.2	0.2	34.2
2 10 "	3.2	28.8	0.4	48.8
3 15 "	5.2	36.6	0.9	58.6
4 20 "	7.6	44.0	1.5	66.5
5 25 "	10.1	49.9	2.3	72.5
6 30 "	12.8	55.3	3.1	77.5
7 35 "	15.5	60.5	4.6	81.0
8 40 "	18.8	65.6	6.2	84.6
9 45 "	22.3	70.0	8.1	87.5
10 50 "	26.1	73.9	10.5	89.5

20. The disparity between the rich and the poor can be seen more clearly from the concentration curves shown in the accompanying chart and also from Table (4) above. The percentage of the population or, alternatively, of households is shown in col. (1). In each line, col. (2) shows what percentage of total expenditure (of the whole population) is shared by the percentage of population from the *bottom* as given in col. (1) of the same line; col. (3) gives the share of the same percentage of persons but from the *top*. Thus, the lower 5 per cent of the population of India share only 1.5 per cent of the total consumer expenditure, while the top 5 per cent of the population share 18.2 per cent of the total expenditure. We also find that while the lower 25 per cent of the population spend 10 per cent of the total expenditure the top 25 per cent shared 50 per cent; and that the lower half has 26 per cent while the upper half of the population spend 74 per cent of the total expenditure.

21. Similar estimates are given in cols. (4) and (5) of Table (4) in respect of the proportion of land owned by different percentages of households. The bottom 5 per cent owns very little land, only about 0.2 per cent or less, while the top 5 per cent own 34 per cent of all lands owned by households. In the same way, it can be seen that the bottom 20 per cent have 1.5 per cent against 66 per cent of all lands owned by the top 20 per cent. The lower half of households have 10 per cent against 90 per cent owned by the upper half. Disparities are much higher at the top. For example, the top one per cent of households owns approximately 13 per cent of the total land; the top two per cent nearly 21 per cent; and the top five per cent of households owns 30 per cent or almost one-third of all lands owned by households. The concentration of landholdings is clearly much greater than that of household expenditure.

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EMPLOYMENT AND UNEMPLOYMENT

22. Some information on employment and unemployment is given in the Statistical Appendix, Tables (A.3.1), (A.3.2), and (A.3.3). I should explain that there are great difficulties in adopting in India the concept of 'unemployment' used in the advanced countries of the world, where practically all gainfully employed persons receive wages and salaries or have earnings in money (except for time spent by members of a family on their own household work). It is, therefore, possible to specify in an objective manner whether a person is gainfully occupied or is out of work. There are, of course, technical difficulties of standardizing the definition of unemployment even in the advanced countries but these are comparatively small. In an under-developed country like India, on the other hand, there is inevitably, a great deal of ambiguity in defining unemployment in an objective manner. Much of the work in household enterprises, in both agriculture and cottage industries, is done by members of the household and is not paid for in money. Also, a large number of persons work on their own account, such as weavers, tailors, carpenters, smithy, barbers, small store-keepers etc. These people may have enough work to keep them busy the whole day; or they may have to sit idle for a part or most of the time; or many have practically no work in hand; and yet they can never be called technically "unemployed" in accordance with the concept used in the more advanced countries. The above considerations must be kept in mind in interpreting the information given in the Statistical Appendix based on the National Sample Survey covering about 24,700 households in the 9th Round : May–August 1955, and covering about 17,600 households in the 5th and 6th Round, December 1952–August 1953. It must also be remembered that all estimates, being based on sample surveys, have margins of errors of sampling.

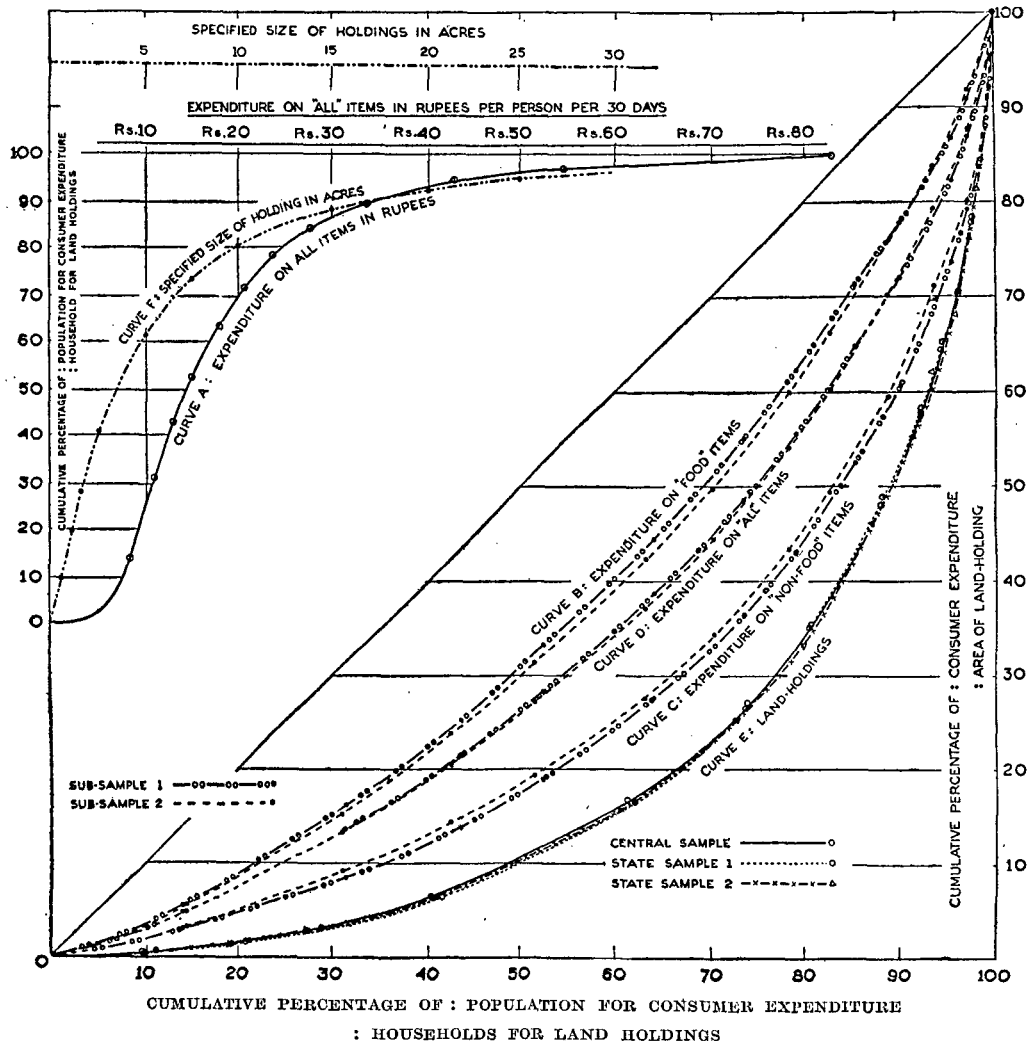
23. Subject to these warnings, we may say broadly that about 160 million persons (or roughly 42 per cent out of an estimated population of 382 million in 1955) were in the labour force, that is, were either engaged in work or were seeking work. Among them 2.2 million, were "unemployed" in the technical sense of the advanced countries [Table (A.3.1)], which, however, has no clear meaning in India. In fact, only about 13 million persons who work under Government and public authorities or in private organized large scale enterprises, have employment of the type usual in the advanced countries [Table (A.3.2)]. The technical concept of "unemployment" can be strictly used only in the case of these 13 million persons (out of a total labour force of 160 million), but is not applicable to the remaining 147 million who work in household or small-scale enterprises.

24. In an under-developed country it is, therefore, necessary to consider how many persons have to sit idle a part or most of the time for lack of work and other economic reasons. From the information collected by the NSS it would seem that nearly 20 million persons normally work one hour or less per day, 27 million work two hours or less per day, and nearly 45 million persons are engaged in gainful

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work for 4 hours a day or less [Table (A.3.1), portion B.(2)]. In NSS 5th and 6th Rounds, December 1952–March 1953, it was found that nearly 30 million persons have gainful work for less than 5 days in the month, 39 million less than 10 days, and 53 million less than 15 days in the month [Table A.(3.1), portion B(3)]. In another enquiry, NSS : 7th Round October 1953–March 1954, it was found that about 45 million persons were working part-time. They were asked supplementary questions; and from the replies received, it seems that among them about 10 million persons were not able to work full time partly on account of their own ill-health or on account of the illness of other members of the family; over 23 million (or about half) gave

CONCENTRATION CURVES FOR CONSUMER EXPENDITURE AND LAND HOLDINGS



BASED ON NATIONAL SAMPLE SURVEY : ALL INDIA

- | | |
|--|---|
| <p>CURVE A : Distribution by expenditure on 'all' item in rupees
 CURVE B : Concentration curve for expenditure on 'food' items
 CURVE C : Concentration curve for expenditure on 'non-food' items
 CURVE D : Concentration curve for expenditure on 'all' items</p> | <p>10th ROUND
 (December 1955–May 1956)</p> |
| <p>CURVE E : Concentration curve for land holdings
 CURVE F : Distribution by size of land holdings</p> | <p>8th ROUND
 (July 1954–March 1955)</p> |

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reasons of an economic nature such as lack of demand for their labour, lack of tools and raw materials, slack and off season, etc.; and 13 million gave other reasons. Finally, in NSS : 9th Round, in reply to a specific question, nearly 12 million persons stated that they were seeking additional work and would be available for 4 hours of work or more per day. [Table (A.3.1), portion B.(1)].

25. From the above account it would be seen that it is difficult to give a precise figure for unemployment or under-employment in India. The estimate would depend on which particular concept and definition is used to measure unemployment or under-employment. However, it may, perhaps, be broadly stated that there can be scarcely any doubt that 10 or 12 million persons are either unemployed in the technical sense of the more advanced countries or are severely underemployed. If consideration is extended to those who are sitting idle for more than half or two-thirds of their working time, the number would probably rise to 25 or 30 million persons.

26. Some more specific information is available regarding unemployment among the educated defined as matriculates and persons having higher qualifications. It is estimated that their total number in 1955 was about 50 lakhs out of which 4.7 lakhs (or 9.4 per cent) were unemployed, most probably in the technical sense of the term as being out of a job or seeking a job as in the more advanced countries. It must be remembered in this connexion that in 1955 just over 4 lakhs of candidates passed the matriculation examination, and the number is rising from year to year. It can be easily appreciated that the problem of unemployment among the educated class is likely to become increasingly serious and would have grave social and political implications.

GENERAL AND PROFESSIONAL EDUCATION

27. I shall now briefly consider the question of trained personnel. Some information regarding the number of persons passing the matriculation examination and acquiring other general or professional qualifications every year from 1950 to 1955 is given in appendix Table (A.3.4). Much interesting information can be obtained from this Table. I shall make only a few brief observations.

28. There has been fairly rapid all round progress in numbers. The number of matriculates increased roughly from 1.89 lakhs in 1950 to just over 4 lakhs in 1955 or has doubled in 5 years. The rate of increase is about the same at other levels. It is also seen that the number of candidates passing the intermediate examination is roughly 40 per cent of the number who passed the matriculation examination two years earlier; the number taking the first degree is roughly 60 per cent of the number who passed the intermediate examination two years earlier; and the number taking the master's degree is roughly one-fourth of the number who took the first degree, two years earlier. These are approximate statistical proportions which would vary considerably from year to year but can give some idea of

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the structure of general education. As a very rough rule, out of 100 matriculates in any given year about 40 would pass the intermediate two years later; 24 would take the first degree after two more years; 6 would take the master's degree two years later.

29. It is of interest to make some comparisons on the basis of the number of literates in India which was about 63 million in 1955. The number of matriculates was thus about 5300 per million literates; and the number of first graduates about 900 per million literates in India. In contrast, the number of first graduates in UK is 450 per million literates or proportionately only half that of India.

30. One gets a general impression that the number of students in the university stage is increasing quite fast and is roughly doubling every five years. The rate of increase in the number of science students is, however, much smaller at all stages and the rate of increase of science students is also appreciably smaller than arts students at the intermediate and degree levels and is roughly the same at the stage of the master's degree. The position is not quite satisfactory from the point of view of technical man-power.

31. The fact that the "proportion of graduates to literates" in India seems to be roughly double that of the UK makes it possible that education at the university level in India is expanding in quantity at the cost of quality. This, I believe, is also the general impression among my scientific colleagues. It raises some serious questions. It is true that when there is a large increase in the number of students, the average quality would usually decrease (as a statistical fact provided the method of selection remains roughly the same). It is doubtful, however, whether this has been the important reason. We are aware that a very large number of natural and social scientists were, during World War II, and are still being appointed in Government agencies at salaries much higher than those that can be offered by universities and scientific institutions. In consequence there is a great shortage of competent and experienced teachers. The expenditure on laboratories and scientific equipment has not kept pace with the expansion in the number of students and is extremely small in comparison with needs or with standards in other countries. The syllabus and courses of instruction are in many cases out of date. All this requires to be changed.

32. It is clear there cannot be any broadbased advance of science and scientific research in India without making university teacher more efficient and more oriented to present needs than at present. With this problem is linked the question of efficiency of science education in the top classes of secondary schools to which I shall merely draw your attention but which I have no time to consider. It is necessary indeed to formulate a comprehensive scheme of science teaching, from the upper classes of secondary schools upto post-graduate teaching in the universities, and implement the same, in order to lay a sound foundation for science in India. The scientists have a very special responsibility in this matter. It is

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true, of course, that it would be necessary for Government to make important decisions of policy and to provide adequate funds. But, on the technical side, improvements in science teaching and research can be brought about only through vigorous and untiring efforts of scientists themselves. They have a triple task. They must take the initiative in formulating, at a concrete level and step by step, programmes for the improvement of science teaching and research; and, secondly, persuade Government to take appropriate action in financial and policy matters. Thirdly, scientists should start doing whatever they can on their own; and, then, as and to the extent Government support begins to be available, make the best use of such support for the promotion of science in India.

SCIENTIFIC AND TECHNICAL MAN-POWER

33. The first problem is to attract young men of ability to take up science as a career. The only way is to offer adequate economic and social incentives. First, consider the position in the advanced countries of the world. USSR has established a definite lead over all other countries including USA in scientific and technical personnel. Professors and research scientists, as a group, get the highest salary and have the highest status in USSR. The Academicians (members of the Academy of Science) have a life pension (half of which would accrue to a surviving widow) in addition to the salary of the post and are held in the highest popular esteem. In USSR science offers the most attractive career to youngmen of intellectual ability. It is being increasingly realized all over the world that it is this high social appreciation of scientists which is the real secret of the rapid advancement of science in USSR. In USA, UK and other countries of Europe also, professors and scientists have had a high status for a long time but the position has deteriorated recently which is a matter of serious concern of these countries.

34. The position of science professors and research scientists in India is, however, much worse than that in advanced countries of the West and still more so than USSR. Scientists working in universities and in scientific institutions receive much less salary than scientists working under Government. Scientists in Government employment also are in an unsatisfactory position. As a group (with a few exceptions) they receive less pay and have lower status than administrative officers; and have very little say in the making of decisions in Government. An urgent requirement for the advancement of science in India, is to remove such disparities.

SCIENTIFIC SOCIETIES AND PLANNING

35. I should now like to draw attention to another problem which is likely to become increasingly serious in future. In the Western countries scientific research and science teaching had developed at first in the universities, and later, in connexion with research in industry and independently of Government control. From the 17th century many scientific societies and institutions were established in the countries of the West for the promotion of science and scientific research.

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More recently Government began to sanction large grants for scientific research. In most countries the largest share of research funds now comes from Government.* This has raised important questions of policy in regard to Government control over scientific research.

36. It is interesting to observe that in the USSR, an Academy of Sciences was established by the communist Government at a very early date as an autonomous institution independent of the executive control of Government. The Academy has been given great responsibilities and supplied with adequate funds for a wide range of functional activities in scientific research and the promotion of science. It maintains over one hundred scientific institutes spread over the country, and in 1957 had a total staff of 50,000 (fifty thousand) of whom 12,000 (twelve thousand) were professional scientists and 4,000 (four thousand) professors. The point to be emphasized is that in all advanced countries of the world, in the West as well as in USSR, there are well established scientific societies with a great tradition of scientific thinking and criticism which are outside Government and which can be relied upon to supply Government with independent advice in scientific matters.

37. It seems to me that there is need in India of a functional scientific institution which would be outside Government but which would take up, by agreement with Government, such scientific work or research or promotion of science, or the coordination of scientific activities as can be done conveniently and efficiently by a non-official agency with the help of a wholtime staff of competent and high level scientists. Scientists engaged on such "decentralized" research or scientific activities, on a salary basis would be independent of Government and would be able to take an unbiased view of Government policy and activities in scientific fields. In this way it would be possible to build up an organization or system of scientific thinking and criticisms which would be able to render great service to Government by offering unbiased and independent views in scientific matters. There is great need of such advice in connexion with planning and in the appraisal of the progress of various projects.

38. To speak quite frankly, some of these ideas have come to mind because I am not satisfied with the present activities of the National Institute of Sciences. I feel scientists must shoulder greater responsibilities in connexion with national planning. Coming together for occasional meetings is not enough. I should, therefore, like to see the National Institute of Sciences undertake assignments relating

* In USSR, China, and other socialized economies, all expenses for research are provided by Government. In other countries also, scientific research is being increasingly financed by Government. Even in the USA, out of the total expenditure of \$ 5.4 dollars (= Rs. 2550 crore) in 1953, the share of Government was highest and 52 per cent. Industry came next with a contribution of 44 per cent. The share of universities was only 3 per cent and that of institutes only one per cent. Of the total expenditure, the biggest portion (72 per cent) was spent by industrial concerns, 18 per cent by Government agencies, and only 9 per cent by universities. It is interesting to note that of the money spent on research by industry, 60 per cent came from industry itself and 40 per cent from Government. (*Scientific American*, November 1957, p. 47).

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to plan
painstakingly
through
purpose
development.

ment which would be done in a systematic and
part-time staff. I have a feeling that it is only
that we shall be able to develop seriousness of
interest in scientific matters of importance for national

STRATEGY OF PLANNING IN INDIA

39. The task of planning must be to improve continually the level of living, especially, of the 95 per cent of the population who are poor, and to create enough new employment to get rid of the fear of unemployment. It has been recognized for a long time that this can be done only through rapid industrial developments. As India has plenty of iron ore, coal, bauxite etc., the key to industrialization lies in establishing the manufacture of heavy machinery, heavy electrical equipment (turbines, generators, switch and transmission gear), and machine tools. Once this is done, everything else can be gradually manufactured in India mostly out of domestic resources. As more and more machinery becomes available it would be possible to create more and more employment, and also continually to construct more machinery and expand the production of coal and electricity; steel and aluminium; fertilizers, cement and heavy chemicals; equipment for transport and communications; scientific instruments etc.; and, later on produce more and more consumer goods.

40. It is accepted, in principle, that until sufficient machinery and tool becomes available, it is essential, to utilize idle hands for the production of cloth, household utensils and other consumer goods. This is for two reasons. Our greatest shortage is of machinery while we have millions of unemployed persons sitting idle. Whatever machinery we can afford to import or manufacture within the country should be used to build up the basic industries which would produce more machinery, more steel, cement, fertilizers, electricity etc. That is, we must not waste our meagre resources of foreign exchange to import non-essential consumer goods, or machinery for the manufacture of consumer goods which can be produced within the country by putting idle hands to work. Expansion of small scale and village industries would create employment all over the country, increase the supply of cloth and other consumer goods made by hand labour, and improve the level of living without hampering the expansion of basic industries.

41. A third point is also fully recognized. Agriculture and industry are closely interlocked in India. Industrial development is not possible without an increasing supply of cheap food and raw materials. On the other hand, in India, owing to scarcity of land, basic improvements in agriculture can be brought about only through the use of more fertilizers, more irrigation, and better methods of cultivation, all of which would have to depend on large scale industrial development. In the short run, a good deal can and must be achieved by intensive cultivation of land by hand and by improving conditions of living in rural areas through community projects, land reform, consolidation of holdings, village cooperative etc.

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42. This brings us to the fourth point, namely, that planning in India must proceed at two different and clearly distinguishable levels or spheres. One is concerned with questions of large scale industrial development which can be and are decided in every country by a small group of persons at the top. For example, the decision in 1949 to instal a million ton steel plant, its reversal in 1950, and fresh decisions in 1953 and 1954 to expand steel production by 3 or 4 million tons were all taken by the Government of India without any consultations with the general public. It is proper for Government to make such decisions. It is also possible to implement the decisions without any difficulty as it would involve only a small number of persons.

43. The position is entirely different in agriculture or small scale and hand production which involve millions of households scattered over a very big country. Consider consolidation of holdings or village cooperatives. It is necessary, of course, for Government to make policy decisions; but this by itself would not be sufficient because the implementation would depend on securing the willing cooperation or at least the concurrence of millions of persons in the villages. In the beginning, the organization of agriculture and small scale production, which may be called the "diffuse" sector, would be far more difficult than establishing large scale industries. The approach must be through institutional changes, spread of education, improvement of communication etc., and, above everything else, by carrying conviction to the masses that Government is doing its best for national development. Success in establishing the basic industries would give Government increasing control over the national economy, and thus place Government in a strong position to make steady improvements in the diffuse sector and to secure the active support of the masses for national development.

44. Basic industries are thus of crucial importance in two different ways. Firstly, these alone can give us economic independence. Secondly, these alone can place Government in a position to make steady advance in the diffuse sector. The strategy of planning, therefore, requires the highest priority being given to the basic industries, namely heavy machine building, heavy electrical equipment, machine tools, fertilizers, steel, cement etc.

THE QUESTION OF FOREIGN EXCHANGE

45. We are aware that grave difficulties have been created by the shortage of foreign exchange. A new approach was adopted in the Second Five Year Plan, and the size of the Second Plan was intentionally made much bigger than that of the First. It is not surprising that mistakes have been made at the stage of transition from a small to a much bigger scale of planned economy. Techniques and tools of planning are not yet adequate and would have to be improved; and these questions are receiving the attention of Government and the Planning Commission. It would be appropriate, however, for us to examine the question of foreign exchange from the point of view of long term planning.

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46. I shall give a numerical example. Consider the question of foodgrains about which India is in a precarious position. From 1948 to 1953 we imported 19.3 million tons of cereals at a cost of about Rs. 867 crores in 6 years, that is, at the average rate of about 3.2 million tons at a cost of Rs. 145 crores per year.¹ The average price paid was about Rs. 450 per ton.

47. The population of India is growing at the rate of possibly, 5 million persons per year. It takes roughly one ton of cereals to feed 7 persons. At this rate, an additional supply of 700,000 tons of foodgrains *every year* would be required to keep pace with the growth of population. If we decide to purchase this quantity from abroad, we would require *every year* an additional Rs. 30 crore of foreign exchange which would amount to Rs. 450 crore in the course of one five-year plan (and this, also, only at the present rate of growth of population).

48. Consider the alternative method of using imported fertilizers to increase the production of cereals. One ton of ammonium sulphate, at a cost of about Rs. 250 per ton, should normally give an additional yield of 2 or 2.2 tons of foodgrains. To give 700,000 tons more of foodgrains, the quantity of ammonium sulphate required would be 350,000 tons of which the price would be Rs. 8.75 crores or say Rs. 9 crore. This would be the additional amount required *every year*; in the course of 5 years the total amount required would be Rs. 135 crore.

49. A still better way would be to instal *every year* a new fertilizer factory to produce 350,000 tons of ammonium sulphate (roughly, like the factory at Sindri). The fixed investment would be about Rs. 20 crore of which the foreign exchange component would be only Rs. 12 crore. After the period of construction is over, each such factory would supply enough fertilizer to take care of the increase of population of one year. The total expenditure in five years would be Rs. 100 crore with, however, a total foreign exchange component of only Rs. 60 crore.²

50. It is possible to go one step further, and establish immediately a heavy machine building factory in India, and, when this plant is constructed, to manufacture in India the machinery required to set up a fertilizer factory. Of course, it is neither possible nor necessary to set up a machine building plant exclusively for the manufacture of machinery for fertilizer factories; the work can be done in big plants which would manufacture machinery for other industries as well. It is, however, possible to make rough calculations of cost because, in the case of heavy machine building plants, the value of output is roughly equal to the value of the fixed investment. To produce machinery worth Rs. 12 crore (the value of imports

¹ Imports fell below one million ton in 1954 and 1955 but we have again started importing foodgrains heavily from 1956.

² Besides this, there will, of course, be current costs of intermediate products used up and wages paid. But when the intermediate products are available within the country, and the output of wages goods industries is sufficient to meet the demand, such costs could be met entirely out of domestic resources. This would, no doubt, call for an expansion of the economy and would require organizational efforts; but similar and even greater organizational efforts would be needed to produce the goods to be exported to meet the larger requirements of foreign exchange in the other cases. Also, great organizational effort is, in any case, essential for economic development.

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required to set up a Sindri-type plant) would thus call for an investment of about Rs. 12 or, say, 15 crore with a foreign exchange component of possibly Rs. 8 or 10 crore. This would be the (apportioned) cost in the first instance. The actual cost of setting up a fertilizer factory would be Rs. 20 crore per year or Rs. 100 crore in 5 years, but this would not involve any expenditure of foreign exchange. In practice, a large machine building plant unit would be established, a point I shall consider a little later.

51. To sum up, in order to feed the fresh additions to the population at the rate of 5 million of persons per year, it would be necessary to provide an additional quantity of 700,000 tons of foodgrains *every year* which would require Rs. 450 crore of foreign exchange over a period of five years. The cost can be reduced to Rs. 135 crore of foreign exchange in a 5-year period if an additional quantity of 350,000 tons of ammonium sulphate is ordered from abroad *every year*, at least two years in advance of the crop season. The cost can be further reduced to Rs. 100 crore (out of which the foreign exchange component would be Rs. 60 crore) over a five-year period if a new fertilizer factory of 350,000 ton capacity is started *every year*; this would call for decision 4 or 5 years ahead of the crop season concerned. The apportioned cost of a heavy machine building factory which would manufacture machinery in India to instal *every year* a new fertilizer factory of 350,000 ton capacity¹ would be, however, so small as Rs. 12 or 15 crore with a foreign exchange component of perhaps Rs. 8 or 10 crore. Such a decision would have to be made only once but 8 or 10 years in advance of the season in which the fertilizer would be used.

52. The above account is, no doubt, over-simplified but it brings out clearly one important point. In India it is of the greatest importance to take a long view of planning. Additional requirements of foodgrains to cope with the growth of population can be met with an (apportioned) investment of only Rs. 15 or 20 crore and of foreign exchange of Rs. 8 or 10 crore provided a decision can be made 8 or 10 years in advance of the year in which the food would be consumed. If the decision is made 4 or 5 years in advance, the cost would increase to Rs. 100 crore with a foreign exchange component of Rs. 60 crore. If the decision is made a couple of years ahead, the cost would increase to Rs. 135 crore in foreign exchange to import fertilizers; and if the decision to import foodgrains is made only from year to year the cost would go up to Rs. 450 crore in foreign exchange.

53. Similar considerations hold good in other crucial sectors. An investment of Rs. 150 crore, including Rs. 80 crore of imported machinery, would be required to instal a million ton steel plant with a product value of Rs. 40 or 45 crore. A heavy machine building factory with an investment of Rs. 80 crore, with foreign imports worth about Rs. 50 crore, would produce every year machinery worth roughly Rs. 80 crore or the equivalent of imported machinery needed to set up a

¹ It is worth mentioning that there is great scope for the use of fertilizers in India. The rate of utilization (national average over all agricultural land) of nitrogen fertilizer is about 5 kilogrammes per hectare in India compared to USA : 55 kilo, Ceylon : 70 kilo, UK : 208 kilo and Japan : 555 kilo, all per hectare (*FAO Yearbook 1956*, Tables 1 and 93).

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a million ton steel plant. Once such a heavy machinery factory gets into production, it would be possible to start a new million ton steel plant *every year* out of our own resources. An investment of Rs. 30 crore in a plant to manufacture mining machinery would produce goods worth about Rs. 30 crore per year. An investment of Rs. 70 crore in heavy electrical equipment (generators, switchgear, heavy motors, rectifiers, transformers etc.) would give products of the value of about Rs. 45 crore per year; and so on.

NEED OF LONG TERM PLANNING

54. From the point of view of industrial development over a period of 15 or 20 years there cannot be any doubt that the correct policy would be to establish the heavy machinery industries. Consider, purely for purposes of illustration, the following programme of investments with a rough value of the product within brackets in each case :—heavy machinery Rs. 150 crore (150 crore), heavy electrical equipment Rs. 100 crore (60 crore), turbines Rs. 20 crore (12 crore), mining machinery and drilling equipment Rs. 30 crore (30 crore), machinery for chemical engineering Rs. 25 crore (25 crore), machine tools¹ Rs. 30 crore (20 crore), aluminium Rs. 25 crore (5 crore), and, say, another Rs. 70 crore for other basic industries giving a total investment of about Rs. 450 crore with foreign exchange requirements of the order of Rs. 300 crore over a period of five years. I am aware that foreign exchange would also be needed to expand transport and other facilities but provision has been made for this and for steel and other investments in the Second Plan.

55. The point I am emphasizing is that Rs. 300 crore of foreign exchange invested in suitable basic industries over a period of 5 years would establish a sound foundation for future industrial development and would enable us to manufacture essential capital goods within the country. (I am not suggesting that we should reduce our imports. On the contrary, we should try, continually to expand our foreign trade. But we must attain as soon as possible a position in which, if necessary, we shall be able to manage on our own in an emergency). We have made some real advance during the First Five Year Plan. It has been a very wise and far-sighted decision to develop atomic energy for which we have much natural resources. Dr. H. Bhabha has shown in a recent article² how great would be the benefit of atomic power electricity to Indian economy. Good progress is being made with steel. It is now necessary to make similar far-sighted decisions to establish the basic heavy industries.

56. I should like to refer in this connexion to some recent trade statistics. Indian exports f.o.b. amounted to Rs. 597 crore in 1954-55; Rs. 641 crore in 1955-56;

¹ To give one example, it is worth mentioning that machine tools formed roughly 3 per cent of industrial equipment (in value) over a long period in the USA. On this basis Rs. 20 crore worth of machine tools would suffice for the manufacture in India of about Rs. 600 crore worth of industrial equipment which, in its turn, would enable industrial investments being made to the extent of *at least*, Rs. 1000 crore per year basically out of our own resources. (*The Machine Tool Industry*, New York, Clark, Dodge & Co., May 1948).

² *Science and Culture*, October and November, 1957.

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and Rs. 637 crore in 1956-57. Imports c.i.f. in these three years were respectively Rs. 684 crore, Rs. 757 crore, and Rs. 1077 crore. It would be noticed that the increase in imports in 1956-57 over 1955-56, that is, in one year was Rs. 326 crore; and in 1956-57 over 1955-54, that is, in two years was Rs. 393 crore out of which the increase on private account was Rs. 272 crore. I may also mention that the Government outlay on the First Five Year Plan was nearly Rs. 2400 crore; and the outlay on the Second FYP is expected to be roughly double. It is in the context of the above figures that one must view the proposal to invest Rs. 450 crore and utilize Rs. 300 crore of foreign exchange to build up the basic industries. After the factories come into operation, there would be a saving of Rs. 300 or Rs. 350 crore of foreign exchange in the import of capital goods. This is the crucial issue of planning in India.

57. Finance and balance of payments are important aspects of planning; and there is no conflict between financial planning and physical planning. But it must be kept in mind that, in an under-developed country, the physical view is of basic importance. In one single year, 1956-57, our imports suddenly exceeded exports by Rs. 440 crore. If by some happy chance, Rs. 300 crore out of this amount had been utilized to purchase capital goods, required for basic industries, then in five year's time, we would have won our economic independence and would have overcome difficulties of foreign exchange permanently. Although the accounting position would have been the same, the real position would have been entirely different and ever so much better. This is the essential logic of planning in India which we must follow in future.

PLANNING IN CHINA

58. It is instructive to consider what happened in China. Mr. Li Hsien-nien, Vice-Premier and Minister of Finance of China, in his speech to the First National People's Congress in Peking on 29 June 1957 (supplement to *Hsinhua News Agency Release, Peking*) stated that China has received foreign loans amounting to 2,174 million yuan (= Rs. 435 crore) before 1953, and 3,120 yuan (= Rs. 624 crore) for China's First Five Year Plan from 1953 to 1957. The total amount of the loan was thus Rs. 1059 crore. A good part of this was used for rehabilitation after the present Government came into power (as stated by the Finance Minister) and a part, no doubt, was used for military expenses during the war in Korea. However, with the whole of the second loan of Rs. 624 crore and a part of the first loan China rapidly developed the basic industries (heavy machinery, heavy electricals, machine tools, steel, fertilizers, trucks etc.). The Finance Minister of China appreciated the help received from USSR, but stated "we may say that we are now in a better position to rely on our own accumulation [i.e., investment] to carry on national constitution." (p. 5, col. 1).

59. It is important to note that foreign credit had tapered off rapidly. In the same speech the Finance Minister stated that foreign loans constituted 117 million yuan or Rs. 23.4 crore in 1956, and 23.3 million yuan or only Rs. 4.7 crore

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in 1957. China has a foreign trade which is roughly of the same size as India on a per capita basis. Although foreign loans would be of help, it seems that China will not have to worry about foreign exchange for essential requirements in future, and would be able to manage, if necessary, on the trading surplus. It may be mentioned that India received about Rs. 200 crore of foreign assistance, roughly half in grants and half in loans, during the First Five Year Plan; and has fairly firm authorization of receiving at least Rs. 600 crore of foreign assistance during the Second Five Year Plan. India also had foreign assets (held by the Reserve Bank) to the extent of Rs. 723 crore in 1951-52 and Rs. 746 crore in 1955-56 at the end of the First Five Year Plan which China had lacked.

60. In Chinese planning the highest priority was given to develop those basic industries which would enable China to manufacture within the country essential capital goods required for rapid industrial development in future. Remembering that the Chinese economy is bigger than ours, it is of interest to note that China has "set off" on the way to industrialization out of its own resources with comparatively less foreign exchange than India. In contrast, India is likely to continue to have foreign exchange difficulties for some considerable time to come¹.

61. The Chinese example merely corroborates what an objective scientific analysis had brought out, namely, that India could have built up, and can build up, with the help of only a few hundred crores of foreign exchange those basic industries which would give here economic independence.

62. It is our responsibility, as scientists, to work out the logic and techniques of planning suited to India. It is our responsibility, as scientists, to educate and convince our countrymen that India is a great country and has vast resources, natural and human. We have the responsibility to use these resources to improve the level of living of our countrymen and to promote science and culture. We should welcome foreign help and cooperation, especially, in science and technology and cultural matters. Also, we must realize that it is not necessary continually to depend upon help from abroad. We must overcome the defeatist attitude which would make us continually ask for foreign loans¹. We have the ability and the responsibility to make rapid economic advance with our own resources, and with hard labour, scientific thinking, wise decisions, and unity of purpose. We must have faith in ourselves.

¹ The Indian Industrial Delegation which visited USA, Canada, UK, West Germany and other countries in Europe in September–November 1957, referring to foreign investments in Canada in its Report to the Federation of Indian Chambers of Commerce and Industry, states :—

"Eight hundred dollars per capita foreign investment means nearly Rs. 4,000 in Indian currency and at that rate and for such high development India should require Rs. 1,60,000 crore (Rupees one lakh sixty thousand crore) of investment of India of which at least one-third, viz. nearly Rs. 50,000 crore would have to be in foreign currency! This can only be a dream. The conclusion to draw is, that India cannot be developed without foreign capital which we shall continue to need for at least the next 25 years and in substantially large amounts" (p. 27).

China with a fifty per cent bigger population than India, succeeded in getting a head start, with the help of foreign loans of only Rs. 1059 crore spread over 7 or 8 years.

STATISTICAL APPENDIX

HOUSEHOLD CONSUMER EXPENDITURE

1. Since 1950 the National Sample Survey (NSS) has been collecting a wide variety of social and economic statistics from all over the country. A great deal of information has thus become available on household expenditure on items of consumer goods such as foodgrains, sugar, milk and milk products, or all food items taken together, clothing, medical expenses etc., as well as the total expenditure on all items for a period of 30 days. Data collected in the NSS : 10th Round (December 1955—May 1956) for 2754 sample households have been used to show some interesting facts in Tables (A.1.0), (A.1.1), (A.1.2) and (A.1.3). For each household it is possible to calculate the "expenditure per person" by dividing the total expenditure on all consumer goods by the number of persons in the household. In this way each person in the sample would be labelled by the "expenditure per person" of the household to which he belongs. It is then possible to classify all the individuals included in the sample into a number of groups or classes of expenditure level. For example, in Table (A.1.0), the individual persons were classified into groups having 'expenditure per person up to Rs. 8', 'between Rs. 8 and Rs. 11', 'between Rs. 11 and Rs. 13' etc., and finally 'Rs. 55 and above'. These class-ranges are shown in the top line of Table (A.1.0) at the head of cols. (1) to (13). Information on different items is given in different lines separately for each class-range in the corresponding cols. (1) to (13).

2. In the first portion of the table the average expenditure per person in rupees per 30 days is shown for 4 'food' items in lines 1 to 4; the total expenditure on food items in line 5; on clothing, medical expenses and 'others' in lines 6-8; non-food total in line 9; and finally the expenditure on all items of consumption in line 10.

3. The expenditure on each item can be expressed as a percentage of the total expenditure given in line 20. These percentages are shown in lines 11 to 20 and show many interesting features. The percentage expenditure on foodgrains (line 11) is over 55 per cent in the poorest group in col. (1) and decreases to about 17 per cent in the highest group in col. (12). The total expenditure on food (line 15) falls from 79 per cent at the bottom in col. (11) to 44.8 per cent at the top in col. (12) with an overall average of 65.4 per cent for all families. This shows that for India as a whole, food items make up about two-thirds of the household expenditure; in the poorest section it can be as high as four-fifths. Many other comparisons can be made on the basis of the results given in this table.

4. The average size of households, that is, the number of persons in the household is given in line 23; the estimated number of households (in million) in line 24; the estimated number of persons (in million) in line 25. It appears that, according to the NSS, there were nearly 80 million households and 385 million persons in India at the time of the survey. The expenditure in crore per 30 days is also given in lines 26 to 28. The household budget of India came to about Rs. 723 crore per 30 days out of which about Rs. 472 crore were spent on food and Rs. 250 crores on non-food items.

SCIENCE AND NATIONAL PLANNING

TABLE (A.1.0) : CONSUMER EXPENDITURE IN RUPEES PER PERSON FOR A PERIOD OF 30 DAYS WITH PERCENTAGE OF TOTAL EXPENDITURE : ALL INDIA (RURAL and URBAN) : 1955-56

items	expenditure classes in rupees per person per month													all classes above
	Rs. 0-8	8-11	11-13	13-15	15-18	18-21	21-24	24-28	28-34	34-43	43-55	55 & above		
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
average expenditure in rupees per month														
1. food grains	3.49	4.69	5.89	6.35	6.93	7.58	8.26	8.52	8.71	9.33	10.08	13.98	6.61	
2. sugar	0.09	0.20	0.25	0.36	0.42	0.52	0.65	0.77	1.05	1.13	1.46	2.41	0.51	
3. milk & products	0.15	0.43	0.66	0.92	1.11	1.78	2.15	2.69	3.69	4.71	9.98	8.56	1.75	
4. other food	1.22	1.85	2.34	3.28	3.28	3.54	4.31	4.81	5.67	6.01	7.43	12.34	3.39	
5. food total	4.95	7.17	9.14	10.36	11.74	13.42	15.37	16.79	19.12	21.18	28.95	37.29	12.26	
6. clothing	0.21	0.53	0.79	1.03	1.43	1.92	2.19	2.60	3.86	4.93	4.33	10.24	1.77	
7. medical	0.01	0.09	0.11	0.19	0.27	0.37	0.46	0.51	0.84	1.21	1.73	3.90	0.43	
8. others	1.00	1.62	1.94	2.38	3.05	3.83	4.49	5.89	6.86	10.40	12.23	31.86	4.28	
9. non-food total	1.31	2.24	2.84	3.50	4.75	6.12	7.14	9.00	11.56	16.54	18.29	46.60	6.48	
10. total (all items)	6.26	9.41	11.98	13.96	16.49	19.54	22.51	25.79	30.68	37.72	47.24	83.29	18.74	
percentage of total expenditure														
11. food grains	55.75	49.84	49.17	45.49	42.30	38.79	36.69	33.04	28.39	24.73	21.34	16.78	35.27	
12. sugar	1.44	2.13	2.09	2.58	2.55	2.66	2.89	2.99	3.42	3.00	3.09	2.89	2.72	
13. milk & products	2.40	4.57	5.51	6.59	6.73	9.11	9.55	10.43	12.03	12.49	21.13	10.28	9.34	
14. other food	19.48	19.66	19.52	19.55	19.88	18.12	19.15	18.64	18.48	15.93	15.72	14.82	18.09	
15. food total	79.07	76.20	76.29	74.21	71.19	68.68	68.28	65.10	62.32	56.15	61.28	44.77	65.42	
16. clothing	3.35	5.63	6.59	7.38	8.97	9.83	9.73	10.08	12.58	13.07	9.17	12.29	9.45	
17. medical	0.16	0.96	0.92	1.36	1.64	1.89	2.04	1.98	2.74	3.21	3.66	4.68	2.29	
18. others	17.42	17.21	16.20	17.05	18.50	19.60	19.95	22.84	22.36	27.57	25.89	38.26	22.84	
19. non-food total	20.93	23.80	23.71	25.79	28.81	31.32	31.72	34.90	37.68	43.85	38.72	55.23	34.58	
20. total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
total expenditure in Rs. crores per 30 days														
21. percentage of persons	14.01	17.31	11.74	9.14	11.55	8.21	7.04	5.53	5.17	4.85	2.59	2.86	100.00	
22. cumulative percentage	14.01	31.32	43.06	52.20	63.75	71.96	79.00	84.53	89.70	94.55	97.14	100.00		
23. size of households (persons)	5.40	5.36	5.72	5.00	4.85	4.57	4.48	4.39	4.05	4.49	3.30	3.38	4.83	
24. number of households (million)	9.99	12.44	7.91	7.04	9.18	6.92	6.05	4.85	4.91	4.16	3.02	3.27	79.74	
25. number of persons (million)	53.96	66.67	45.21	35.21	44.50	31.62	27.12	21.32	19.91	18.68	9.99	11.03	385.22	
number of sample urban blocks = 1220.														
26. on 'food' items	26.69	47.83	41.83	36.48	52.23	42.43	41.68	35.79	38.08	39.58	28.92	41.14	472.18	
27. on 'non-food' items	7.22	14.96	12.86	12.66	21.15	19.35	19.37	19.19	23.01	30.90	18.27	50.75	249.69	
28. on 'all' items	33.91	62.79	54.19	49.14	73.38	61.78	61.05	54.98	61.09	70.48	47.19	91.89	721.87	
number of sample villages = 1544.														
29. number of sample households	260	369	240	217	305	244	197	207	193	187	138	197	2754	

Based on the National Sample Survey (NSS) : 10th Round, December 1955—May 1956. All-India (rural and urban) excluding Jammu & Kashmir.

TALKS ON PLANNING

5. Line 21 gives the percentage of persons in each expenditure class. From this line it can be seen that 14.01 per cent of the population spend less than Rs. 8 per person in 30 days. The next line 22 gives the accumulated percentage which is obtained by adding the figures in successive columns. This is very convenient because it makes it possible to see directly the percentage of the population spending less than a specified amount. For example, from col. (2) it would be seen that 31.32 per cent or almost a third of the population spend less than Rs. 11 per person per 30 days; from col. (4), that 52.2 per cent or more than half the population spend less than Rs. 15;¹ from col. (9), that nearly 90 per cent of the population spend less than Rs. 34.² This brings out the actual level of living of 90 per cent of our countrymen.

6. The above information has been shown in a graphical form in the chart on page 64 in "Curve A : Expenditure on all items in rupees" (per person per 30 days) in a solid line in the upper left hand corner of the chart. The vertical scale on the left gives the cumulative percentage of the population and the horizontal scale at the top (in solid line) gives the scale of expenditure in rupees per person per 30 days. It is easy to read off from this graph the percentage of persons having an expenditure below any assigned value. From this it is also possible to obtain (by subtraction from 100) the percentage of persons having an expenditure greater than any assigned value. It is, of course, also possible to obtain for any assigned percentage the limiting value of the expenditure. These values are given in Table (3) in the main text.

PERCENTAGE EXPENDITURE ON CONSUMPTION

7. The information given in Table (A.1.0) is shown in a different form in Table (A.1.1). In each line the average expenditure for all classes, given in col. (13) of Table (A.1.0), is adopted as the basis for comparison and is put=100. Each figure in the same line is then expressed in the form of a percentage of the figure in col. (13). These are given in the form of index-numbers in Table (A.1.1) and show how the expenditure on each item and the value of other quantities increase with an increase in the level of expenditure.

8. For example, in line 1 for foodgrains, it is seen that in col. (1) the expenditure on food is 53 per cent of the average expenditure for all classes taken together. In contrast, in col. (12), the highest group, the index-number is 211 showing that the relative expenditure on foodgrains is double that of the general average. Also, comparing the index-number 211 with the index-number 53, it is seen that the expenditure is four times greater in the top group compared to the bottom group. For sugar (line 2), the bottom and top index-numbers are 18 and 473 respectively showing an increase of 26 times. Similar comparisons can be made for other items; but, because of errors of sampling, the comparisons should not become too refined.

¹ Approximately \$3 (three US dollars) and British 22s. 6d. or US 10 cents and 9 pence per head per day.

² Approximately \$7 (seven US dollars) and British 51 shillings or less than US 25 cents and British 1s. 6d. per head per day.

SCIENCE AND NATIONAL PLANNING

TABLE (A.1.1) : INDEX NUMBER OF CONSUMER EXPENDITURE PER PERSON FOR A PERIOD OF 30 DAYS BY ITEMS OF CONSUMPTION : ALL INDIA (RURAL AND URBAN) : 1955-56

items	expenditure classes in rupees per person per month												
	0-8	8-11	11-13	13-15	15-18	18-21	21-24	24-28	28-34	34-43	43-55	55 & above	all classes
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	average expenditure per month												
1. food grains	53	71	89	96	105	115	125	129	132	141	152	211	100
2. sugar	18	39	49	71	82	102	127	151	206	222	286	473	100
3. milk & products	9	25	38	53	63	102	123	154	211	269	570	489	100
4. other food	36	55	69	81	97	104	127	142	167	177	219	364	100
5. total food	40	58	75	85	96	109	125	137	156	173	236	304	100
6. clothing	12	30	45	58	81	108	124	147	218	279	545	579	100
7. medical	2	21	26	44	63	86	107	119	195	281	402	907	100
8. others	25	38	45	56	71	89	105	138	160	243	286	744	100
9. non-food total	20	35	44	56	73	94	110	139	178	255	282	710	100
10. total (all items)	33	50	64	74	88	104	120	138	164	201	252	444	100
	percentage of total expenditure												
11. food grains	158	141	139	129	120	110	104	94	80	70	61	48	100
12. sugar	53	78	77	95	94	98	106	110	126	110	114	106	100
13. milk & products	26	49	59	71	72	98	102	112	129	134	226	110	100
14. other food	108	109	108	108	110	100	106	103	102	88	87	82	100
15. food total	121	116	117	113	109	105	104	110	95	86	94	68	100
16. clothing	35	60	70	78	92	104	103	107	133	138	97	130	100
17. medical	7	42	40	59	72	83	89	86	120	140	160	204	100
18. others	76	75	71	75	81	86	87	100	98	121	113	168	100
19. non-food total	61	69	69	75	83	91	92	101	109	127	112	160	100
20. total	100	100	100	100	100	100	100	100	100	100	100	100	100
21. percentage of persons	14.01	17.31	11.74	9.14	11.55	8.21	7.04	5.53	5.17	4.85	2.59	2.86	100.00
22. cumulative percentage	14.01	31.32	43.06	52.20	63.75	71.96	79.00	84.53	89.70	94.55	71.14	100.00	—
23. size of households (persons)	112	111	118	104	100	95	93	91	84	93	68	70	100
24. number of households	12.53	15.59	9.92	8.83	11.51	8.68	7.59	6.08	6.16	5.22	3.79	4.10	100.00
25. number of persons	14.01	17.31	11.74	9.14	11.55	8.21	7.04	5.53	5.17	4.85	2.59	2.86	100.00
	total expenditure												
26. on 'food' items	5.65	10.13	8.75	7.73	11.07	8.99	8.83	7.58	8.06	8.38	6.12	8.71	100.00
27. on 'non-food' items	2.89	5.99	5.15	5.07	8.47	7.75	7.76	7.69	9.22	12.37	7.32	20.32	100.00
28. on 'all' items	4.70	8.70	7.51	6.81	10.16	8.56	8.46	7.62	8.46	9.76	6.54	12.72	100.00
29. number of sample households	260	369	240	217	305	244	197	207	193	187	138	197	2754

Based on the National Sample Survey (NSS) : 10th Round, December 1955-May 1956, All-India (rural and urban) excluding Jammu & Kashmir. number of sample villages = 1544, number of sample urban blocks = 1220.

TALKS ON PLANNING

A glance at col. (12) would also show that expenditure in the top group is relatively much greater on non-food items (710) compared to food items (394), and very high (907) in the case of medical expenses. In fact, medical care would seem to be the highest luxury in India which only the richer people can afford.

9. The index-numbers given in Table (A.1.1.) lines 11 to 19, show the change in percentages of expenditures (as distinguished from actual expenditure) on different items. It is seen that the percentage expenditure on foodgrains and other items of food decrease with rising expenditure level. The percentage expenditures on sugar, milk and milk-products, and clothing, however, continue to increase as expenditure increases; and the relative increase is highest in the case of medical expense.

CONCENTRATION CURVES FOR CONSUMER EXPENDITURE

10. The question of equality or otherwise of the consumer expenditure can be studied in a different way in the form of what is called "concentration curves". Relevant data are given in Table (A.1.2) and are also shown in a graphical form in curves B, C, and D in the chart mentioned before. Consider the right hand side of the chart. The horizontal scale at the bottom represents percentage of the population (beginning at the bottom with those having the lowest expenditure per person and finishing with those having the highest expenditure at the top). The vertical scale, on the right hand side represents percentages of the total consumer expenditure, rising from zero to 100 per cent at the top.

11. Consider the total expenditure, say, on all items and call this 100. If each person has an exactly equal share then 5 per cent of the population would have 5 per cent of the total expenditure; 10 per cent of the population would have 10 per cent of the total expenditure and so on. It is possible to draw this as a graph. Corresponding to a point 5 per cent on the horizontal scale the value of the ordinate would be 5 per cent; for 10 per cent on the horizontal scale the corresponding value on the vertical scale would be 10 per cent. The graph is obviously given by the straight line joining the "zero" point on both scales with the "100" point on the both scales which is the straight line inclined at 45° to the axis. This line represents a completely egalitarian distribution without any concentration.

12. The actual distribution or appointment of expenditure is, however, not equal; and it would be of interest to plot the graph of the observed expenditure. Relevant data are given in Table (A.1.2), in which col. (1) shows the expenditure groups as in Tables (A.1.0) and (A.1.1.). In this particular case the information is given separately for two sub-samples 1 and 2 based on different sets of sample villages and sample households. It may be mentioned here that the estimates given in Tables (A.1.0) and (A.1.1) were obtained by combining the two sub-samples 1 and 2.

13. The sample villages and the sample households in each sub-sample were selected in accordance with a design of sampling based on the theory of probability.

TABLE (A.1.2) : CUMULATIVE PERCENTAGE OF EXPENDITURE ON 'FOOD', 'NON-FOOD', AND 'ALL' ITEMS : ALL-INDIA (RURAL AND URBAN) : 1955-56.

per capita expenditure classes in Rs.	actual number of sample households		cumulative percentage of total number of persons		cumulative percentage of expenditure on					
					'food' items		'non-food' items		'all' items	
	S.S.1	S.S.2	S.S.1	S.S.2	S.S.1	S.S.2	S.S.1	S.S.2	S.S.1	S.S.2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0—8	135	125	13.84	14.18	5.64	5.66	2.82	2.96	4.67	4.73
8—11	181	188	31.52	31.12	16.15	15.43	8.60	9.15	13.55	13.26
11—13	122	118	43.62	42.50	25.37	23.74	13.80	14.25	21.38	20.45
13—15	115	102	52.65	51.74	33.16	31.41	18.89	19.31	28.23	27.21
15—18	153	152	64.17	63.33	44.38	42.30	27.56	27.59	38.57	37.20
18—21	131	113	73.61	70.32	55.06	49.66	36.32	34.37	48.59	44.36
21—24	89	108	79.36	78.63	62.29	60.03	42.97	43.19	55.62	54.19
24—28	104	103	85.93	83.14	71.32	66.22	52.37	49.24	64.78	60.33
28—34	91	102	90.28	89.12	77.81	75.80	60.63	59.37	71.88	70.10
34—43	98	89	95.31	93.79	86.66	83.73	73.64	71.14	82.17	79.36
43—55	60	78	97.08	97.19	90.83	91.73	79.27	80.07	86.85	87.69
55 & above	98	99	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
all classes	1377	1377								

Based on National Sample Survey (NSS) : 10th Round, December 1955-May 1956. All-India (rural and urban) excluding Jammu & Kashmir.

TALKS ON PLANNING

Each sub-sample covers the whole of India (rural and urban), and each sub-sample would supply valid estimates for every item under study. The two sub-samples are completely interpenetrating; and the results based on the two samples have equal validity and are comparable. The object of using two (or more) interpenetrating sub-samples can be briefly explained. As each sub-sample gives a valid estimate, a direct comparison of the results based on two (or more) sub-samples immediately supplies information on the consistency of the estimates. If two (or more) sub-sample estimates are in good agreement then it is possible to have confidence in the results. If the results diverge widely then the results must be suspect. How this method works in practice would become clear as soon as the procedure for drawing the graphs is explained.

14. The number of sample households in the two sub-samples are given in cols. (2) and (3) to show the size of samples but are not used in drawing the concentration curves. Col. (4) gives the accumulated percentages of persons in sub-sample 1, similar to the figures given in line 22 of Table (A.1.0). Percentages for sub-sample 2 are given in col. (5). The expenditure on, say, food items (or non-food items, or all items) is known for each expenditure group shown in col. (1); and the total expenditure on food items for all expenditure groups taken together is also known. It is, therefore, possible to express the expenditure incurred in any particular group as a percentage of the expenditure incurred by all the groups. In this way, each expenditure group, in each line of Table (A.1.2) would have a figure given its percentage share of the total expenditure on food (or non-food, or all) items. These percentages can then be added successively from the bottom up, and would supply the 'cumulative percentage of expenditure', say, on food items shown in col. (6). For example, the expenditure group '0-Rs. 8' accounts for 5.64 per cent of the total expenditure on food items. The two groups '0-Rs. 8' and 'Rs. 8-11' together account for 16.15 per cent of the total expenditure on food items; and so on.

15. The cumulative percentages of persons in col. (4) can be represented on the horizontal scale (at the bottom of the chart); and the corresponding cumulative percentage of expenditure can be represented on the vertical scale (on the right of the chart). The values given in the same line in cols. (4) and (6) are plotted on the chart and is shown by the graph for sub-sample 1 of concentration curve B for expenditure of food items. A similar graph can be drawn for sub-sample 2 on the basis of each pair of figures given in the same line of cols. (5) and (7). The two graphs for concentration curve B were drawn in this way. The same procedure was followed in the case of expenditure on non-food items by plotting the figures given in cols. (4) and (8) for sub-sample 1, and the figures in cols. (5) and (9) for sub-sample 2; these are shown in the two graphs of concentration curve C. For expenditure on all items, the figures in cols (4) and (10) for sub-sample 1, and figures in cols. (5) and (11) for sub-sample 2, are plotted to give the two graphs of concentration curve D.

TABLE (A.2.0): PERCENTAGE OF HOUSEHOLDS (EXCLUDING THOSE OF SIZE LESS THAN 0.10 ACRE) BELOW SPECIFIED SIZE OF OWNERSHIP HOLDING AND THE CORRESPONDING PERCENTAGE OF AREA OWNED: ALL INDIA (RURAL): 1953-54

specified size of ownership holdings	cumulative percentage of											
	number of sample households					total number of households					area owned	
	Central	(2)	State I	State II	Central	(5)	State I	State II	Central	(8)	State I	State II
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
1. 0.10-0.50 acre	1107	1210	1043	9.49	10.94	9.47	0.37	0.40	0.33			
2. upto 1.00 "	1099	1095	1075	18.95	20.58	18.82	1.29	1.37	1.23			
3. " 1.50 "	1060	996	1012	27.38	28.90	27.34	2.70	2.80	2.61			
4. " 2.50 "	1656	1578	1596	40.21	41.33	40.75	6.17	6.20	6.10			
5. " 5.00 "	2856	2805	2622	61.24	61.97	60.68	16.53	16.65	15.54			
6. " 7.50 "	1825	1848	1722	73.73	73.51	72.60	26.99	26.55	25.20			
7. " 10.00 "	1164	1265	1241	80.77	80.60	80.05	35.34	35.17	33.73			
8. " 15.00 "	2311	2495	2486	88.25	88.69	87.71	47.93	48.93	46.06			
9. " 20.00 "	1368	1337	1337	92.42	92.56	91.78	57.83	58.28	55.36			
10. " 25.00 "	1038	964	1021	94.56	94.80	94.11	64.38	65.23	62.18			
11. " 30.00 "	675	629	740	96.13	96.15	95.76	70.29	70.38	68.18			
12. " 40.00 "	757	693	847	97.77	97.77	97.56	77.98	78.19	76.32			
13. " 50.00 "	396	392	414	98.61	98.64	98.48	83.10	83.58	81.39			
14. " 75.00 "	413	395	464	99.48	99.44	99.44	90.16	90.37	89.48			
15. " 100.00 "	127	134	136	99.73	99.71	99.70	92.98	93.64	92.40			
16. " 250.00 "	131	134	128	99.97	99.99	99.97	97.60	99.10	97.69			
17. " 500.00 "	14	6	18	99.99	100.00	100.00	98.62	99.68	99.01			
18. above 500.00 "	6	1	4	100.00	100.00	100.00	100.00	100.00	100.00			
19. total	18,003	17,977	17,906									
20. sample villages	1,410	1,422	1,383									

Based on the National Sample Survey: 8th Round, July 1954-March 1955, Information for the Central sample was collected by an agency of the Government of India and for the State samples by the respective State Governments. The Central, State-I and State-II samples are each based on four interpenetrating samples; and all 12 samples also form, of course, an interpenetrating net work of samples covering the rural area.

TALKS ON PLANNING

16. It is of interest to examine the three sets of double graphs of B, C, and D. Consider the two graphs of curve B, each of which gives an equally valid sample, representing the concentration curve for expenditure on food. They diverge to some extent but not too much. We may, therefore, infer that the 'true' concentration curve B for expenditure on food items lies somewhere in the neighbourhood of the pair of graphs for sub-samples 1 and 2. Also, the divergence between this pair of graphs supplies some idea of the margin of errors of sampling. In the same way, we can locate approximately (and always subject to some margin of errors of sampling) the position of concentration curve C for expenditure on non-food items; and the position of concentration curve D for expenditure on all items of consumption.

17. The divergence between the concentration curve B, on one hand, and the concentration curve D, on the other hand, can be directly seen on the chart to be much greater than the divergence between the pair of graphs for the two sub-samples of curve B or of curve D. From this we may infer that the two concentration curves B and D are significantly different in the statistical sense. Looking at all three pairs of graphs it can be inferred that the three concentration curves B, C and D are all different. It has been possible to make this inference in this very simple manner because we have been able to use a pair of graphs (based respectively on sub-samples 1 and 2) for each of the three concentration curves B, C and D¹.

18. We may now examine the concentration curve or the figures given in Table (A.1.2) to understand the implications. For sub-samples 1, the lowest group '0 to Rs. 8' has a percentage share of population of 13.84 per cent, in col. (4); but its share of expenditure on food items on only 5.64 per cent, in col. (6); and the share of non-food expenditure is still less and only 2.82 per cent, in col. (8); the share of expenditure on all items is 4.67 per cent, in col. (10), and naturally falls between the other two. The position can be ascertained for other groups or for any percentage of the population directly from the graph. It would be seen, the lower the concentration curve at the beginning, the lower will be the share of the poorer households.

19. It will be noticed that expenditure on food is more egalitarian than the expenditure on all items while expenditure on non-food items deviates most from equality. This can be seen clearly from the curves B, C and D on the chart. The further a concentration curve lies towards the lower right-hand corner of the chart, the greater is its deviation from the egalitarian distribution shown by the straight line inclined at 45° to the axis. The more intense the concentration, the greater would be the advantage enjoyed by a few rich men over a very large number of poor people. Concentration curves thus give a simple visual picture of the non-equality of the distribution.

¹ When a particular number or quantity (as distinguished from a curve, as in the present case) is estimated, the margin of error can be calculated with considerable accuracy on results based on two or more interpenetrating samples. The rule is extremely simple: for a set of 2, 3, 4, 5, 6, ... k interpenetrating samples, the probability would be respectively

$$1/2, 3/4, 7/8, 15/16, 31/32, \dots, (2^k - 1)/2^k$$

that the 'true' value of the parameter lies between the two extreme estimates based on the interpenetrating samples. This method is being used in the Indian Statistical Institute since 1937.

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CONCENTRATION CURVE FOR LAND-HOLDINGS

20. It is, of course, possible to draw concentration curves for distributions other than that of expenditure. The case of holdings of land by households is of great interest. Some relevant data are given in Table (A.2.0) based on a special survey of land-holdings carried out in the NSS : 8th round : July 1954–March 1955 covering the whole rural area of India. In this survey 12 interpenetrating sub-samples were used; information for 4 of which were collected by the NSS (which is a Central agency) and information for the remaining 8 sub-samples was collected by respective State Governments in the form of two groups of samples called State-I and State-II, each consisting of 4 sub-samples. The information is given in Table (A.2.0) separately for 3 groups of samples : Central, State-I, and State-II.

21. Information was obtained about the size in acres of the total holdings of land owned by each household. The households were then classified in groups by size of holding, such as, owning '0.10 to 0.50 acre'; owning '0.50 to 1.00 acre'; and so on. The number of households in each group and also the total area of land held by each group were then calculated; and these were expressed as percentage of the total number of households and of the total area of land owned by all households. The next step was adding up the percentages by successive groups to give the 'cumulative percentage of household' and the 'cumulative percentage of total area of land owned by households'. These figures are given for the Central sample in cols. (5) and (8) respectively of Table (A.2.0); for State-I samples in cols. (6) and (9) respectively; and for State-II sample in cols. (7) and (10) respectively. These three sets of values were then drawn on the chart in the form of the three graphs of concentration curve E, at the extreme lower right hand corner of the chart.

22. The number of sample households is given in cols. (2), (3) and (4) which show that the size of the sample was much larger in the case of the survey of land-holdings compared to the survey of household expenditure. Each of the Central, State-I and State-II samples had about 18,000 sample households compared to only 1377 sample households in sub-samples 1 and 2 in the case of household expenditure. It is of interest to note that the three graphs of curve E lie very close to one another (and are almost indistinguishable), no doubt, due to the large size of the samples. Comparing the graphs of curve E with the graphs of B, C and D, it is seen that the margin of errors of sampling is much smaller in the case of curve E. The size of samples in the case of land-holdings would seem to be quite adequate.

23. It should be mentioned that in the present case only those households have been included which own more than 0.10 acre of land in order to exclude landless labour and households who practically do not own any land. The most important point to be noted is that the concentration of land-holdings is far greater than the concentration of expenditure on non-food items of consumption. The distribution of land-holdings is thus far more unequal than the distribution of consumer expenditure. The curves B, C, D and E give a clear idea of the inequality in the level of living and in the ownership of land in India at the present time.

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EMPLOYMENT AND UNEMPLOYMENT

24. Table (A.3.1) shows the position regarding the labour force, employment, and unemployment based on the 9th Round of the National Sample Survey (NSS) : May–August 1955. Estimated numbers in million are given for each category in cols. (2), (3) and (4) for rural and urban areas, and all-India respectively. The corresponding percentage of the total are shown in cols. (5), (6) and (7). The first portion A gives the basic information. Consider the all-India figures given in col. (4) and corresponding percentages in col. (7). It is seen from line 1, that the total estimated population (on the basis of the National Sample Survey) was 382.4 million in 1955, and from line 3 that the labour force consisted of 162.6 million persons [or 42.5 per cent of the population, as shown in col. (7), line 3] who were at work or seeking work at the time of the survey. Within the labour-force itself 160.4 million were gainfully occupied (line 5), and 2.24 million were “unemployed” (line 4) in accordance with the concept of “unemployment” used in industrially advanced countries.

25. For various reasons, it is known that the concept of unemployment used in the advanced countries is not suitable in the case of underdeveloped countries in which most of the people work in household enterprises and agriculture. They are never “unemployed” in the technical sense, but may often have to sit idle for lack of gainful work. The figures for “unemployed” given in line 4, are not, therefore, adequate. A better picture can be obtained if consideration is given to the amount of time a person is available for work, or, is actually engaged in gainful work. This has been sought to be done in part B of the table. Three different approaches were used.

26. Information was collected on how many more hours a person was available for work per week and the replies were classified in groups of “available from 1 to 8 hours per week”, “from 8 to 14 hours per week”, etc., (that is, by units of 1 hour per day per week), shown in lines 6 to 13. Those who are available for work for more than 29 hours per week (that is, who can accept work for more than 4 hours per day for 7 days) are either practically unemployed or are sitting idle for half the week or more. Their number would come to 11.7 million [col. (4), line 9]. This perhaps is a lower limit of effective unemployment.

27. Information about hours of work per week is given (in an accumulated form) in lines 14 to 20. It would be seen that the number of persons working less than 8 hours per week was 20.9 million, and their position was practically the same as that of the unemployed. The number of persons working less than 29 hours per week or 4 hours per day was as large as 44.8 million [col. (4), line 16].

28. A third approach was to enquire how many days a person was engaged in gainful work during 30 days preceding the day of interview. The information is given in the form of accumulated totals in lines 21 to 26. The number of persons working less than 10 days out of 30 days, or less than one-third of the month, was

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39.2 million [col. (4), line 22]. This is broadly consistent with the figure 44.8 million given in the previous paragraph.

29. There is, however, a big gap between estimates of the number of unemployed persons based on B.(1) the hours per week available for additional work and B.(2) the hours of work per week. A special enquiry carried out in the NSS : 7th Round, October 1953–March 1954, had given some interesting information on this point. The number of persons working part-time was obtained as 47.2 million corresponding roughly to 44.8 million persons who worked 28 hours or less per week as given in col. (4), line 16 of Table (A.3.1). The enquiry in the 7th Round brought out that among them 10.4 million (22 per cent of the total) were working part-time partly on account of ill-health of the worker and partly because of illness in his household. Also, 23.4 million persons (or roughly half) were working a part of the time for reasons of an economic nature such as lack of demand for their labour, lack of tools and raw materials, slack and off season etc.; and 13.4 million persons gave other reasons. It would seem from the above discussion that at least 23 million persons, who were working part-time for reasons of an economic nature, can be considered as severely “underemployed”.

30. It is clear that the volume of under-employment is very great indeed in India. It is, however, difficult to set up precise definitions and standards for unemployment and under-employment especially in rural areas and in household and small scale enterprises and in the case of self-employed persons. The actual number would depend entirely on where the line is to be drawn between employment and under-employment.

31. Table (A.3.2) gives information on the distribution of gainfully employed persons by industries and by economic sectors (public, large scale, private household etc.). From col. (9) it is seen that out of a total number of gainfully employed persons of 160.38 million, 119.76 or nearly 120 million work in agriculture, forestry, livestock, etc. The total number engaged in manufacturing industries is only 17.54 million out of which also only 3.47 million are engaged in modern large scale industries. Trade and commerce with 5.84 million, and service with 5.13 million come next in order of importance.

32. From col. (2), bottom line, it is seen that 7.26 million persons are employed in the public sector, that is, under the Central and State Governments, Municipalities, and other public authorities; and from the total of col. (3) that 5.65 million are employed in private large scale enterprises. These two taken together, namely, 12.91 million persons have employment of the type familiar in industrially advanced countries; and in their case it is probably possible to specify fairly well whether a person is employed or unemployed in the sense in which “unemployment” is defined in advanced countries.

33. The private small scale sector has 146.61 million [col. (7), bottom line] out of which 115.23 million are household labour (col. 4). They may be fully or

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only partly engaged in work but can almost never be "unemployed" in the technical sense. The structure of employment clearly shows the backwardness of the Indian economy.

TABLE (A.3.1): STATUS OF ECONOMIC ACTIVITY AND GAINFUL EMPLOYMENT RURAL URBAN & ALL-INDIA

(1)	estimated number of persons in million			percentage of total		
	rural	urban	all-India	rural	urban	all-India
(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Distribution of population by status of economic activity¹						
1. total population	316.1	66.3	382.4	100.0	100.0	100.0
2. outside labour force	176.4	43.4	219.8	55.8	65.6	57.5
3. in labour force	139.7	22.9	162.6	44.2	34.5	42.5
4. unemployed	0.92	1.32	2.24	0.29	1.99	0.59
5. gainfully employed	138.8	21.6	160.4	43.9	32.6	41.9
B. Distribution of gainfully employed persons by period of work						
<i>(1) hours available for additional work per week²</i>						
6. above 70 hours	0.38	0.04	0.42	0.28	0.20	0.26
7. " 56 "	1.2	0.11	1.3	0.85	0.51	0.81
8. " 42 "	6.1	0.7	6.8	4.4	3.3	4.2
9. " 28 "	10.4	1.3	11.7	7.5	6.2	7.3
10. " 14 "	17.6	2.5	20.1	12.7	11.6	12.5
11. " 7 "	22.1	3.2	25.3	15.9	15.0	15.8
12. " 1 hour	24.3	3.4	27.7	17.5	15.7	17.3
13. " nil	138.8	21.6	160.4	100.0	100.0	100.0
<i>(2) hours of work per week²</i>						
14. 7 hours & less	18.9	2.0	20.9	13.6	9.2	13.0
15. 14 "	24.3	2.6	26.9	17.5	12.1	16.8
16. 28 "	40.2	4.6	44.8	29.0	21.5	27.9
17. 42 "	64.3	8.5	72.8	46.3	39.5	45.4
18. 56 "	109.7	17.2	126.2	79.0	79.4	79.1
19. 70 "	133.4	20.3	153.7	96.1	93.9	95.8
20. all	138.8	21.6	160.4	100.0	100.0	100.0
<i>(3) days of work per 30 days³</i>						
21. less than 5 days	28.2	1.6	29.8	30.2	7.2	18.6
22. " " 10 "	37.2	2.1	39.2	26.7	9.6	24.4
23. " " 15 "	50.1	3.2	53.3	36.1	14.6	33.2
24. " " 20 "	62.5	4.6	67.1	45.0	21.1	41.8
25. " " 25 "	78.3	8.2	86.5	56.4	38.0	53.9
26. " " 30 "	138.8	21.6	160.4	100.0	100.0	100.0

¹ Based on the National Sample Survey (NSS): 9th Round: May-August 1955; growth of population calculated on the Census 1941-1951 rate of 1.32 per cent per annum.

² Percentages in cols. (5) to (7) and lines (1) to (20) based on NSS 9th Round, May-August 1955, sub-samples 1 and 2 only, consisting of 8,037 rural and 16,703 urban sample households.

³ Percentages in cols. (5) to (7) and lines (21) to (26) based on NSS 5th and 6th Rounds, December 1952-August 1953, consisting of 12,976 rural and 5,670 urban sample households.

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TABLE (A.3.2) : GAINFULLY EMPLOYED PERSONS BY INDUSTRIES : ALL-INDIA : 1955

industry	public	private large-scale	private small-scale				not recorded	total
			household labour	hired labour	domestic service	sub-total (4)+(5)+(6)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
million persons								
1. agriculture, forestry, livestock, fishing and hunting	0.41	0.93	93.23	24.76	0.00	117.99	0.51	119.84
2. mining and quarrying	0.04	0.39	0.01	0.08	—	0.09	0.00	0.52
3. manufacturing	0.44	3.47	11.38	2.10	0.00	13.48	0.16	17.55
4. construction	0.26	0.22	9.66	0.85	0.00	1.51	0.01	2.00
5. electricity, gas, water, sanitation	0.16	0.01	0.09	0.00	—	0.09	0.01	0.27
6. trade and commerce	0.10	0.22	4.78	0.72	0.00	5.50	0.02	5.84
7. service	2.65	0.14	1.07	0.49	0.77	2.33	0.01	5.13
8. transport and communication	1.47	0.14	1.03	0.24	0.00	1.27	0.03	2.91
9. not specified above and not recorded	1.73	0.13	2.98	0.67	0.70	4.35	0.11	6.32
10. total	7.26	5.65	115.23	29.91	1.47	146.61	0.86	160.38

Based on the National Sample Survey (NSS) : 9th Round : May-August 1955, sub-samples 1 and 2 only consisting of 8,027 rural and 16,703 urban households.

34. Table (A.3.3) shows the incidence of "unemployment" among educated persons defined as matriculates or having higher educational qualifications. The concept of "unemployment" used is the same as that used in the advanced countries and is known to be much too restricted and hence unsuitable for underdeveloped countries. However, using this strict definition of unemployment, it is of interest to observe [from col. (7), line 5] that there were about 0.47 million or 4.7 lakhs unemployed in 1955 out of a total of 5 million or 50 lakhs of educated persons altogether. Taking into consideration the fact that about 4 lakhs of candidates matriculated in 1955, and that the number is steadily increasing, it can be easily imagined how very difficult the problem of unemployment among educated persons would become in future, unless there is rapid economic development.

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TABLE (A.3.3): DISTRIBUTION OF TOTAL POPULATION AND UNEMPLOYED PERSONS
BY EDUCATION CLASS : RURAL, URBAN & ALL-INDIA : 1955

education class	rural		urban		all-India		percentage of unemployed		
	total	un- employed	total	un- employed	total	un- employed	rural	urban	all- India
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
.....million persons.....						percentage.....		
1. below matriculate	314.70	0.76	62.70	1.01	377.40	1.77	0.24	1.60	0.47
2. matriculate	1.10		2.40		3.50				
3. intermediate	0.19		0.65		0.84				
4. graduate and above	0.13		0.57		0.70				
5. sub-total (2-4)	1.42	0.16	3.62	0.31	5.04	0.47	11.42	8.59	9.40
6. total	316.12	0.92	66.32	1.32	382.44	2.24	0.29	1.99	0.59

Based on the National Sample-Survey : 9th Round, May-August 1955, sub-samples 1 and 2 only, consisting of 8,037 rural and 16,703 urban sample households. Growth of population calculated on the Census 1941-51 rate of 1.32 per cent per annum.

GENERAL AND PROFESSIONAL EDUCATION

35. Table (A.3.4) shows the number of persons passing different examinations in India each year from 1950 to 1955 based on information collected by the Planning Commission. There is no doubt that general education is increasing quite fast. In most cases numbers have more than doubled in five years since 1950. The number of matriculates was over 4 lakhs in 1955 which represented about 1050 matriculates per million of the population. The number of first graduates was about 57,000 or about 150 per million which is comparable with an outturn of about 20,000 graduates in the UK with a population of 51 million or 392 per million. A comparison can also be made on the basis of literate persons. The number of literates in India in 1955 was about 63.2 million (all ages below 5 are omitted in calculations relating to literacy). The number of matriculates in 1955 was thus about 5300 per million literates; and the number of first graduates was about 900 per million literates. In the UK the number of persons of age 5 years or more was about 44 million and this would be also the number of literates (because of universal literacy) and is comparable to 63 million literates in India. On the basis of an outturn of about 20,000 graduates per year in the UK, the number would work out as about 450 graduates per million literates. The proportion of graduates in India in relation to literates (900) would thus seem to be double that of the UK (450). This supplies some interesting information on social differentials in education.

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TABLE (A.3.4) : GENERAL AND PROFESSIONAL EDUCATION : ALL-INDIA 1950-1955

qualification	number of persons qualifying in						index- number: 1951=100
	1950	1951	1952	1953	1954	1955	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GENERAL EDUCATION							
1. Matriculation	1,89,184	2,41,143	2,61,059	3,34,760	3,97,005	4,00,014	166
2. Intermediate	59,283	72,685	77,836	89,021	1,04,851	1,26,476	174
.1 Arts	41,652	47,013	52,373	59,703	71,640	86,741	185
.2 Science	17,631	25,672	25,463	29,318	33,211	39,735	155
3. First degree	28,745	32,238	36,136	40,033	50,178	57,051	177
.1 Arts	19,212	21,251	24,965	27,491	35,773	40,444	190
.2 Science	9,533	10,987	11,171	12,542	14,405	16,607	151
4. Master's degree	5,581	7,138	7,734	7,855	9,777	11,013	154
.1 Arts	4,503	5,729	6,054	6,161	7,700	8,802	154
.2 Science	1,078	1,409	1,680	1,694	2,068	2,211	157
5. Doctorate	115	146	164	123	280	324	222
.1 D.Phil.(junior)	56	136	159	115	269	n.a.	(198)
.2 D.Sc. (senior)	59	10	5	8	11	n.a.	(110)
6. total	2,82,908	3,53,350	3,82,929	4,71,792	5,62,091	5,94,878	168
ENGINEERING AND TECHNOLOGY							
7. Certificate	566	14,189	13,604	17,418	15,718	18,588	131
8. Diploma	784	1,547	2,871	2,575	3,148	3,774	244
9. First degree	1,923	2,189	2,150	3,046	3,520	3,583	164
10. Master's degree	50	66	82	69	211	144	218
11. total	3,323	17,991	19,067	23,108	22,597	26,089	145
MEDICAL SCIENCE							
12. Diploma	50	117	120	267	—	—	—
13. First degree	2,017	1,624	1,985	2,146	3,131	—	(193)
14. Master's degree	19	256	261	350	693	—	(271)
15. Doctorate	52	54	55	63	48	—	(89)
16. total	2,138	2,051	2,421	2,826	3,872	—	(200)

Contd.

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TABLE (A,3,4) (Contd.) : GENERAL AND PROFESSIONAL EDUCATION : ALL-INDIA 1950-1955

qualification	number of persons qualifying in						index- number 1951=100
	1950	1951	1952	1953	1954	1955	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
AGRICULTURE							
17. Certificates	459	783	1,120	982	999	1,510	193
18. Diploma	585	661	352	691	563	778	118
19. First degree	1,067	1,118	984	914	1,004	971	87
20. Master's degree	146	151	209	190	198	193	128
21. total	2,257	2,713	2,665	2,777	2,764	3,452	127
VETERINARY SCIENCE							
22. Diploma	62	34	37	—	—	—	—
23. First degree	112	242	237	252	298	330	124
24. Master's degree	—	—	—	—	135	147	—
25. total	174	276	274	252	433	447	124

Notes : (1) Index-numbers within brackets are for year 1954. e.

(2) Source of information : Division of Perspective Planning, Planning Commission.

NEXT STEPS IN PLANNING

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INTRODUCTION

1.1. India adopted planning for economic development with the initiation of the First Five Year Plan in 1951. At this stage, the plan was essentially a list of projects without any clear unity of purpose. A sense of strategy began to develop and certain broad aims were formulated in advance in 1954 for the preparation of a draft frame for the Second Five Year Plan. It was agreed that attempts must be made to get India out of the fear of unemployment in ten years or as soon as possible; to lay sound foundations for a continuing improvement in the level of living, that is, of the national income; and also to bring about greater equality of opportunities.

1.2. In 1955 India accepted socialism as the goal of economic policy. The Second Five Year Plan took a long term view to economic development over a period of 10 or 15 years or more, and adopted a basic strategy for this purpose which involved a crucial change in the outlook. Three years have nearly passed after the initiation of the Second Plan in April 1956. There have been many gains and some set-backs; and much experience has been gathered. We must now prepare our mind for the Third Five Year Plan which will have to be started in about two years. It is, therefore, appropriate that we should now consider the next steps in planning.

REVIEW OF INDUSTRIAL DEVELOPMENTS

2.1. Before doing this it will be useful to consider previous developments in India in the context of the history of industrialization of the more advanced countries of the world. The industrial revolution started about two hundred years ago in the United Kingdom, the U.S.A. and countries of Western Europe where science and technology were highly developed. At first there was expansion of the manufacture of textiles and other consumer goods. The use of steel for industrial purposes started less than a hundred years ago. The world production¹ of steel was less than one million metric tons in 1870, and reached 4.4m. tons in 1880 and 28m. tons in 1900. In 1870, U.K. and Germany were producing about 200,000 tons per year and U.S.A. and Russia had just started. By 1880 U.K. and U.S.A. reached 1.3m. tons and Germany reached this level in 1885, and France in 1895. These countries were already industrialized and had a high-level of living indicated by

¹ Data on production of steel are given in Table (3) in the Appendix.

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an income of from 400 to 600 U.S. dollars per person per year (at current dollars for 1955 and 1956) at the time they reached the level of production of one million tons of steel per year. Health and education also were fairly well developed with the number of physicians ranging between 3.6 and 16.3 per ten thousand of people, and with a proportion of school children between 12 and 19 per cent of the population. Developments were fairly rapid from this time and U.S.A. reached 4.3m. tons in 1890, Germany 4m. tons in 1895, U.K. 5m. tons in 1900 and France 4.7m. tons in 1913. During this period there was some further expansion of health, education and research which was broadly in accordance with the previous trend¹. An output of 4 or 5 million tons of steel per year usually makes a turning point in industrial progress. At this level it becomes possible to establish comprehensive manufacturing complexes of steel, heavy machine building and heavy electrical industries, and chemical engineering.

2.2. Japan had started producing steel just before the First World War and reached one million tons in 1923 when Japan's per capita national income was still quite low and only 125 U.S. dollars. Health and education in Japan were, however, as highly developed as in the advanced countries of Europe and America. Japan reached 4.9m. tons in 1935, that is, in 12 years. It is important to note that modernization in Japan had started about 90 years ago with the Meiji Restoration with deliberate emphasis on health, education, scientific research and industrialization. Japan, for example, had made primary education free and compulsory before U.K.

2.3. Russia had reached the production of about one million tons of steel as early as 1895 but was quite backward in education and health with 1.6 physicians per ten thousand of population and with only 3 per cent of the population in primary schools. Owing to war, revolution and civil war, production in U.S.S.R. had decreased to 0.6m. tons in 1923, but recovered to 4.9m. tons in 1929, by which time education and health had also developed in a remarkable manner approaching conditions prevailing in the more advanced countries at corresponding epochs. China started very recently with 0.6m. tons of steel in 1950 and rapidly reached 5m. tons in 1956 and 10m. tons in 1958.

2.4. Until recently industrial developments in India were taking place rather slowly and in a somewhat imitative way of the earlier history of industrial growth in Europe and America in which we can distinguish four layers or phases. On the top or the surface comes consumer goods which can be established fairly quickly with the help of imported machinery. The second layer is the production of electricity, steel and other metals; this is highly capital intensive and requires large imports of machinery and also an appreciable amount of time. Next is the manufacture of heavy machines, heavy electrical apparatus and chemical engineering (for the production of industrial raw materials). This usually requires a much

¹ Information on certain characteristics of development is given for selected countries in Table (1) in the Appendix.

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longer time but, once established, would enable a large part of the capital and producer goods being manufactured out of domestic resources. Even more basic is the expansion of health, education, science, and of scientific and technical manpower which takes practically a generation to mature.

2.5. Following the above pattern only upto the first phase of consumer goods, India had become the second biggest producer of textiles in the world and had also developed the manufacture of other consumer goods without however establishing the basic industries like metals, heavy machine building and heavy electricals. In fact, in India the production of steel had remained basically at a little above the level of one million tons after nearly half a century of the beginning of the industry, although the country has very large resources of iron ore of the best quality. The economy was developing only very slowly on the basis of immediate demands and supplies without any long range view. Also, there was comparatively little development of health, education, and science in relation to the size of the country and its population.

GAINS IN THE SECOND FIVE YEAR PLAN

3.1. There were important gains in the Second Five Year Plan which marked a radical break with the old way of thinking. It was realised that unemployment and poverty can be cured only through rapid industrialization. It was not enough to expand the production of textiles and consumer goods. It was necessary to increase the supply of energy and of machinery and tools of production to create more employment. It was realised that the only way to do this in a big country like India was to establish, as rapidly as possible, the basic steel, heavy machine building, and heavy electrical industries and chemical engineering. This would make it possible to produce capital and producer goods of all kinds and thus expand industrial investments increasingly out of domestic resources. This is the only way to secure increasing supplies of machinery and energy, with which we can create more employment and also can give the workers more machinery so that the total production in the country can rise rapidly.

3.2. In India the highest priority must be given to the establishment and expansion of the basic industries. Large investments in the basic industries would, of course, give rise to an increasing demand for food, cloth and other consumer goods. In India it is possible and desirable to meet this demand by setting idle hands to work in the traditional way or in small scale industries to produce consumer goods and other necessities as much as possible. This would also create much employment all over the country.

3.3. It was appreciated that, in India, the production of an agricultural surplus is the key to industrialization. It is not only essential to grow enough food and fibres for our own requirements but it is also necessary to produce a surplus

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in the form of either industrial or food crops. In India agriculture and manufacturing industries are completely interlocked. Economic progress depends on the advance of both. Advance of one step in agriculture would supply food and raw materials for advance of one step in manufacturing industries which again, in its turn, would speed up irrigation and increase the supply of fertilizers and pesticides and help in the promotion of scientific research, which would lead to further advances in agriculture. The importance of the scattered or diffused phase of production, both in agriculture and in traditional and small scale industries, was broadly appreciated. It is also being increasingly realised that land reform and the organization of village cooperatives are urgent and essential needs for increasing agricultural production.

3.4. The Second Five Year Plan accepted the above strategy of economic development in a general way. It was decided to expand steel production to about 5 million tons; to give high priority to atomic energy; to establish a heavy machine building industry and the manufacture of heavy electricals; and also to develop prospecting for oil exploration and to establish oil refineries of our own. India would be now able to start developing large manufacturing complexes.

3.5. There were, however, gaps and set-backs also. An acute shortage of foreign currency occurred in the very first year of the Second Plan, which in my opinion was not inescapable but was largely due to lack of adequate tools and instruments of planning and also partly to lack of proper appreciation of the strategy of the Second Plan. The shortage of foreign currency created great difficulties. I discussed this question in my Anniversary Address last year. The remedy is in our own hands because in India we can manufacture capital and producer goods increasingly out of our own domestic resources, once the basic industries are established and developed. Therefore the only radical cure of the shortage of foreign currency would be by building up the basic industries as rapidly as possible.

3.6. Foreign aid, especially in the form of long term loans for capital goods and technical personnel, would be of critical importance at the stage of what P.M.S. Blackett has called "assisted take off" in industrialization. Indefinite reliance on foreign loans is neither possible nor desirable. A continuing stream of short-term financial loans from abroad would not be of much help in the long run and may make the position worse. The chief source of capital formation must be domestic savings. Fortunately, the need of raising more resources is admitted and gradually action is being taken in this regard. One notable advance was the acceptance of the principle of an expenditure tax together with a tax on wealth.

3.7. In the highly developed countries of the West, taxes on commodities are usually looked upon as "regressive" as being a burden on the poor. Public enterprises are also expected to be run on a no-loss-no-profit basis. Fortunately our outlook is changing and it is being realised that in an underdeveloped country like India excise and customs duties, purchase tax on commodities or a levy on services

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would be convenient and adaptable methods to raise resources. It is also agreed in principle that public enterprises should earn and contribute increasing returns for purposes of national development.

3.8. It is encouraging that the question of scientific and technical man-power is receiving increasing attention. The subject is being studied at a technical level in the Division of Perspective Planning in the Planning Commission. A Standing Committee of the Cabinet has been set up for man-power; and administrative units have been established in the Central Government and in the States.

WEAKNESSES IN PLANNING

4.1 The Second Plan, no doubt, has been a great step in advance. It has set productive forces in motion which cannot possibly be reversed without disaster. There are, however, serious gaps and weaknesses.

4.2. Review of industrialization has shown that there is a close connexion between economic development and progress in health and education. (Some relevant data for both developed and underdeveloped countries have been given in Table 2 in the Appendix.) In West Europe and America there was simultaneous progress of industries and health, education and science. In Russia, before the first World War, the production of steel had reached 5 million tons but there was little progress in health and education; and there was revolution. In U.S.S.R., China, and other socialized countries and also in Japan great emphasis was and is being given to progress in health, education and science *pari passu* with industrialization. India would soon reach the critical level of steel production of 5 million tons but is still backward in health, education and science.

4.3. Before considering these three points in some detail I shall refer to another disturbing aspect of the present situation, namely, the steady increase in unemployment.

INCREASE IN UNEMPLOYMENT

5.1. We do not yet have in India any regular reporting of unemployment. Some indications are, however, available from trends in the number of applicants in the Labour Exchange Registers in India, for which some data are given in Tables (4) and (5) in the Appendix. It is disturbing to note that the total number of persons registering in these Exchanges had more than doubled in five years between January 1953 and December 1957. It is also worth noting that the Labour Exchanges can find employment for only a very few; and the average number of applicants for each notified vacancy increased steadily from 23.3 in 1953, year by year, to 33 in 1957. Also, as all notified vacancies were not filled by applicants recommended by the Labour Exchanges, the number of applicants for each effective placement was nearly 40 in 1953 and had steadily increased to nearly 51 in 1957. That is, the

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Labour Exchanges can find employment for only two persons or less out of every *hundred* applicants, on an average. This is not a criticism of Labour Exchanges but simply an indication of the heavy back-log of unemployment.

5.2. This back-log differs in different occupational categories for which some information is given in Table (4). The ratio of applicants to effective placements increased in practically all categories except in "others". The greatest relative increase occurred among those seeking "educational", "clerical" and "unskilled" jobs. In 1957 there was only one effective placement for 36 applicants seeking educational posts; and one for 75 seeking clerical or unskilled jobs. It is clear that the size of the Second Plan was not big enough to absorb the fresh seekers of employment who joined the labour force through the growth of population. A much bigger plan is essential to get rid of the fear of unemployment.

5.3. In my Anniversary Address last year I gave some information on unemployment and underemployment obtained through the National Sample Survey. I explained the difficulties of measuring underemployment and stated that there was scarcely any doubt that 10 to 12 million persons in India were unemployed or severely underemployed and that this figure might rise to even 25 or 30 million if consideration is extended to those who were sitting idle for more than half of their normal working time. I had drawn attention to the fact that about 10 per cent of educated persons (matriculates and above) were probably unemployed, and that this number was likely to rise. The evidence from Labour Exchanges would seem broadly to corroborate this.

5.4. It is clear that the Second Five Year Plan has not succeeded in absorbing, in sufficiently large numbers, the new seekers of employment. It is also likely that unemployment is continuing to increase among educated persons especially in urban areas. This is a disturbing sign. The only conclusion to be drawn is that the Third Five Year Plan must be much bigger in size than the Second Five Year Plan. It would be remembered that in the Second Five Year Plan it was visualized that net investments should reach Rs. 9900 crores in the Third Plan. Let us round off the figure, and adopt Rs. 10,000 crores as the target for investment in the Third Five Year Plan.

HEALTH

6.1. Health, education and research have indeed, a dual role. These are no doubt significant constituents of the level of living and, in this sense, are fruits of national development. On the other hand, advance of health, education and research are of basic importance in bringing about industrial and social progress. I shall first consider health.

6.2. In India at present there are about 70,000 physicians of whom a little less than a half are trained at the University level and about 37,000 are licentiates with four-year training in junior medical schools. The distribution of doctors by

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level and qualification and state of residence in 1954 is given in Table (6). The number of doctors in India as a whole is about 176 per million of population or one physician for about 5700 persons on an average. The number however varies widely from one state to another, from over 600 per million (one doctor for 1700 persons) in West Bengal and Delhi to 40 per million (or one for 25,000) in Rajasthan and Manipur. What is, however, much more serious is that most of the doctors reside in urban areas; and the total number of doctors residing in rural areas (with a population of about 330 million) may be below 10,000 that is, only one doctor for 30,000 persons or more on an average. In some rural areas it is known that there is only one qualified doctor for 50,000 or 100,000 persons.

6.3. An important committee on health and medical care (popularly known as the Bhore Committee from the name of its Chairman) stated in the foreword to its report submitted in 1946 that "*no individual should fail to secure adequate medical care because of inability to pay for it*". This Committee had prepared a long-term programme most of which still remains unimplemented.

6.4. There is no difference of opinion regarding the desirability of providing medical care to all who need it. In India, unfortunately, in some respects we are still at the stage of a somewhat superficial imitation of the most advanced countries of Europe and America. Junior medical schools were abolished after independence on the view that our countrymen cannot be allowed to have anything less than the best. And yet to provide a sufficient number of university trained doctors and adequate hospital and medical services upto the standard of the rich countries of the world is absolutely impossible at present.

6.5. Doctors and drugs are both extremely scarce in India. Doctor's fees and the price of drugs are also high which keep these beyond the reach of most people. The extreme inequality in the distribution of expenditure on medicine and medical services can be appreciated from the relative share of expenditure on these items, shown below (and also from the Chart in the Appendix) for the bottom ten per cent, the lower half, and the top ten per cent of all households.

6.6. The following table gives some similar figures for urban areas in U.S.A. in 1950. Looking at the first line of the table it is seen that the bottom ten per cent of American households share five per cent of the total expenditure on medical services incurred by all households; the corresponding share of the bottom ten per cent of rural households in India is negligibly small and only about 0.1 per cent. From the second line it is noticed that the lower half of American households share 37 per cent of the total expenditure while the Indian households share only 6 per cent of the total. We may also look at the top. Ten per cent of the households at the top in America take a share of 19 per cent of the total while the corresponding Indian households at the top have 64 per cent or nearly two-thirds of the total expenditure on medical services. The position is almost as bad in the case of medicine. In India the lower half of rural households share only 8 per cent of the

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total expenditure on drugs¹, the corresponding figure for urban households being 9 per cent.

per cent of households		cumulative percentage of expenditure on			
		medical services		medicine	
		USA ¹ 1950	India ³ 1955	India ² 1952	India ³ 1955
(1)	(2)	(3)	(4)	(5)	
per cent share of expenditure*					
bottom	10 per cent	5	0.1	1	1
(lower half)	50 „	37	6	9	8
top	10 „	19	64	45	56

¹ USA 1950 : Studies on Consumer Expenditure, 1950, Vol. VIII (University of Pennsylvania).

² India 1952 : National Sample Survey : 4th Round; April-September 1952 : All-India (Urban).

³ India 1955 : National Sample Survey : 9th Round; May-November 1955 : All-India (Rural).

* *Note* : The classification is by size of income of households for the USA 1950 data; by size of expenditure of households for the India 1952 data; and by size of expenditure of persons for the India 1955 data. The American and Indian results are therefore not comparable in a completely rigorous way but the broad picture is clear. The expenditure on both medicine and medical services are far more concentrated in India showing that it is only the very few rich who can afford to pay for medicine and medical services. The two series for India, 1955 have been, however, classified in the same way; and show that the distribution of expenditure on medical services is relatively more concentrated, that is, medical services are even more scarce than medicine in rural areas of India.

6.7. It may be pointed out, at this stage, that in countries with free and universal health services like U.K. and U.S.S.R. every person, in principle, receives essential medical services and medicine. In both countries, as private medical practice is permitted and drugs can be purchased in the market, some medical expenditure may be incurred by the rich on their own, but there is no discrimination between the rich and poor so far as the national health services are concerned. In all other advanced countries medical care is available to the poor either free of charge or at a very small cost.

6.8. I should like to make a few suggestions for consideration for the Third Five Year Plan. Firstly, I think it would be wise to reintroduce training extending over, say, 3 years for a junior type of doctor or auxiliary health worker who would be prepared to serve in villages for a modest allowance of say something like Rs. 1,000 per year with permission for private practice within certain limits. The training cost would be possibly one-fourth or one-fifth of that of a fully qualified doctor. The pay or allowance would also be one-fifth or even less of the pay which would have to be given to a university level doctor. The cost of training and maintaining a junior doctor may be thus five times cheaper.

¹ Similar figures for the distribution of consumer expenditure on other items like foodgrains, all food items, cloth, sugar, education, and medical services are given in Tables (12), (13) and (14) in the Appendix.

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6.9. The organisation of medical teaching at a junior level would also be feasible on a much larger scale than at the university level. There are about 400 district hospitals which, with some additional facilities, can serve as training centres for junior doctors; and which, on an average, may be able to run out 25 trained persons each per year which would supply 10,000 junior doctors per year after the scheme is in full operation. This would make it possible to have, say, one junior doctor for a group of ten villages in roughly half a million villages in eight or ten years. One fully qualified doctor may be placed in charge of about five junior doctors; and should be able to give some attention to the more difficult cases.

6.10. The cost of providing hospital and other health services would also have to be brought down to a level which the country can afford. The cost of construction of buildings can and should be lowered very appreciably firstly by adopting standards and specifications which would be appropriate for a poor country like India; and, secondly, by improving the efficiency of public construction. It is also necessary to develop rapidly the manufacture of drugs and medical goods, and also to establish factories for the manufacture of machinery for this purpose. There is, of course, need of more systematic research for a fuller exploitation of our own natural resources for medical and health purposes.

6.11. Finally, it seems to me it would be very wise to initiate a truly national health service, even if this be in a skeletal form, during the Third Plan period. The emphasis in the first instance should be on establishing a large number of small village units which would provide essential medical and health service to the villages and also serve as family planning centres. This is the only way in which there would be any real chance of promoting birth-control effectively. This is a matter of great importance and urgency.

EDUCATION

7.1. India is backward in education generally. Some comparative information is given in Table (7) for selected countries. In most advanced countries there is practically no illiteracy; and in China also the position is improving rapidly. India is still far off from universal and compulsory primary education. In India the number of illiterates (including both males and females) was 83.5 per cent of the population according to the Census of 1951. The National Sample Survey indicated that there was only a slight reduction of illiteracy to 82.5 per cent of the population as a whole in 1955. The number of students in primary schools in India was about 60 per 1000 of population in 1956 against 87 in China in 1955, 144 in Japan in 1956, 125 in U.S.S.R. in 1957-58, and 154 in U.S.A. in 1955.

7.2. The position is quite different at the secondary level. India had 23 students per 1000 of population at the secondary level in 1956 which was three times higher than the corresponding figure 7.4 in China in 1955. Also, the Indian figure does not compare too badly with 38 in U.S.S.R in 1957-58 or 48 in U.S.A. in 1955.

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The number of students in the university and equivalent levels in India is remarkably high with a rate of 1.8 per 1000 of population which can compare favourably with 0.5 in China, 1.6 in U.K., or 2.5 in West Germany and 3.5 in France.

7.3. This structural difference in education comes out, even more clearly if we adopt the number of primary students as the base for comparison. For every thousand students in the primary stage, India had about 384 at the secondary level in 1956 which was much higher than the corresponding proportion of 84 in China, and also higher than the proportions in France (264), U.S.S.R. (300) and U.S.A. (312). The number of students in the university and equivalent levels per thousand students in the primary level is also very high in India and was about 30 against 5 or 6 in China, 15 in U.K., 26 in West Germany, 31 in France and 47 in Japan. Only U.S.A. and U.S.S.R. have higher proportions.

7.4. The above comparisons bring out several points. India is weakest at the primary level and is far behind China and all advanced countries of the world. India has a much stronger position at the secondary level on a population basis. If, however, the number of primary students is used as the base for comparison then India has proportionately larger numbers in the secondary schools than most advanced countries of the world including U.S.A. and U.S.S.R. At the university and equivalent levels, also, India has a higher proportion of students than U.K., and has a proportion of the same order as Germany or France on the basis broadly of both population and of the number of students at the primary level.

7.5. It is important to note that higher education in India has been expanding quite rapidly in recent years. Some relevant information is given in Table (9) which shows the enrolment of students by level of education, subjects, and sex in 1950-51 and 1956-57. It can be seen from this table that the total enrolment at higher levels (from intermediate to post-graduate and equivalent courses) was about 400,000 in 1951 and increased to about 780,000 in 1956-57, that is, the number had almost doubled in six years. It can be further noted that the largest increase had taken place at the intermediate level. On the whole, there was relatively greater expansion in arts, commerce and law compared to science and technology including medicine and veterinaries.

7.6. The outturn of qualified persons in India, at intermediate and higher levels, also showed a large increase and, more or less, kept pace with the increase in enrolment. Relevant data for the period 1951-1956 are given in Table (9) in the Appendix. There was, however, a good deal of wastage. On the whole, only about half the candidates who appeared at the examinations at the higher (university and equivalent) levels succeeded in passing these examinations. The proportion of successful candidates was the lowest at the intermediate stage (between 42 and 46 per cent). Relevant figures on number and percentage of successful candidates are given in Table (10). Large percentages of failure give rise to much frustration and to much waste of time, money and effort.

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7.7. Some interesting information can be obtained by examining the number of students in higher courses in proportion to the number of matriculates for which relevant statistics are given in Table (11). It can be noticed from this table that for every 10,000 students who matriculated in 1952, about 6,750 had enrolled for courses at the intermediate level in 1952-53 out of whom about 4,400 succeeded in passing the appropriate examinations at this level in 1954. The enrolment at the degree level was 3,319 in 1954-55, and the number receiving degrees two years later in 1956 was 2,364. The enrolment in post-graduate courses in 1956-57 was 1,552. It may be noted that for every 10,000 candidates who had matriculated in 1952 only 2,920 or less than 30 per cent took up course in science and technical subjects at the intermediate level; and less than 12 per cent proceeded with courses in science, technology, agriculture, medicine and veterinary at the degree stage. Finally, only 156 or less than two per cent took post-graduate courses in science and technology. The educational base is poor for a rapid expansion of scientific and technical personnel at higher levels.

7.8. Higher education in India developed to a great extent in a somewhat imitative way on the British pattern. Social and economic conditions are however entirely different in India. Academic ideals which are realisable in the U.K. sometimes necessarily degenerate into superficial imitation and window dressing. Indian colleges often have very large numbers of students who are not adequately prepared for higher education. University and college teachers are poorly paid and are often obliged to do a good deal of part-time outside work. Classes are very big, and library and laboratory facilities are often poor. It is not surprising that conditions of work in the universities are not entirely satisfactory.

7.9. In the advanced countries of the world there are usually good opportunities for productive employment for the students who come out of universities and other higher institutions. In India the position is entirely different. Only a very small proportion receive vocational or professional training. A very large number receive what is called general education which does not make them fit to undertake any particular productive work. As I have already mentioned, unemployment among educated persons in India is increasing. This is creating a great deal of frustration and discontent. The greatest weakness in India is the lack of an organic relation between the system of education and national needs for economic development.

7.10. A radical reform of the educational system is a most urgent next step in planning. It is necessary, to turn out an increasing number of suitably trained personnel to meet the increasing demands of an expanding economy. The first thing in education must therefore be to give appropriate vocational and professional training which would make graduates of higher educational institutions qualified to undertake productive work of one kind or another. This is not in any way incompatible with what is called general culture. In fact, the two can very well go together. Dr. Zakir Hussain in his Patel Memorial Lectures has recently given a most illuminating exposition of this theme.

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PLANNING FOR SOCIALISM

8.1. At this stage it is desirable to recall that in India socialism has been declared to be the goal of economic policy. It is quite proper not to try to give any rigid definition. And yet it is essential to have some clear understanding in this matter as a guide to action. In U.S.S.R., China and other countries in which socialism of one form or another has been already established, planning is considered to be an essential requirement for economic and social progress; and the aims and objectives of planning are settled in accordance with the principles of socialism in the accepted form. In other words planning in the socialized countries is an instrument of socialism. In India the position is different. Socialism has been accepted as the aim but not yet been established. It is, therefore, important to examine the relation between planning and socialism.

8.2. Many different ideas have been associated with the concept of socialism in different countries and at different times. I shall select three ideas which have special relevance to our problems. The first is rapid economic development through full utilization of the resources of the country. This was the object for which planning was established in India and should continue to receive full attention. The second idea I should like to mention is removing progressively large disparities in wealth, income, and power; and the third is fostering equality of opportunities of all kinds for all the people of India.

8.3. The distribution of wealth, income and privileges is extremely unequal in India. The number of persons who pay income-tax is of the order of five lakhs or half a million.¹ Multiplying by five, (which is the average number of persons per household) the total number of persons in families paying income-tax would be about 2.5 million out of a population of nearly 400 million or appreciably less than one per cent. The class which has some money and influence in India is thus extremely small and possibly forms not more than one or two per cent of the whole population. Facilities for education being both scarce and expensive, higher education is probably almost a monopoly of this privileged class at the top. The inequality in the distribution of expenditure on education service can be seen from Table (14) in the Appendix and the accompanying Chart. The bottom 10 per cent of rural households in India have a share of less than one per cent of the total educational expenditure and the lower half (50 per cent) of households shared 11 per cent only; while the top 10 per cent have as much as 36 per cent. Many poor people do not get even the opportunity to learn how to read and write. Many who complete the primary stage cannot join secondary schools; many who complete the secondary stage are unable to go to institutions of higher education on account of poverty. The same process of selection, on the basis of the income of the parents, continues at all levels of higher education. Finally it is only the rich people who can send their children abroad for higher training and education.

¹ The actual number depends on the level of income at which income-tax becomes chargeable; this level has fluctuated between Rs. 2500 and Rs. 4200 per year in recent years.

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8.4. Inequalities in medical care result in a larger number of deaths among the poor people. Inequalities in educational opportunities have a deeper and more pervasive effect. It is true that some extremely able students succeed in securing scholarships upto the highest level but their number is very small. By and large, it is the rich people who have the opportunity of giving their children the type of education required for posts of influence and responsibility in the country. By and large, those having such training are selected for posts of responsibility on the strength of their higher educational qualifications. In this way the power and privileges of a small group of people at the top tend to be not only preserved but strengthened. In both public services and organized private enterprises practically all posts of influence and power are held by persons belonging to the same small privileged class. This has created an influential group of people who naturally desire to maintain their privileged position and power. During the British period many of the influential people were not enthusiastic about the political change because they were afraid of losing their own privileges. In the same way it is not surprising that there are people in India today who are not enthusiastic about a rapid economic progress out of a similar fear of losing their privileges and power. It is necessary to remove barriers to educational opportunities to overcome such difficulties. This is the only way in which a sound foundation can be laid for democracy and socialism in India.

EDUCATIONAL REFORM

9.1. The only real remedy⁹ is to make education entirely free and also to ensure that no deserving student would be deprived of educational opportunities on account of poverty. It is no doubt necessary and desirable to do this at all levels of education; but it may be too difficult a task to undertake immediately. As a first step, it is suggested, that this reform should be carried through at the university and equivalent levels during the period of the Third Five Year Plan. This would call for several types of action. Firstly, all fees at the university level would have to be abolished by increasing the direct contribution from Government by an equal amount. Secondly, enough financial assistance would have to be provided by Government to enable every deserving student being maintained during the whole period of his study in higher educational institutions. Thirdly, selection for admission to higher education would have to be made entirely on merit. Fourthly, it would be desirable to institute evening classes, correspondence courses, and external examinations on a large scale to provide opportunities for higher education to those who are unable to attend the day-classes and also to maintain a policy of open door as a safeguard against rigidities and defects which may develop within a strictly controlled system of admissions. Finally, it would be desirable to initiate a scheme for constructive work for the nation which would be obligatory for one or two years for all students who are admitted to higher educational institution or who graduate from such institutions. This is not the occasion to give any detailed scheme but it may be useful briefly to consider some of the implications of the above proposals.

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9.2. We have seen that total enrolment in higher education had nearly doubled in six years and was about 780,000 in 1956-57. The direct expenditure on higher education was about Rs. 293 million (Rs. 29.3 crores) out of which about 42 per cent or Rs. 120 million (Rs. 12 crores) came from students' fees.¹ The number of students during the Third Plan period would no doubt be higher. If expansion continued at about the same rate, the number in the middle of the Third Plan period may reach a million and a half. It may not be however necessary or desirable to allow such an increase in future, and we may provisionally accept a target of one million students in higher education in the Third Plan but also keep in mind a million and a half. For one million students, the Government grant in lieu of fees would come to about Rs. 16 crores, and for a million and a half to about Rs. 24 crores per year at current rates and prices.

9.3. As regards financial assistance for maintenance, at the rate of Rs. 300 or Rs. 400 per year per student on an average, the cost would come to Rs. 30 or Rs. 40 crores per year for one million students. I have used average figures because it would be quite reasonable to adopt something like a "means test" so that the amount of the stipend would depend on what assistance the parent would need to maintain the student without any strain. Secondly, stipends of a larger amount may be offered as incentives to attract students to science and technology or other suitable subjects and also to post-graduate courses. The total cost may be of the order of Rs. 50 or Rs. 60 crores per year. If the Third Plan succeeds in raising the national income by five per cent per year (and this is about the lowest safe limit) then the additional income generated would be at least of the order of Rs. 600 crores per year or more out of which there should not be any difficulty in providing the above expenditure.²

9.4. Selection for admissions on merit is indeed a formidable task, but I venture to think it is not beyond our capacity if we call science to our aid. The objects of the admission test must be clearly defined, and attempts must be made to maintain uniform standards throughout the country. I shall make a few suggestions to serve as a basis for further discussions. It may be desirable to try to assess such aspects of the candidate's qualifications, for example, as (a) his content of knowledge in appropriate subjects, (b) his ability to search and compile relevant information from books and written materials, (c) his capacity to organize his knowledge and convey his ideas in a clear way in a written form, or (d) his skill in manual or technical work or ability to make scientific observations or experiments. These are all amenable to

¹ Compared to a fee income of 42 per cent of the total expenditure in India the income from fees at the university level is less than 11 per cent in U.K. and is about 8 per cent in the land-grant institutions many of which are the great State universities of U.S.A.

² It is appropriate at this stage to point out that the proposals to abolish all fees in higher education and to award maintenance stipends out of government funds would merely involve a redistribution of the national income; and should not, in principle, cause any additional strain on the economy as a whole. It would be necessary, of course, for Government to raise the required amount through additional taxation or in other ways. But, in principle, the amount which was being spent by the parents of the students would be set free and would be available for either savings or consumption. In other words, there would be no additional call on physical resources.

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assessment on a more or less objective basis. For example, modern objective tests, in which a candidate has only to indicate his choice between different alternative answers, can be used in testing knowledge in a standardised manner throughout the country. The ability to compile and collect information from given books and materials can also be standardised at different levels of difficulty. The ability to convey in a coherent form his knowledge and ideas can be tested by asking the candidate to prepare written notes on the basis of material given to him or to be collected by him from given books and papers. His power of expression can be tested by the usual type of free essay for which several hours can be allotted. Some kind of practical work or experiments can also be made a part of the examination.

9.5. I should like to mention that, in my opinion, modern statistical methods can be used very effectively to select a required number of questions for any particular paper out of a given "universe of questions" in a random manner and at the same time to maintain assigned levels of difficulty and subject coverage within prescribed limits with objective certainty. This would have two advantages. It would enable uniform standards being maintained throughout the country and from year to year. It would also permit almost infinite variations in the content of individual question papers so that copying from an answer book can be made practically impossible. Furthermore, with the help of modern electronic computers it would be possible to mark the objective type of papers very quickly and accurately.

9.6. I may also explain that the test for admission need not be one single examination but may very well be different examinations for different groups of subjects. For each examination it would be, however, necessary to maintain as uniform standards as possible over the whole country. To maintain parity or equivalence of standards between different examinations would be technically a more difficult task. However in principle, it is not absolutely necessary that the quality of the candidates should be the same in all subjects. If there is greater competition in certain subjects it is likely that such subjects would attract candidates of a higher quality on an average. This need not be prevented.

9.7. One great advantage of the proposed system would be that it would be possible to regulate admissions to particular subjects in accordance with social needs and opportunities of employment which are likely to be available to the students after graduation. In this way admission to higher education would be geared to future requirements of trained manpower.

9.8. It would be of advantage in many ways to institute evening classes, correspondence courses and external examinations to offer fuller opportunities for higher education. Correspondence courses are being used very extensively in U.S.S.R. apparently with great success; and it would be possible to take advantage of Soviet experience. Arrangements may have to be made for laboratory or other institutional work for prescribed periods or during vacations. All this would, of course, call for much organizational effort and experimentation which would offer scope for much employment of persons with higher education. A standard system of external

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examinations (including practical work or tests as necessary) would keep the door open for every one and would be a safeguard against abuses developing within a closed system.

NATIONAL SERVICE

10.1. If the State undertakes to make education available at its own expense to all deserving students then it would be entirely proper to ask the students to undertake productive and constructive work for the country for one or two years. The maintenance stipend would be continued or can be increased in suitable cases during this period. In many countries of the world a period of service in the armed forces is compulsory. In India, instead of conscripted service in the defence forces, we may think of a period of obligatory service in peace camps or in a peace force for constructive work.

10.2. It would be probably convenient to ask the students to put in their prescribed period of service immediately after their graduation. This would supply every year a large number of highly trained persons who would be able to undertake productive work of various kinds. This would be of direct gain to the nation. For example, it would be possible to use a large number of such students to do teaching work at different levels all over the country. The medical graduates can help in bringing medical care to the villages. For the trainee himself it would be a valuable period of apprenticeship training, something like the "internee" work in hospitals by medical graduates, and would be of help in their finding employment suited to their training and aptitudes. The most valuable aspect of the peace camps or peace forces, if I may use this phrase, would be the bringing together of young persons from widely differing types of families in a comradeship of active work for the country. This would be an effective way of promoting the spirit of democracy.

10.3. Although I have spoken of students joining the peace camps or the peace force after graduation from higher institutions of education it is also possible to have "work schools", as Dr. Zakir Hussain has called them, for students before they come to the University. In U.S.S.R. a new policy has been adopted of asking all students to work for at least two years from the age of 15 before they are admitted to institutions of higher education. Various possibilities are thus open. The really important point is to accept the principle that a prescribed period of service in a peace force for say two years at some stage or other would be an obligatory requirement for all educated persons.

SCIENCE AND RESEARCH

11.1. The importance of science and technology for national development has been recognised in India, in principle, since independence. It cannot be said, however, that progress has been entirely adequate or satisfactory. There is urgent need of improving the teaching of science at all levels. Much improvement is also needed in the organization of research. There is no time to make a comprehensive review, and I shall make some brief observations on some selected aspects of the problem.

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11.2. Science is developing so fast that it is becoming increasingly difficult for teaching to keep pace with the advancement of knowledge. J. D. Bernal has recently pointed out that:

“With a rapidly growing civilization, the young will year by year have more to know and also, will be required, by the new demands made on them, to know more. ...Something must be done to simplify and reduce the amount of learning at every stage. ...In the past with some reason, teaching was considered to be the passing on of known and established truths from one generation to the next. ...But clearly, in a civilization where the whole basis of knowledge is expected to change several times in a generation, the passing on of established knowledge becomes palpably inadequate and, also, from its ever increasing bulk, impossible. It is lucky if most of what is taught is true, or supposed to be true, at the time it is taught. It is certain that it will no longer be considered true by the time those who are taught are half way through their lives. What is needed, therefore, is a different and lightened content of education. The emphasis will be on discovery rather than knowledge. It will be, not so much the passing on the established truths, as showing the way to criticize and discover new truths; in other words, the active part of the scientific method.”¹

11.3. Some serious thinking has been going on for some time in the Indian Statistical Institute on organizing an integrated course of science teaching in which emphasis would be given to develop the student's skill in observation, counting, measurement, logical analysis and interpretation of the facts, and the design of new experiments to test the working hypothesis. One single set of observations and experiments may cover different branches of science, which, it is hoped, may give an integrated outlook on scientific method. It is no longer possible to have encyclopaedic coverage of knowledge. The only possibility is to try to make an intensive and integrated study which would touch particular aspects of different branches of science. I have no time to elaborate these thoughts but it seems to me that it will be well worth making some experiments in this direction.

11.4. It is essential to spread the teaching of science extensively at the school level without which it will be never possible to secure a sound foundation for advancement of science in India. Sir Alexander Fleck, in his presidential address to the British Association for the Advancement of Science in 1958 mentioned that in U.S.S.R. children from 11 to 17 years devote 46 per cent of their school time to science subjects. I am aware that it is not possible to approach this level immediately in India but we should keep some such target in view. Teaching of science, both in schools and universities, deserves serious attention by senior scientists.

11.5. As regards the organization of science in its wider sense, I have on other occasions pointed out that our own National Institute of Sciences is not very active.

¹ J. D. Bernal : World Without War, 1958, pp. 197-198.

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Our Institute is supposed to have the responsibility of advising Government on scientific matters. In practice there is very little activity of this kind. This I think is partly due to lack of clear ideas regarding what should be the proper function of scientific societies in the changing conditions of the present time; and also, I am sorry to say, partly due to lack of a sense of responsibility on our own part. I have made some suggestions in my Annual Review in 1958 and need not say anything more on the present occasion.

11.6. I am a strong advocate of the public sector but this, in my view, does not mean concentrating all activities in government departments. On the contrary, in the scientific field, I think it is essential to build up and maintain truly independent scientific organizations which would be in a position to offer advice and constructive criticism and suggestions to Government. I have already mentioned that we ourselves have not been sufficiently serious regarding our own responsibilities. But I also think that the time has come for Government to give serious attention to the future structure of scientific organization and research in India not only within government but for the country as a whole.

11.7. If I may put it in this way, the solution does not lie in officialising all scientific activities but gradually to make the scientific organizations truly functional by transferring to them real responsibilities and entrusting them with fruitful activities. The advancement of science requires proper recognition of scientists in the structure of society as a whole. In this connexion I may remind you that Sir Alexander Fleck has given a quotation from an administrator which went on record that "the place of the expert is not in the saddle but as the assistant and the adviser. The scientist must be on tap, not on top." I can only say that the future of India depends on reversing the dictum of the administrator and recognising that the scientist must be on top and not merely on tap. I have a deep conviction that scientists must supply the leadership in national development. It is necessary that they should take the initiative.

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APPENDIX

TABLE (1) : SOME CHARACTERISTICS OF DEVELOPMENT FOR SELECTED COUNTRIES

country	year	popula- tion in million (10 ⁶)	steel pro- duction in million metric tons per year	per capita national income US dollars	physicians per ten thousand of popu- lation	school children per cent of popul- ation
(1)	(2)	(3)	(4)	(5)	(6)	(7)
level of one million tons of steel per year						
1. USA	1880	50	1.3	635	16.3	19
2. UK	1880	31	1.3	385	6.6	12
3. Germany	1885	48	1.2	340	3.6	15
4. France	1895	39	0.9	485	3.9	14
5. Russia	1895	105	0.9	95	1.6	3
6. Japan	1923	56	1.0	125	7.7	17
7. India	1955-56	384	1.3	60	1.7	0.8
level of 4 or 5 million tons of steel per year						
1. USA	1890	63	4.3	735	15.9	20
2. UK	1900	38	5.0	560	8.8	16
3. Germany	1895	54	4.0	430	4.0	17
4. France	1913	39	4.7	550	5.3	14
5. USSR	1929	147	4.9	95	4.3	8
6. Japan	1935	69	4.9	195	8.4	17
7. China	1956	608	4.5	70	1.2	1.6
8. India	1960-61	408	4.3	72	2.1	1.0

Compiled by the Planning Division, Indian Statistical Institute.

NOTES ON TABLE (1)

1. Figures of steel output are taken from Woytinsky and Woytinsky : *World Population and Production*, for all countries except China and India. Chinese and Indian figures relate to finished steel and are respectively taken from *China To-day*, 25 August, 1957, and *Second Five Year Plan, 1956 (India)*.

2. For USA, UK and Japan, population figures are taken from the Statistical Abstracts of the respective countries relating to different years. Figures for Germany and France are obtained by interpolation from data given by Woytinsky and Woytinsky. Russian data relating to 1895 are obtained in the same manner while the figure for 1926 is from the *National Economy of USSR*. Chinese data are from unpublished official Chinese sources; and Indian data from the *Second Five Year Plan*.

3. Data on number of school children for USA, Germany, UK and Russia are taken from the *Encyclopaedia of Social Reform* and Mulhall, *Dictionary of Statistics*. French data relating to 1895 is from the *Statistical Year Book : National Institute of Statistical and Economic Studies*, France, while data for 1912-13 are from the *International Year Book of Statistics, 1920*. Data for USSR and India are from sources given in (2). The figure for Japan is based on the *Statistical Abstract of Japan, 1933* and the *UN Statistical Year Book*. The Chinese figure is from the *Report on Fulfillment of the National Economic Plan in 1955*.

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4. The US figures for doctors are from the *Historical Statistics of USA* while those for UK dear from the *Professions* by Carr-Saunders and Wilson. French data are obtained from Woytinsky and Woytinsky. The German and Russian figures are from Mulhall, *Dictionary of Statistics* and Woytinsky and Woytinsky, *World Population and Production* while the figure for USSR is from *40 years of Soviet Power*. The Japanese figures are from the *Statistical Abstract of Japan, 1933* and the *UN Statistical Year Book, 1949-50*. Indian and Chinese data are from sources indicated in (3).

5. National income figures are roughly dimensional and are obtained from certain estimates at current dollars for 1955 or 1956 carried backward by index numbers of real per capita income. Some of these current estimates were considered in the *Science and National Planning, Sankhyā*, September 1958.

The index numbers used for USA are taken from data given in the *Economic Report of the President, 1957*; and the "Long-term Changes in the National Income of the USA since 1870" by Simon Kuznets, (*Income and Wealth, Series II*). The German figure is adjusted by series available in the *Statistics of National Income and Expenditure*, (UN Statistical Papers, Series H), and the "Long-term Growth of the National Income in Germany" by P. Jostock, (*Income and Wealth, Series V*). For the UK estimates, use has been made of data given by Prest, National Income of the UK (*Economic Journal*, March 1948); Phyllis Dean, Contemporary Estimates of National Income in the first and second half of the Nineteenth Century, (*Economic History Review*, vol. 8, no. 3 and vol. 9, no. 3); the *Statistics of National Income and Expenditure (UN)* and *UN Statistical Year Book*. The French figures are obtained on the basis of UN sources indicated above and a series of real output per working person given in Colin Clark: *Conditions of Economic Progress*. The figure for Japan is adjusted by data given in the *Japanese Statistical Year Book, 1957* while Chinese and Indian data relating to current period are taken from official sources.

NOTES ON TABLE (2)

List A (developed countries):

(1) Australia, (2) Austria, (3) Belgium, (4) Canada, (5) Denmark, (6) France, (7) Federal Republic of Germany, (8) Finland, (9) Iceland, (10) Italy, (11) Luxembourg, (12) Netherlands, (13) New Zealand, (14) Norway, (15) Sweden, (16) Switzerland, (17) South Africa, (18) UK, (19) USA.

List B (socialized countries):

(1) Albania, (2) Bulgaria, (3) Czechoslovakia, (4) China, (5) German Democratic Republic, (6) Hungary, (7) Poland, (8) Rumania, (9) USSR, (10) Yugoslavia.

List C (medium developed countries):

(1) Argentina, (2) Bolivia, (3) Brazil, (4) Costa Rica, (5) Cuba, (6) Chile, (7) Columbia, (8) Dominican Republic, (9) El-salvador, (10) Ecuador, (11) Greece, (12) Guatemala, (13) Haiti, (14) Honduras, (15) Ireland, (16) Japan, (17) Jamaica, (18) Mexico, (19) Portugal, (20) Paraguay, (21) Peru, (22) Panama, (23) Puerto Rico, (24) Spain, (25) Turkey, (26) Uruguay, (27) Venezuela.

List D (underdeveloped countries):

(1) Afghanistan, (2) Algeria, (3) Angola, (4) Burma, (5) Belgian Congo, (6) China, (7) Ceylon, (8) Cameroon, (9) Egypt, (10) Ethiopia, (11) French West Africa, (12) Ghana, (13) Hongkong, (14) India, (15) Indonesia, (16) Iran, (17) Iraq, (18) Israel, (19) Kenya, (20) Lebanon, (21) Liberia, (22) Malay, (23) Morocco, (24) Mauritius, (25) Mozambique, (26) Madagascar, (27) Nigeria, (28) Pakistan, (29) Phillipines, (30) Rhodesia and Nyasaland, (31) Saudi Arabia, (32) South Korea, (33) Syria, (34) Thailand, (35) Taiwan, (36) Tunisia, (37) Tanganyika, (38) Uganda, (39) Vietnam, (40) Yemen.

Sources:

Columns (2), (4), (5), (9) and (10) are from the *UN Statistical Year Book, 1956*.

The Chinese population figure is taken from statistics prepared by the State Statistical Bureau of the People's Republic of China (in Chinese). The Chinese figures for physicians and primary school students are from the statistics prepared by the State Statistical Bureau of the People's Republic of China.

The USSR figures for physicians and primary school students are from the data supplied by the Central Board of Statistics of the USSR.

The method of estimation of national income figures is explained generally in *Sankhyā*, vol. 20, parts 1 and 2, "Science and National Planning".

TABLE (2) : POPULATION, NATIONAL INCOME, PRODUCTION OF STEEL AND ELECTRICITY, AND NUMBER OF PHYSICIANS AND PRIMARY SCHOOL STUDENTS BY COUNTRIES AND GROUPS OF COUNTRIES ABOUT 1955-56

countries	popula- tion in millions (10 ⁶)	national income in US dollar billion (10 ⁹)	production		per capita		physicians per ten thousand of popula- tion	primary school pupils per thousand of popu- lation	
			crude steel in million (10 ⁶) metric tons	electricity city billion (10 ⁹) kwh	national income in US dollar	production crude steel (kg) electricity (kwh)			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. United States of America	165	341	106	629	2030	642	3812	13.2	158
2. United Kingdom	50	46	20	94	900	394	1846	16.7	108
3. Developed (sub-total) ¹	450	566	191	1107	1292	436	2527	11.5	132
4. USSR	200	200	45	170	1000	226	850	14.9	65
5. China	620	44	3	12	72	4.8	20	1.2	87
6. Socialized (sub-total) ²	900	278	63	298	317	72	340	5.9	90
7. Japan	90	21	10	65	230	105	724	10.5	144
8. Medium (sub-total) ³	350	86	13	120	259	38	360	7.3	116
9. India	380	23	2	8	61	4.5	21	1.8	54
10. Underdeveloped (sub-total) excluding China	900	71	2	25	80	2	28	1.4	65
11. Underdeveloped including China ⁴	1500	114	5	37	76	3	25	1.3	73
12. World [3+6+8+10] total	2600	002	269	1550	395	106	611	5.5	92

Compiled by the Planning Division, Indian Statistical Institute. Population and other figures have been rounded off dimensionally.

1. Includes developed countries in North America, Europe, Australia (as in list A).

2. Includes all socialized countries (as in list B).

3. Includes Japan and medium developed countries in Europe and Latin America (as in list C).

4. Includes underdeveloped countries in Asia and Africa (as in list D).

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TABLE (3) : OUTPUT OF CRUDE STEEL IN MILLION METRIC TONS¹ FOR WORLD AND
SELECTED COUNTRIES

year	World ²	United Kingdom	United States	Germany	USSR	Japan ⁶	China	India
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1870	0.7	0.2	f ³	0.2	f			
1880	4.4	1.3	1.3	0.7	0.3			
1890	12.4	3.6	4.3	2.2	0.4			
1900	28.3	5.0	10.4	6.6	2.2			
1910	60.5	6.5	26.5	13.7	3.5			
1913	76.5	7.8	31.8	18.9	4.8	0.2		f
1918	78.6	9.7	45.2	15.0	0.4	0.8		0.2
1923	78.5	8.6	45.7	6.3	0.6	1.0		0.2
1929	120.5	9.8	57.3	16.2	4.9	2.3		0.6
1932	50.7	5.3	13.9	5.7	5.9	2.4		0.6 ¹⁰
1939	135.6	13.4	47.9	22.4	17.6	6.7	0.5	1.1
1940	142.9	13.2	60.8	19.0	18.3	6.9	0.6	1.3
1944	152.1	12.3	81.3	18.0	13.9	5.9	0.9 ⁷	1.4
1945	113.3	12.0	72.3	0.3	12.3	2.1	n.a.	1.4
1950	188.7	16.6	87.8	12.1 ⁴	27.3	4.8	0.2 ⁸	1.5
1955	269.1	20.1	106.2	21.3	45.3	9.4	2.9	1.7
1956	282.6	21.0	104.5	23.2	48.6 ⁵	11.1	4.5 ⁹	1.8

¹ One metric ton = 1.1023 short tons.

⁶ Includes Korea upto 1932.

² Excludes China upto 1932 and 1944-50.

⁷ Relates to 1943.

³ f = less than 100,000 tons.

⁸ Relates to 1949.

⁴ West Germany from 1950.

⁹ China 1957 and 1958 figures are 5.3 and 11 million metric tons respectively.

⁵ USSR 1957 and 1958 figures are 51 and 55 million metric tons respectively.

¹⁰ Relates to 1932-33.

Compiled by the Planning Division, Indian Statistical Institute, from :

(a) Woytinsky and Woytinsky: *World Population and Production: Trends and Outlook*, (New York, 1953).

(b) *United Nations Statistical Year Book*, 1957.

(c) D. G. Zhimerin: *Economy of the Soviet Union, Past and Present*, (Moscow, 1958).

(d) *News and Views from the Soviet Union*, (USSR Embassy, New Delhi, 18 December 1958).

(e) *China Today* : 25 September 1958; 10 January 1959.

(f) *Report on Fulfilment of the National Economic Plan of the People's Republic of China in 1955* (with Statistical Summary).

(g) Sastry: *A Statistical Study of India's Industrial Development*.

(h) *Statistical Abstract, India* : 1927-28 to 1936-37.

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TABLE (4): INCREASE IN LIVE NUMBER ON LABOUR EXCHANGE REGISTERS IN INDIA
IN 5 YEARS : 1953-1957.

occupational category	number on live-register at end of month		increase in five years		monthly average of effective placements		ratio of applicants to effective placements ¹	
	January 1953 (131)	December 1957 (181)	number	per cent	1953	1957	(8)	(9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. industrial								
supervisory	4,317	5,929	1,612	37.3	180	171	24.0	34.7
2. skilled and semi-skilled	46,539	71,508	24,969	53.7	2,247	1,910	20.7	37.4
3. educational	6,615	40,246	33,621	507.5	401	1,117	16.5	36.0
4. clerical	113,424	267,757	154,333	136.1	2,006	3,594	56.5	74.5
5. domestic service	13,987	32,018	18,031	128.9	938	1,141	14.0	28.1
6. unskilled	221,761	460,639	238,878	107.7	8,452	6,178	26.2	74.6
7. others	27,775	44,002	16,227	58.4	1,230	1,958	22.6	22.5
8. all categories	434,428	922,099	487,671	112.3	15,454	16,069	28.1	57.4

¹ That is, col. (8) = col. (2)/col. (6); and col. (9) = col. (3)/col. (7).

TABLE (5): NUMBER ON LIVE REGISTER AND NUMBER OF VACANCIES AND REPLACEMENTS: LABOUR EXCHANGES IN INDIA, 1953-1957

all categories	year				
	1953	1954	1955	1956	1957
(1)	(2)	(3)	(4)	(5)	(6)
1. monthly average of effective placements	15,454	13,538	14,145	15,821	16,069
2. monthly average of vacancies	21,392	19,990	23,377	24,718	24,766
3. monthly average on Live Register	477,575	562,319	647,109	749,099	816,280
4. number of applicants per vacancy (row 3—row 2)	22.3	28.1	27.7	30.3	33.0
5. number of applicants per placement (row 3—row 1)	30.9	41.5	45.7	47.3	50.8

Compiled in the Indian Statistical Institute from "A Study of Trends in the Number of Employment Seekers in the Year 1953-1957." (Ministry of Labour & Employment D.G.R. & E. September, 1958).

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TABLE (6) : DISTRIBUTION OF DOCTORS PER MILLION POPULATION BY LEVEL OF QUALIFICATIONS AND STATE OF RESIDENCE IN 1954

states	popula- tion 1954 (million)	number of doctors			doctors per million (10 ⁶) population			index with West Bengal = 100
		graduate and post- graduate	licen- tiate	all	graduate and post- graduate	licen- tiate	all	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Andhra	32.65	2,025	1,908	3,933	62	58	120	19.8
2. Assam	9.59	403	2,281	2,684	42	238	280	46.3
3. Bihar	40.07	1,762	3,302	5,064	44	82	126	20.8
4. Bombay	51.15	6,928	6,044	12,972	135	118	253	41.8
5. Jammu & Kashmir	4.54	32	42	74	7	9	16	2.6
6. Kerala	14.51	836	845	1,681	58	58	116	19.2
7. Madhya Pradesh	26.80	731	1,191	1,922	28	44	72	11.9
8. Madras	31.38	2,959	3,083	6,042	95	98	193	31.9
9. Mysore	20.58	1,100	1,846	2,946	53	90	143	23.6
10. Orissa	14.94	448	800	1,248	30	54	84	13.9
11. Punjab	16.63	1,118	1,915	3,033	67	115	182	30.1
12. Rajasthan	16.74	213	454	667	13	27	40	6.6
13. Uttar Pradesh	65.60	3,244	2,989	6,233	49	46	95	15.7
14. West Bengal	27.41	6,157	10,434	16,591	225	381	605	100.0
15. Delhi	1.93	771	468	1,239	399	242	642	106.1
16. Himachal Pradesh	1.13	31	42	73	27	37	65	10.7
17. Manipur	0.60	3	21	24	5	35	40	6.6
18. Tripura	0.69	31	145	176	45	210	255	42.1
all-India	376.94	28,792	37,810	66,602	76	100	176	29.1

Source : Perspective Planning Division, Planning Commission; based on Medical Registers.

TABLE (6.1) : INCOME AND EXPENDITURE OF UNIVERSITIES AND COLLEGES IN INDIA : 1955-56

type of institution	recurring expen- diture (Rs. lakhs)	source of income (percentage)				type of expenditure (percentage)		
		govt. grants	fees	endow- ment	others	salary	scholar- ship	others
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. university teaching	937	49	34	2	15	25	4	71
2. boards of education	132	1	97	—	2	—	—	100
3. professional colleges	700	67	23	3	7	48	14	38
4. general colleges	1040	34	56	3	7	62	14	24
5. intermediate colleges	125	39	39	7	15	68	22	9
6. total higher	2934	45	42	3	10	44	10	46
in Rs. lakhs	—	1320	1232	—	—	1291	293	—

Source : Education in India, Vol. 1, 1955-56.

NEXT STEPS IN PLANNING

TABLE (7) : STRUCTURE OF EDUCATION : SELECTED COUNTRIES

level of education	USA	USSR	UK	West Germany	France	Japan	China	India
	1955	1957-58	1954	1956	1954	1956	1955	1955-56
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. population (in millions)	165	200	51	51	43	90	608	384
number of students in thousands (000's)								
2. primary	25,458	25,055	5,484	4,955	4,921	12,956	53,126	22,899
3. secondary	7,961	7,511	2,483	3,668	1,300	8,063	4,473	8,789
4. higher	2,679	2,100	84	127	150	610	292	681
5. total	36,098	34,666	8,051	8,750	6,371	21,629	57,891	32,369
number of students per 1000 of population								
6. primary	154.3	125.3	107.5	97.2	114.0	144.4	87.4	59.6
7. secondary	48.2	37.6	48.7	71.9	30.2	89.6	7.4	22.9
8. higher	16.2	10.5	1.6	2.5	3.5	6.8	0.5	1.8
9. total	218.7	173.4	157.8	171.6	148.1	240.4	95.3	84.3
number of secondary and higher students per 1000 primary students								
10. secondary	312.7	299.8	452.8	740.3	264.3	622.3	84.2	383.8
11. higher	105.2	83.8	15.3	25.6	30.5	47.1	5.5	29.7
12. total	417.9	383.6	468.1	765.9	294.7	669.4	89.7	413.5
number of higher students per 1000 secondary students								
13. higher	336.5	279.6	33.8	34.6	115.4	75.7	65.3	77.5

Compiled by the Planning Division, Indian Statistical Institute from :

1. Population figures are taken from *UN Statistical Year Book* 1956 and 1957 except for China for which they are taken from official data (in Chinese).

2. Educational statistics are taken from the following sources :

USA : *Statistical Abstract of USA*, 1956 and 1957.

USSR : *USSR in Figures* (in Russian), 1958. Structural features of Soviet education are not fully revealed in recent data due to the fact that very few children were born during the war.

UK, West Germany, France and Japan : *UN Statistical Year Book*, 1957.

China : From *Report on Fulfilment of the National Economic Plan of the People's Republic of China in 1955*.

India : Basic Statistics relating to Indian Economy (mimeographed : CSO) for primary education; and *Education in India*, Vol. 1, 1955-56.

TALKS ON PLANNING

TABLE (8) : ENROLMENT OF STUDENTS BY LEVEL, SUBJECT AND SEX WITH PERCENTAGE : 1950-51 AND 1956-57

level and subject	1950-51						1956-57						index 1950-51 = 100
	number (000)			percentage			number (000)			percentage			
	boys (2.1)	girls (3.1)	total (4.1)	boys (2.2)	girls (3.2)	total (4.2)	boys (5.1)	girls (6.1)	total (7.1)	boys (5.2)	girls (6.2)	total (7.2)	
1. <i>Intermediate</i>	198.6	24.4	223.0	89.1	10.9	100.0	381.2	59.5	440.7	86.5	13.5	100.0	198
2. arts	96.3	18.0	114.3	43.2	8.0	51.2	195.1	48.1	243.2	44.3	10.9	55.2	213
3. commerce	16.1	0.1	16.2	7.3	0.0	7.3	35.0	0.2	35.2	7.9	0.1	8.0	217
4. science	84.6	6.3	90.9	37.9	2.9	40.8	145.0	11.2	156.2	32.9	2.5	35.4	172
5. agriculture	1.6	—	1.6	0.7	—	0.7	6.1	—	6.1	1.4	—	1.4	381
6. <i>Diploma</i>	9.5	0.3	9.8	96.9	3.1	100.0	26.1	0.7	26.8	97.4	2.6	100.0	275
7. " engineering & technology	8.2	—	8.2	83.7	—	83.7	23.7	—	23.7	88.5	—	88.5	289
8. " others	1.3	0.3	1.6	13.2	3.1	16.3	2.4	0.7	3.1	8.9	2.6	11.5	194
9. <i>Degree</i>	130.4	15.0	145.4	89.7	10.3	100.0	236.7	38.4	275.1	86.0	14.0	100.0	189
10. arts	44.4	8.9	53.3	30.6	6.1	36.7	88.8	25.0	113.8	32.2	9.2	41.4	214
11. commerce	15.8	0.1	15.9	10.9	0.0	10.9	31.1	0.2	31.3	11.3	0.1	11.4	197
12. science	29.1	2.4	31.5	20.0	1.7	21.7	48.6	5.8	54.4	17.7	2.1	19.8	173
13. engineering & technology ¹	10.1	—	10.1	6.9	—	6.9	17.7	—	17.7	6.4	—	6.4	175
14. medicine & veterinary ²	13.0	2.3	15.3	8.9	1.6	10.5	20.3	3.7	24.0	7.4	1.3	8.7	157
15. agriculture	2.7	—	2.7	1.9	—	1.9	3.7	—	3.7	1.3	—	1.3	137
16. <i>Post graduate</i>	18.7	2.6	21.3	87.8	12.2	100.0	30.4	5.6	36.0	84.4	15.6	100.0	169
17. arts	11.0	2.1	13.1	51.7	9.8	61.5	17.3	4.2	21.5	48.0	11.7	59.7	164
18. commerce	2.0	—	2.0	9.3	—	9.3	2.7	—	2.7	7.5	—	7.5	135
19.1 law	13.2	0.3	13.5	9.1	0.2	9.3	18.9	0.4	19.3	6.9	0.1	7.0	143
19.2 law (higher)	0.2	—	0.2	0.9	—	0.9	0.4	—	0.4	1.1	—	1.1	200
20.1 education (B.R.)	2.1	1.0	3.1	1.4	0.7	2.1	7.6	3.3	10.9	2.8	1.2	4.0	352
20.2 education (higher)	0.3	0.1	0.4	1.4	0.5	1.9	0.5	0.3	0.8	1.4	0.8	2.2	200
21. science	4.3	0.4	4.7	20.3	1.9	22.2	7.3	0.9	8.2	20.2	2.5	22.7	174
22.1 technology & engineering ¹	0.2	—	0.2	0.9	—	0.9	0.6	—	0.6	1.7	—	1.7	300
22.2 medicine & veterinary ²	0.3	—	0.3	1.4	—	1.4	1.0	0.2	1.2	2.8	0.6	3.4	400
23. agriculture	0.4	—	0.4	1.9	—	1.9	0.6	—	0.6	1.7	—	1.7	150
24. <i>Intermediate</i>	112.4	18.1	130.5	50.5	8.0	58.5	230.1	48.3	278.4	52.2	11.0	63.2	213
25. arts, law, commerce	86.2	6.3	92.5	38.6	2.9	41.5	151.1	11.2	162.3	34.3	2.5	36.8	175
26. science & technology ¹	73.4	9.3	82.7	50.6	6.3	56.9	138.8	25.6	164.4	50.4	9.4	59.8	199
27. <i>Degree</i>	54.9	4.7	59.6	37.7	3.3	41.0	90.3	9.5	99.8	32.8	3.4	36.2	167
28. arts, law, commerce	13.2	2.1	15.3	61.9	9.8	71.7	20.4	4.2	24.6	56.6	11.7	68.3	161
29. science & technology ²	5.2	0.4	5.6	24.5	1.9	26.4	9.5	1.1	10.6	26.4	3.1	29.5	180
30. <i>All levels</i>	357.2	42.3	399.5	89.4	10.6	100.0	674.4	104.2	778.6	86.6	13.4	100.0	195
31. arts, law, commerce	199.0	29.5	228.5	49.8	7.4	57.2	389.9	78.1	468.0	50.1	10.0	60.1	205
32. education	2.8	1.3	4.1	0.7	0.3	1.0	8.8	4.1	12.9	1.1	0.6	1.7	315
33. science & technology ²	155.4	11.5	166.9	38.9	2.9	41.8	275.7	22.0	297.7	35.4	2.8	38.2	178

¹ Includes Agriculture. ² Includes engineering, medicine & veterinary, and agriculture.

Source : Perspective Planning Division, Planning Commission.

NEXT STEPS IN PLANNING

TABLE (9) : OUTTURN OF QUALIFIED PERSONS IN INDIA BY LEVEL AND SUBJECT : 1950-51 AND 1955-56.

examination	1950-51				1955-56				index 1950-51 = 100
	number passed		percentage of girls		number passed		percentage of girls		
	boys	girls	total	(5)	boys	girls	total	(9)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>Intermediate</i>									
1. arts	71,272	9,815	81,087	12.1	125,939	20,213	146,152	13.8	180
2. commerce	38,748	7,913	46,661	17.0	75,764	16,482	92,246	17.9	198
3. science	6,393	17	6,410	0.3	11,216	104	11,320	0.9	177
4. agriculture	25,459	1,884	27,343	6.9	37,716	3,625	41,341	8.8	151
5. agriculture	672	1	673	0.1	1,243	2	1,245	0.2	185
6. <i>Diploma</i>	8,724	5,418	14,142	38.3	10,031	2,535	12,566	20.2	89
7. " engineering & technology	2,026	1	2,027	0.1	4,977	—	4,977	—	246
8. " others	6,698	5,417	12,115	44.7	5,054	2,535	7,589	33.4	63
9. <i>Degree</i>	44,141	6,332	50,473	12.5	72,697	13,342	86,039	15.5	171
10.1 arts (pass)	16,586	3,738	20,324	18.4	29,117	7,899	37,016	21.3	182
10.2 " (hons.)	1,814	450	2,264	19.9	1,865	487	2,352	20.7	104
11. commerce	5,411	22	5,433	0.4	8,203	50	8,253	0.6	152
12.1 science (pass)	9,640	767	10,407	7.4	13,370	1,577	14,947	10.6	144
12.2 " (hons.)	713	73	786	9.3	1,077	132	1,209	10.9	154
13. engineering & technology	1,772	1	1,773	0.1	3,810	6	3,816	0.2	215
14. medicine & veterinary	1,598	325	1,923	16.9	2,583	491	3,074	16.0	160
15. agriculture	1,037	4	1,041	0.4	887	6	893	0.7	86
16. <i>Post-graduate</i>	7,423	1,100	8,523	12.9	11,742	2,344	14,086	16.6	165
17. arts	5,020	949	5,969	15.9	7,627	1,901	9,528	20.0	160
18. commerce	575	1	576	0.2	1,027	4	1,031	0.4	179
19.1 law	3,474	71	3,545	2.0	5,733	118	5,851	2.0	165
19.2 law (higher)	15	1	16	6.2	41	2	43	4.7	269
20.1 education (n.r.)	2,096	881	2,977	29.6	6,052	2,576	8,628	29.9	290
20.2 education (higher)	151	65	216	30.1	301	142	443	32.1	205
21. science	1,326	72	1,398	5.2	2,277	262	2,539	10.3	182
22.1 engineering	87	1	88	1.1	148	—	148	—	168
22.2 medicine & veterinary	106	11	117	9.4	169	33	202	17.3	173
23. agriculture	143	—	143	—	152	—	152	—	106
<i>Intermediate</i>									
24. arts & commerce	45,141	7,930	53,071	14.9	86,980	16,586	103,566	16.0	195
25. science, agriculture & technology	28,157	1,886	30,043	6.3	43,936	3,627	47,563	7.6	158
<i>Degree</i>									
26. arts, law & commerce	27,285	4,281	31,566	13.6	44,918	8,554	53,472	16.0	169
27. science & technology	14,760	1,170	15,930	7.3	21,727	2,212	23,939	9.2	150
<i>Post-graduate</i>									
28. arts, law & commerce	5,610	951	6,561	14.5	8,695	1,907	10,602	18.0	162
29. science & technology ¹	1,662	84	1,746	4.8	2,746	295	3,041	9.7	174
<i>All levels</i>									
30. arts, law & commerce	124,862	17,248	142,110	12.1	215,355	35,899	251,254	14.3	177
31. education	78,036	13,162	91,198	14.4	140,593	27,047	167,640	16.1	184
32. science & technology	2,247	946	3,193	29.6	6,353	2,718	9,071	30.0	284
33. doctorate	44,579	3,140	47,719	6.6	68,409	6,134	74,543	8.2	156
34. doctorate	115	13	128	10.2	261	24	285	8.4	223

¹Includes engineering, medicine & veterinary, and agriculture.
Source : Perspective Planning Division, Planning Commission.

TALKS ON PLANNING

TABLE (10): NUMBER OF STUDENTS APPEARING IN AND PASSING DIFFERENT EXAMINATIONS, AND THE PERCENTAGE OF SUCCESSFUL STUDENTS

India : 1951-1952 to 1955-56

	1951-1952	1952-1953	1953-1954	1954-1955	1955-1956
(1)	(2)	(3)	(4)	(5)	(6)
<i>Appeared</i>					
1. Intermediate Arts	109,493	139,422	169,287	189,385	207,118
2. Intermediate Science	61,891	67,155	78,973	85,042	93,405
3. Bachelor of Arts	47,841	54,710	74,824	81,421	79,920
4. Bachelor of Science	23,428	27,457	31,107	34,754	32,667
5. Master of Arts	7,780	7,808	10,281	11,729	13,215
6. Master of Science	2,144	2,114	2,667	2,946	3,142
7. Professional	36,402	41,497	48,237	53,005	48,450
8. total	288,979	340,163	415,376	458,282	477,917
<i>Passed</i>					
9. Matriculation	261,059	334,760	397,005	400,014	429,494
10. Intermediate Arts	52,373	59,703	71,640	86,741	90,182
11. Intermediate Science	25,463	29,318	33,211	39,735	41,557
12. Bachelor of Arts	24,965	27,491	35,773	40,445	37,992
13. Bachelor of Science	11,171	12,526	14,405	16,704	15,997
14. Master of Arts	6,063	6,169	7,753	8,892	9,313
15. Master of Science	1,680	1,694	2,068	2,211	2,456
16. Professional	22,684	26,269	30,162	33,181	35,772
16.1 Commerce	6,785	7,559	8,452	8,773	9,597
16.2 Law	4,538	5,562	6,602	5,996	5,628
16.3 Education & Teacher's Training ¹	5,251	6,215	6,749	9,492	11,106
16.4 Technology & Engineering	2,592	3,117	3,638	3,680	4,444
16.5 Medicine & Veterinary	2,324	2,512	3,541	4,089	3,888
16.6 Agriculture and Forestry	1,194	1,104	1,180	1,151	1,109
17. total	429,142	524,199	622,179	661,104	698,535
<i>Percentage passed.</i>					
18. Intermediate Arts	47.8	42.8	42.3	45.8	43.5
19. Intermediate Science	41.1	43.7	42.1	46.7	44.5
20. Bachelor of Arts	52.2	50.2	47.8	49.6	47.5
21. Bachelor of Science	47.7	45.6	46.3	48.1	49.0
22. Master of Arts	77.9	79.0	75.4	75.8	70.5
23. Master of Science	78.4	80.1	77.5	75.1	78.2
24. Intermediate (I.A. & I.Sc.)	45.4	43.1	42.2	46.1	43.8
25. Degree (B.A. & B.Sc.)	50.7	48.7	47.4	49.2	48.0
26. M.A. & M.Sc.	78.0	79.2	75.8	75.7	72.0
27. Professional	62.3	63.3	62.5	62.6	73.8
28. total	50.0	48.0	46.9	49.7	48.8

¹ Includes "others".

Source : *Education in India* 1952-1953, 1954-1955 and 1955-1956.

TALKS ON PLANNING

TABLE (12) : TOTAL CONSUMER EXPENDITURE PER PERSON PER 30 DAYS AND CUMULATIVE PERCENTAGES OF POPULATION AND CONSUMER EXPENDITURE BY SUB-SAMPLES

National Sample Survey : 9th Round : May–November 1955, All-India (Rural)¹

per- cen- tile	number of sample households		total consumer expenditure in Rs. per person per 30 days					cumulative percentage of							
	limiting values		average expenditure					total population					total consumer expenditure		
	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
5	39	39	78	4.91	4.79	4.90	4.01	3.82	3.90	6.32	5.58	5.83	1.69	1.39	1.50
10	38	35	71	5.99	5.85	5.92	5.43	5.39	5.39	12.39	10.86	11.56	3.88	3.26	3.54
15	35	37	73	6.74	6.88	6.80	6.39	6.38	6.38	17.17	15.94	16.50	5.91	5.37	5.62
20	36	43	78	7.54	7.90	7.76	7.25	7.35	7.28	22.16	21.47	21.72	8.32	8.03	8.13
25	37	37	76	8.52	8.59	8.56	8.05	8.31	8.20	26.82	27.05	26.98	10.81	11.06	10.97
30	33	42	75	9.36	9.57	9.53	8.96	9.19	9.06	32.78	32.49	32.61	13.36	14.33	14.34
35	38	41	79	10.17	10.39	10.31	9.80	9.95	9.89	37.43	38.06	37.78	17.39	17.95	17.71
40	38	34	72	11.03	11.09	11.07	10.66	10.74	10.69	42.93	43.75	43.13	21.29	21.95	21.48
45	34	36	73	11.80	12.06	11.92	11.42	11.68	11.49	47.56	48.50	47.74	24.80	25.58	24.97
50	41	43	80	12.83	13.02	12.88	12.35	12.59	12.43	53.11	53.41	53.12	29.36	29.62	29.38
55	40	38	78	14.14	14.05	14.14	13.46	13.45	13.44	58.19	58.65	58.37	33.90	34.23	34.03
60	37	43	80	15.13	15.55	15.24	14.57	14.73	14.64	63.77	63.75	63.83	39.30	39.14	39.30
65	42	34	77	16.61	16.97	16.77	15.81	16.12	16.00	68.51	67.87	68.32	44.29	43.48	44.04
70	44	38	82	18.49	18.59	18.56	17.61	17.88	17.78	74.26	72.37	73.38	51.02	48.75	49.97
75	40	39	78	19.85	20.08	20.02	19.14	19.37	19.26	78.60	77.55	77.94	56.55	55.30	55.76
80	37	40	76	22.59	22.01	22.11	21.22	21.27	21.19	82.95	82.65	82.73	62.69	62.40	62.45
85	39	31	72	24.95	23.60	24.35	23.77	22.97	23.36	87.83	86.19	87.07	70.40	67.71	69.12
90	40	40	79	29.57	27.53	28.59	27.40	25.42	26.23	92.60	91.08	91.47	79.09	75.85	76.74
95	40	40	81	38.05	38.38	38.13	32.85	32.06	32.17	96.92	96.07	96.46	88.54	86.29	87.31
100	40	38	78	194.41	128.86	194.41	55.96	53.30	54.31	100	100	100	100	100	100
all	768	768	1536				15.03	15.24	15.15						

Number of sample villages including 4 uninhabited villages in each sub-sample : 772 (s.s.1), 772 (s.s.2), 1544 (combined).
 Number of sample households : 768 (s.s.1), 768 (s.s.2), 1536 (combined).
¹ Excludes Jammu & Kashmir.

NEXT STEPS IN PLANNING

TABLE (13) : EXPENDITURE IN RUPEES PER PERSON PER 30 DAYS BY ITEMS OF CONSUMPTION AND BY SUB-SAMPLES
*National Sample Survey : 9th Round : May-November 1955 : All-India (Rural)*¹

popu- la- cen- tion ² in lakh (10 ⁵)	expenditure in rupees per person per 30 days																							
	foodgrains			food total			sugar			clothing			education			medicine			medical services					
	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)		
5	197	2.34	2.49	2.39	3.12	3.18	3.12	0.04	0.04	0.04	0.10	0.05	0.08	0.00	0.02	0.01	0.01	0.00	0.01	0.00	—	—	0.00	
10	194	3.01	3.14	3.09	4.41	4.22	4.32	0.06	0.06	0.06	0.09	0.23	0.16	—	0.01	0.01	0.06	0.04	0.05	—	—	—	—	
15	167	3.43	3.54	3.48	5.05	4.94	5.02	0.10	0.11	0.11	0.09	0.42	0.22	0.02	0.01	0.02	0.03	0.04	0.04	0.04	0.02	0.02	0.02	0.02
20	177	3.42	3.88	3.60	5.15	5.63	5.32	0.13	0.11	0.12	0.33	0.59	0.52	0.00	0.01	0.00	0.07	0.01	0.04	0.05	—	—	—	0.02
25	178	4.46	4.37	4.50	6.43	6.48	6.47	0.09	0.21	0.14	0.32	0.34	0.31	0.00	0.05	0.03	0.03	0.01	0.02	—	—	—	—	0.04
0	191	4.28	4.50	4.39	6.73	6.86	6.83	0.25	0.16	0.23	0.27	0.61	0.44	0.02	0.01	0.02	0.08	0.03	0.06	0.01	0.06	—	—	0.04
35	175	5.11	5.06	5.05	7.43	7.81	7.56	0.28	0.26	0.24	0.72	0.72	0.74	0.03	0.00	0.01	0.03	0.02	0.02	0.04	—	—	—	0.02
40	181	5.44	5.43	5.34	8.16	8.11	8.11	0.26	0.25	0.28	0.61	0.66	0.67	0.08	0.02	0.05	0.05	0.01	0.04	—	—	—	—	0.01
45	156	5.18	6.02	5.61	8.59	9.00	8.79	0.35	0.28	0.30	0.66	0.63	0.62	0.04	0.02	0.04	0.15	0.23	0.15	0.02	—	—	—	0.02
50	182	6.25	5.70	6.00	9.40	9.65	9.52	0.16	0.34	0.28	0.69	0.57	0.62	0.08	0.04	0.06	0.11	0.08	0.12	—	—	—	—	0.01
55	177	5.45	6.09	5.80	9.38	9.97	9.70	0.38	0.35	0.34	1.24	0.79	0.99	0.22	0.14	0.17	0.11	0.09	0.10	0.04	0.02	0.03	—	0.03
60	185	7.05	5.99	6.56	11.13	10.22	10.88	0.33	0.44	0.43	1.00	0.97	1.02	0.05	0.21	0.11	0.15	0.33	0.17	0.08	0.00	0.04	—	0.01
65	152	6.29	6.09	6.30	11.01	11.28	11.12	0.64	0.66	0.60	1.85	1.38	1.62	0.04	0.01	0.05	0.21	0.18	0.23	0.03	0.02	0.06	—	0.08
70	171	5.68	7.03	6.18	12.07	12.22	11.98	0.51	0.60	0.53	1.74	1.67	1.69	0.13	0.15	0.13	0.18	0.19	0.24	0.02	0.02	0.06	—	0.06
75	154	7.15	7.23	7.19	13.32	13.44	13.36	0.49	0.66	0.58	2.19	1.88	2.04	0.12	0.07	0.11	0.18	0.32	0.24	0.02	0.05	0.04	—	0.04
80	162	7.41	7.61	7.50	14.22	14.40	14.30	0.87	0.49	0.69	2.12	2.50	2.27	0.21	0.09	0.14	0.18	0.52	0.39	0.08	0.07	0.07	—	0.07
85	147	7.82	8.49	8.05	15.44	16.70	16.25	0.73	0.71	0.76	2.11	0.92	1.50	0.23	0.20	0.22	0.81	0.46	0.49	0.26	0.18	0.14	—	0.14
90	149	8.36	8.09	8.21	16.28	16.52	16.37	0.98	0.98	0.85	3.43	2.53	2.89	0.15	0.29	0.30	0.82	0.44	0.82	0.19	0.19	0.29	—	0.29
95	169	9.66	7.21	8.50	20.13	17.80	18.30	1.14	1.27	1.08	3.86	4.27	4.24	0.71	0.51	0.46	0.43	1.32	0.84	—	—	—	—	0.39
100	120	10.51	8.97	9.50	22.88	22.65	23.02	0.98	1.24	1.19	5.87	4.90	5.28	0.58	0.29	0.48	8.37	1.12	4.21	3.43	0.42	1.69	—	1.69
all	3384	5.70	5.71	5.70	9.99	10.16	10.08	0.39	0.44	0.41	1.31	1.27	1.29	0.12	0.10	0.11	0.44	0.25	0.34	0.15	0.07	0.11	—	0.11

Number of sample villages including 4 uninhabited villages in each sub-sample : 772 (s.s.1), 772 (s.s.2), 1544 (combined).

Number of sample households : 768 (s.s.1), 768 (s.s.2), 1536 (combined).

¹ Excludes Jammu & Kashmir.

² Population estimates used elsewhere are based on projection.

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TABLE (14): CUMULATIVE PERCENTAGES OF EXPENDITURE PER 30 DAYS BY ITEMS OF CONSUMPTION AND BY SUB-SAMPLES

National Sample Survey : 9th Round : May-November 1955 : All-India (Rural)¹

per- cen- tile	cumulative percentage of expenditure on																					
	foodgrains			food total			sugar			clothing			education			medicine			medical services			
	s.s.1 s.s.2 comb.	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
5	2.59	2.43	2.44	1.98	1.75	1.80	0.61	0.51	0.52	0.48	0.20	0.34	0.20	0.90	0.52	0.15	0.06	0.12	0.07	—	—	0.05
10	5.80	5.33	5.54	4.65	3.94	4.26	1.56	1.25	1.34	0.88	1.16	1.04	0.20	1.48	0.79	0.99	0.84	0.94	0.07	—	—	0.05
15	8.68	8.48	8.55	7.07	6.41	6.72	2.76	2.51	2.62	1.22	2.83	1.88	0.98	1.99	1.45	1.35	1.60	1.45	0.66	1.45	0.92	2.08
20	11.67	12.24	11.85	9.64	9.47	9.48	4.39	3.86	4.10	2.47	5.42	4.01	1.14	2.25	1.54	2.12	1.76	2.01	2.38	1.45	2.08	3.94
25	15.31	16.51	16.00	12.64	13.03	12.85	5.42	6.57	5.90	3.63	6.93	5.27	1.17	4.87	2.88	2.45	1.91	2.26	2.38	1.45	2.08	3.94
30	19.79	20.80	20.34	16.65	16.70	16.67	9.19	8.53	9.06	4.88	9.56	7.18	2.41	5.15	3.78	3.54	2.63	3.22	2.74	6.42	3.94	4.74
35	23.96	25.73	24.92	20.12	20.98	20.55	12.46	11.91	12.10	7.43	12.73	10.16	3.47	5.21	4.28	3.83	3.04	3.55	3.91	6.42	4.73	4.74
40	29.22	31.15	29.92	24.60	25.52	24.85	16.14	15.22	15.66	9.98	15.71	12.94	7.14	6.21	6.71	4.46	3.26	4.09	3.91	6.78	4.74	4.74
45	33.42	36.16	34.45	28.58	29.74	28.87	20.25	18.28	19.00	12.31	18.07	15.15	8.87	7.18	8.24	6.05	7.60	6.15	6.09	8.43	6.86	8.81
50	39.51	41.07	40.12	33.80	34.39	33.96	22.58	22.15	22.60	15.24	20.28	17.75	12.33	9.29	11.12	7.39	9.12	8.04	8.89	8.60	8.81	8.81
55	44.36	46.66	45.45	38.57	39.54	39.01	27.51	26.34	26.86	20.04	23.55	21.79	21.76	16.60	19.39	8.70	10.99	9.57	6.09	8.43	6.86	8.81
60	51.26	52.01	51.73	44.78	44.66	44.91	32.24	31.52	32.58	24.29	27.48	26.12	23.96	27.43	24.70	10.62	17.66	12.33	8.89	8.60	8.81	8.81
65	56.50	56.40	56.69	50.02	49.24	49.86	39.98	37.80	39.13	31.02	31.97	31.79	25.57	27.71	26.60	13.35	20.65	15.35	11.44	18.13	11.87	14.48
70	62.22	61.96	62.17	56.95	54.66	55.88	47.42	44.03	45.59	38.66	37.92	38.44	31.93	34.37	32.49	15.66	24.14	18.94	12.03	19.51	14.48	14.48
75	67.67	68.51	67.92	62.75	61.51	61.92	52.81	51.87	51.96	45.93	45.58	45.65	36.46	37.94	37.12	17.49	30.63	22.07	12.63	23.10	16.05	16.05
80	73.32	75.32	74.22	68.93	68.73	68.73	62.44	57.59	59.95	52.99	55.67	54.10	44.18	42.45	43.21	19.30	41.28	27.50	14.98	27.90	19.19	19.19
85	80.01	80.58	80.33	76.47	74.55	75.71	71.51	63.33	67.86	60.87	58.25	59.15	53.56	49.65	51.72	28.26	47.83	33.70	23.55	36.93	24.71	24.71
90	87.00	87.52	86.66	84.24	82.50	82.86	79.77	74.33	76.85	73.39	68.02	69.03	59.38	63.59	63.90	37.17	56.32	44.24	29.72	49.81	36.23	36.23
95	94.32	93.82	94.09	92.95	91.23	91.91	92.32	88.84	89.81	86.15	84.79	85.45	85.04	88.75	84.73	41.38	82.47	56.49	29.72	76.93	45.66	45.66
100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Number of sample villages including 4 uninhabited villages in each sub-sample : 772 (s.s.1), 772 (s.s.2), 1544 (combined).

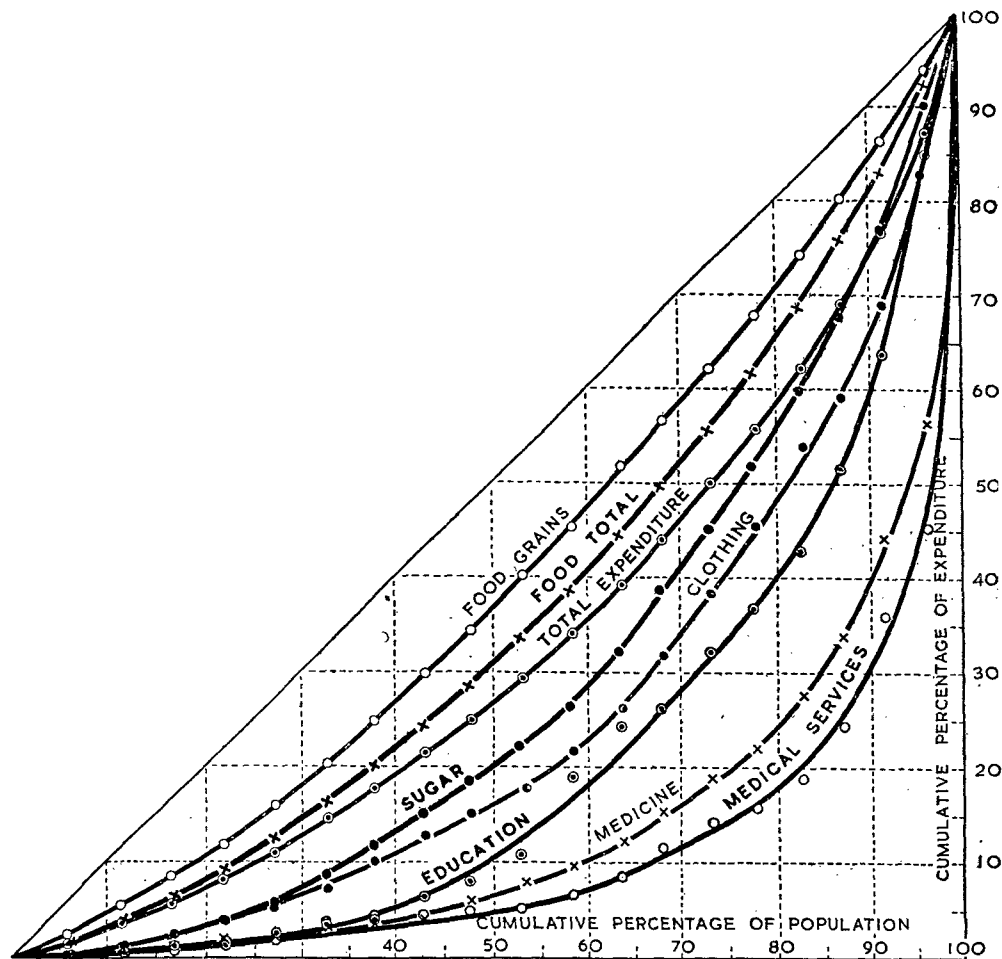
Number of sample households : 768 (s.s.1), 768 (s.s.2), 1536 (combined).

¹Excludes Jammu & Kashmir.

CONCENTRATION CURVES FOR CONSUMER EXPENDITURE

Cumulative percentage of total expenditure per 30 days on selected items based on the National Sample Survey: 9th Round:
May–November 1955: All-India Rural.

Number of sample villages 1544 including 8 uninhabited villages.
Number of sample households 1536.



limit of per capita expenditure per 30 days	percentage of household	food grains	food total	total expenditure	sugar	clothing	education	medicine	medical services
(0.1)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
share in percentage of total expenditure									
Rs. 6	bottom 10 p.e.	5.5	4.3	3.5	1.3	1.0	0.8	0.9	0.05
Rs. 13	lower 50 p.e.	40.1	34.0	29.4	22.6	17.8	11.1	8.0	5.6
(Rs. 194)	top 10 p.e.	13.3	17.1	23.2	23.2	31.0	36.1	55.8	63.8

INDUSTRIALIZATION OF UNDERDEVELOPED COUNTRIES— A MEANS TO PEACE

Paper presented at the Third Pugwash Conference at Kitzbühel—Vienna in September 1958 and then published in the *Bulletin of the Atomic Scientists*, Vol. 15, No. 1 (1959), pp. 12-17 and 46 and in *Sankhyā*, Vol. 22, Parts 1 & 2 (1960), pp. 173-182.

1. The world population was estimated at about 2,600 or 2,700 million in 1956. About 400 million in the highly industrialized countries like the USA, Canada, Western Europe, and Australia—that is, roughly the NATO powers together with some of the advanced neutral countries of Europe like Sweden, Switzerland, Finland, and Austria—have a high level of living with, of course, a great deal of variation among themselves. These 400 million have a total national income of about \$ 550 (U.S.) billion out of, possibly, a world income of a little over \$ 1,000 billion. The USSR and other socialized countries of Europe with about 300 million people have adopted a planned economy with rapid industrialization. China with 600 million has also started a policy of vigorous economic development. These 900 million in the socialized countries have a total national income, at official rates of exchange, of somewhat less than \$ 300 billion with an average income of about \$ 330 per person per year¹. The level of living is still low but is rising rapidly and steadily; and there are wide differences from one country to another.

2. The remaining half of the world's population, or over 1,300 million, are in countries which are generally underdeveloped with a few exceptions, like Japan or Argentina, which have more advanced economies. Their total national income would be about \$ 190 billion, which would give something less than \$ 150 per person per year. Nearly 1,550 million in Africa and Asia (excluding Japan and Turkey and a few small places, but including China) have to live on something like \$ 110 billion or on less than \$ 75 per person per year².

3. The underdeveloped countries often have large resources in the form of minerals and land, which is being or can be used to produce agricultural crops of various kinds, and which offer great possibilities of economic development. The

¹ Figures given in this paper are based on various adjustments and should be used as very rough approximations. Population estimates are subject to many adjustments. National income figures are difficult to compare; and the use of official rates of exchange for conversion into U.S. dollars can be often misleading. The results given here should be, therefore, interpreted as broadly indicative of the general position and should not be used for refined comparisons.

² The distribution of national income among countries is extremely uneven. Roughly half of the population (or over 1,300 million) have \$85 billion, that is, just over 8 per cent or one-twelfth of the national income of the whole world. About two-thirds of the population have \$160 billion, or one-sixth of the total income. On the other side, the top 5 per cent (about 130 million) have \$325 billion, or almost one-third of the world income; and the top 10 per cent have nearly \$450 milliards, or about 43 per cent of the total income.

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highly industrialized countries in the West already have (and naturally desire to continue to have or to increase) opportunities of exploiting these resources to their own advantage. The "East" (as the socialized countries are called) have large resources of their own and are less dependent on the supply of minerals and raw materials from the underdeveloped countries. However, for both strategic and economic reasons, the Eastern powers would continually try to reduce the influence of the Western powers on the underdeveloped countries, which, so long as they continue to remain underdeveloped, must constitute areas of conflicting interests between East and West.

II

4. The scientific and industrial revolution of the last two centuries was brought about almost entirely by the Western countries, and led to a position of indisputable and undisputed military supremacy of the Western powers. The earlier form of exploitation of the resources of the underdeveloped countries was military and political occupation, that is, by the building up of large colonial empires. In some countries, for example, in China, there was no direct political occupation, but the foreign powers established advantageous economic controls. This indirect form of economic influence, backed invariably by military sanctions, became increasingly more important during the present century so that many underdeveloped countries are politically independent but are economically dominated by an industrialized country.

5. In this connection I may also refer briefly to the impact of the characteristically Western doctrine of laissez-faire and division of labour at the international level. To put it crudely, there has been a tendency for at least one school of Western economists to assert that it is proper and wise for the underdeveloped countries to specialize in the production of agricultural crops; and to continue to export agricultural products and minerals to be processed by industrially advanced countries which are in a position to utilize these resources with greater efficiency. Experience, however, has shown that it is not possible to improve the level of living beyond a certain limit on the basis of agricultural production alone. The USA supplies a very instructive example. Agriculture is very highly developed, but has to be supported by perpetual subsidies. This being the position in the USA, it would seem practically impossible for any underdeveloped country to attain a high level of living through the export of agricultural products alone. In recent years there has been some recognition of the need of economic development through industrialization of the underdeveloped countries. It has been generally assumed, however, that such economic development would broadly follow the pattern of industrialization in the West, essentially a slow process.

6. Since the Second World War attempts have also been made through the United Nations Technical Assistance Program, USA "Point Four," Colombo Plan, etc., to help the underdeveloped countries in economic affairs. The experience of

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the last twelve years, however, has shown that there has been very little general improvement in the level of living in the underdeveloped countries. It is also being gradually conceded that disparities in the level of living, both *relative* and *absolute*, between the highly industrialized and the pre-industrial countries have been steadily increasing.

III

7. The level of living in underdeveloped countries is extremely low, and the distribution of income is extremely concentrated. For example, in India (which is relatively an advanced country in the underdeveloped group), half the population live on less than 10 cents (USA) a day, and only 10 per cent of the population have more than 20 cents (USA) per day.

8. Most of the people depend on agriculture or on indirect income derived from the export of minerals. There are very few modern manufacturing industries. Unemployment, or rather underemployment, is widespread and universal, for lack of capital and modern tools of production. Facilities for education and medical care are extremely meagre. Naturally, there is also a great scarcity of scientific and technical personnel.

9. A very small group of families or persons have the largest share of wealth, income, and political and economic influence. In fact, the greater the lack of economic development the fewer would be the number of persons who have the effective power of making political and economic decisions. This makes it possible for a foreign power to exert pressure on a small group of powerful persons to give concessions in favour of the foreign power. Such arrangements, because they depend on the will of only a small group of persons, are necessarily subject to violent changes from time to time. Relations between foreign powers and underdeveloped countries are, therefore, basically unstable.

IV

10. The world situation has changed in a most significant way with the emergence of the USSR and other socialized economies. It is now accepted that economic planning in the USSR (and more recently in other socialized countries) has led to a far more rapid rate of industrialization than had been achieved in West Europe and North America in the past. The Western powers do not any longer have monopoly of ability to supply capital goods and technical know-how. There is also a growing belief among underdeveloped countries that the only way of achieving a rapid rate of industrialization would be through economic planning.

11. Very recently, the monopolistic superiority of the West in atomic and nuclear weapons and ballistic missiles has also gone. In this situation, it is inevitable that the conflict of interests between East and West in regard to spheres of influence in the underdeveloped countries would become more and more sharp. This, in brief, is the present position. Recent events in the Middle East, for example, corroborate the above analysis.

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V

12. With the progress of industrialization of a country it would automatically follow that its own natural resources would be increasingly exploited by itself. With increasing industrialization it is also inescapable that commercial and economic relations with other countries would increasingly tend to become as between equals.

13. It is agreed that the very process of economic development would generally broaden the base of social and political decisions. That is, with the progress of economic development a larger and larger number of persons would become involved in making economic and political decisions. External economic and political relations would, therefore, tend to become more stable.

14. A quick transformation of the underdeveloped countries into industrialized economies would, therefore, reduce the sphere of conflicting interests; and hence decrease the tension between East and West.

VI

15. The General Assembly of the United Nations passed a Resolution on November 20, 1950 "recognizing that a more rapid economic development of underdeveloped countries is essential for raising the level of productive employment and the living standards of their populations, for the growth of the world economy as a whole and for the maintenance of international peace and security"; and also that there was need of "an increased flow of international public funds" for this purpose. A Committee of Experts was appointed by United Nations in 1951 "to prepare a report...on unemployment and underemployment in underdeveloped countries, and the national, and international measures to reduce such unemployment and underemployment."

16. This Committee made a valuable review of the position and reached the conclusion that economic development was the only radical solution of underemployment; and that external assistance, in the form of capital and technical knowledge, was essential for this purpose. The Committee also made a very tentative estimate, on a per capita basis, of capital requirements and came to the conclusion that for about 1,500 million persons in underdeveloped countries (including China) the external capital required would be about \$ 14 billion U.S. dollars (or \$9.3 dollars per person) per year and expected that this would lead to a rise of income of 2 per cent per capita allowing for growth of population.

17. In recent years efforts have also been made to give economic and technical aid to the underdeveloped countries through the United Nations Technical Assistance Board, the World Bank, International Monetary Fund, USA "Point Four" (under various names), the Colombo Plan, etc. It is, however, generally agreed that such efforts have not been adequate, and very little improvement has occurred in

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the level of living of underdeveloped countries. Mention may be made, for example, of Gunnar Myrdal's recent essays and articles in which he has stressed the fact that rich nations are getting richer more and more rapidly, while poor nations are sometimes even getting poorer.

18. It is also being increasingly appreciated that special efforts have to be made in the initial stage of industrialization. P. M. S. Blackett in his presidential address to the British Association for the Advancement of Science in 1957 stressed the importance of giving external assistance, in the form of capital and technical knowledge, during this initial stage which he called "assisted take-off." He also made some rough estimates of requirements, again on a per capita basis, and thought that about £ 1 (one pound sterling) per head per year or about £ 1,000 million or \$ 2.8 billion U.S. dollars per year of external aid would be required for 1,000 million inhabitants for 8 or 10 years for effective industrialization. This estimate of requirement of external aid at the rate of \$2.8 U.S. dollars per head per year is less than one-third of the earlier estimate of \$9.3 U.S. dollars per head per year made in 1951 by the U.N. Committee of Experts. This wide divergence shows that these estimates are very tentative; and that much more detailed studies would be required to supply more realistic figures¹.

VII

19. Unfortunately, no economic theory of development is at present available to guide our thinking in this matter. It, therefore, seems urgently necessary to start serious and systematic studies to build up a general conceptual framework to handle questions of economic development, and more particularly, to formulate a program of action (including the supply of external capital and technical aid) to assist the underdeveloped countries.

20. It is not possible to subsidize the underdeveloped countries indefinitely. The aim must be to make each country sufficiently developed to reach some kind of a steady state or a balanced economy in the course of say 10 years (or 15 years at the most) so that the inflow of external aid would gradually decrease and, preferably, cease after 5 or 10 years. That is, it is necessary to make some realistic estimate of the total external aid required for this purpose so that the industrially backward countries can get some idea of the magnitude of the task.

¹It is worth noting that the expenditure on defence is of the order of \$100 billion (of which the share of NATO powers is about \$60 billion and of the USSR about \$25 billion) per year at present; if expenditure on associated research is included the total would be higher. It would be seen, therefore, that the requirement of about \$3 billion (as estimated by Blackett) or about \$10 billion dollars per year for 1,000 million (on the basis of the rate used by the U.N. Committee) would amount to no more than 3 per cent or 10 per cent of the defence budget of the world. A saving of 3 per cent (or 10 per cent, as the case may be) in the cost of defence, if used in a wise manner, would be more than sufficient for the economic development of 1,000 million people in the most backward countries of the world.

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VIII

21. Estimates prepared by the U.N. Committee of Experts in 1951 and by P. M. S. Blackett in 1957 were both on a per capita basis. Some broad general considerations would, however, show that capital requirements per head would differ from one country to another. The bigger a country (as measured by its geographical area, unexploited natural resources, and population) the greater would be the possibility of achieving its industrial development out of its own resources. In a big country it is possible and desirable to push back the manufacturing process to the utmost limit in order to expand continually its capacity to make investments increasingly out of its own domestic resources.

22. We may consider the case of India as an example. In India it would be economical to establish a heavy machine building industry which would manufacture heavy machines and equipment required for the installation of factories for the production of steel, fertilizers, aluminium, etc. or for the production of heavy electrical equipment like big generators, transformers, switchgear, etc. It would be also economical gradually to establish large-scale industries for the manufacture of synthetic raw materials of many kinds (including the production of petrol from coal, in case an adequate supply of oil is not discovered). Once such basic industries are established it would be possible to expand the production of electricity, coal, steel, aluminium, fertilizers, mining and transport equipment, etc.; and then, with the help of such heavy machinery, producer goods, and energy to manufacture machinery for the increasing production of consumer goods. It follows that a big country would require a comparatively small amount of outside capital.

23. It is of interest to note that in the case of China, with a population of roughly 600 million, the Soviet loan of roughly \$1.25 billion U.S. dollars, given for economic development during the First Five Year Plan (from 1953 to 1957), represented only about two U.S. dollars per head spread over five years, or forty U.S. cents per head per year. This seems to have been quite enough to make China "take off" on its way to rapid industrialization, but is clearly a lower limit of external capital requirement.

24. For a big country, external economic transactions (of which foreign trade is a most important form) would be comparatively small in relation to the magnitude of its internal economy. In the USA, for example, external trade is only about 5 or 6 per cent and in the USSR only about 2.5 per cent of the national income. It should not be very difficult, therefore, for a big country to attain a fairly stable balance of payment.

25. It is clear that planning must have a fairly long perspective of time. Factories can be established for the production of consumer goods in 2 or 3 years; large-scale production of steel and other metals, electricity, fertilizers etc., would take at least 7 to 10 years; heavy machinery building and heavy electricals would take from 10 to 15 years. The most slowly maturing sector would be that of scientific and technical manpower which would require planning for 25 to 30 years.

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26. In the case of a small country (as measured by its area, natural resources, or population) the problem is more difficult. There is a limit beyond which manufacturing processes cannot be pushed back, because there is a minimum factory size below which production is uneconomic, in the case of many important commodities like heavy machines, steel etc. It may not be economical for a small country to establish a heavy machine manufacturing industry, because it would not be possible for the country itself to utilize the output every year. There is also a limit below which it may be difficult to undertake in small countries the economic production of steel and other metals on a large scale. A small country, therefore, would have to depend, to a larger measure than a big country, on the import of capital goods as well as of many producer or consumer goods. The industrialization of a small country (unless it has large natural resources like oil or other minerals which it can export on profitable terms) would presumably require comparatively more external aid.

27. Also, the smaller a country, the greater is likely to be the magnitude of its foreign trade in relation to its whole economy. In the case of a small country it is, therefore, of great importance to consider the expansion of foreign trade in desirable directions. In a paper prepared for the Bandung Conference of Afro-Asian countries in April 1955, I had given some preliminary consideration to this problem (see Appendix).

28. The pattern of development is likely to be more or less similar for big countries. But it is not possible to reduce the same pattern mechanically to scale to suit the needs of small countries. The developmental plan for a small country must have specific relation to its own natural resources and also to possibilities of expanding its foreign trade in cooperation with other countries of the same region.

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29. It is suggested that attempts should be made to set up, as soon as possible, small groups of experts to study the problem of industrialization, at a concrete level, for the underdeveloped countries. The aim would be to formulate the broad strategy of planning for economic development over a period of 15 or 20 or 25 years. This would imply preparing a rough time program for the development of agriculture and the establishment of modern industries with appropriate priorities. Special attention will have to be given to health, education, and the supply of scientific and technical manpower.

30. Consideration will have to be given to the expansion of foreign trade, not merely as an extrapolation of current trends, but with a changing pattern over time which would be in keeping with and would also promote rapid economic development. Naturally, economic relations with other countries, especially the underdeveloped countries in the same region, will have to be considered; and economic

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measures will have to be devised which would promote both the expansion of trade and the economic development of the countries concerned in the regional group. Gunnar Myrdal, for example, in a recent lecture in India (1958) has pointed out the advantage of group of underdeveloped countries in a particular region forming, by mutual agreement, a "common market" protected from outside with, however, a free flow of trade and specialization of manufactures within the protected area.

31. Studies will also have to be made of not only the amount but also of the pattern of external aid, in the form of capital and technical knowledge, which would have to be supplied by the more highly industrialized countries to start the process of industrialization and to carry it through until some kind of a balanced economy has been established when no further special subsidies or long-term developmental loans would be required. Formulation of even rough estimates would be of great value in supplying a starting point for further thinking.

32. It is believed that enough information is available for at least a good number of countries to enable such studies to be initiated immediately. It would be necessary, of course, for experts from the advanced countries to supply the leadership. At the same time, it would be essential to associate with these studies, as early as possible, technical personnel from the underdeveloped countries. In fact, one important aim of such studies would be to provide opportunities to personnel from underdeveloped countries to acquire knowledge and experience of planning for economic development.

33. The task proposed in this section would call for patient study and the collection of much essential information. It may be necessary to carry out special surveys for this purpose. The formulation of a program of surveys with indication of priorities would indeed be a most useful piece of work as a first step for development. The approach will have to be of a "spiral" type. Attempts would be made to make rough estimates on the basis of available data. This very process would indicate gaps in information. As these gaps are filled up, the first estimates would be revised; and the process of revision would disclose the need of further information; and so on. It is, therefore, necessary to begin serious studies as early as possible.

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34. It is true that mere formulation of even a sound technical plan for development would not be of any use until social and institutional conditions within a country become favourable to industrialization. But the very formulation of a general conceptual framework for economic development would serve as a powerful stimulus to set social forces in motion for industrialization.

35. A number of countries of Afro-Asia, such as India, Pakistan, Burma, Ceylon, Indonesia, Egypt and Syria (United Arab Republic), etc., have already started planning for economic development and would welcome and greatly profit by the

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studies of the type discussed in this note. In fact, these countries would probably agree to help and gladly participate in such studies. There are many other countries which would be seriously interested.

36. There are also countries in which there is as yet no definite movement for economic development. But, in such countries also, individuals here and there may have already started thinking or may soon begin to think on this subject. The proposed studies would give them encouragement and guidance and thus help in the creation of favourable conditions for industrialization.

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37. With the progress of industrialization, disparities, both absolute and relative, between the highly industrialized countries and those which are at present underdeveloped, would decrease. Also, some of the advantages which the highly industrialized colonial powers (in either the political or the economic sense) now enjoy in having preferential access to sources of cheap raw materials or of markets would, no doubt, decrease; but this does not mean that there would be any worsening of their absolute level of living. On the contrary, with fuller and better exploitation of the resources of all the countries of the world, it should be possible to reconcile conflicting interests in such a way as to safeguard the level of living of all the countries of the world.

38. The Western Powers have so far refrained from promoting industrialization of the underdeveloped countries in any significant way, possibly because they do not wish any competition to grow about securing minerals and raw materials at concession rates or to lose markets for manufactured products. It is true that Western Powers, especially the USA, have been giving aid to the value of billions of dollars every year to some of the underdeveloped countries, but such aid has been extremely selective and mostly for military purposes. Although there is much talk of economic aid, the actual amount devoted to industrial development is extremely small and forms an insignificant proportion of the total aid. For example, the total budget for economic and technical assistance through United Nations and the Specialized Agencies like the International Labour Organization (ILO), Food and Agriculture Organization (FAO), World Health Organization (WHO), etc., amounts to only about \$34 million dollars compared to something like one hundred times that amount spent on bilateral aid mostly for military purposes. The primary object of Western aid being of a political or military nature, stringent conditions are usually attached.

39. The USSR, on the other hand, may be eager to bring about the industrial revolution in the underdeveloped countries as quickly as possible, because this would make them independent of the Western Powers in economic affairs. This would also create a working class which, according to the Marxist view, may promote social revolution from within. As the USSR and other Eastern Powers do not have any

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direct military or political objects in view, they can and actually do give economic aid without strings. Although it is only about two or three years since the USSR has started giving economic aid in any large measure, the impact on the underdeveloped countries has been already very great.

40. The basic difference in the outlook of the West and the East has important consequences. Western aid, primarily military in nature, is usually welcomed by being given to small groups of persons who happen to be in power, often against popular will; and thus serves to preserve reactionary social and political conditions and hamper industrialization in countries receiving such aid. The aid from the USSR and China, on the other hand, is being increasingly sought by and given to groups who are more eager for economic progress and, therefore, tend to have greater popular support behind them.

41. However, once it is realized that the industrialization of the underdeveloped countries is inescapable, and also that any country which actively helps in the process of transformation would steadily gain in political and economic influence, it is inevitable that *both* blocs would try to assist in the process. The advantage will lie with that bloc which approaches this task with greater honesty, sincerity, and efficiency.

42. Nuclear weapons and guided missiles have made the cold war obsolete. Stopping of nuclear tests and gradual disarmament would be most desirable and welcome, but would not by themselves guarantee peace. In the future, peace can be preserved only by active cooperation between the two blocs (and this may be possible, in principle, even without complete or drastic disarmament). Such cooperation would be difficult if rivalries continue to persist in the underdeveloped countries. A quick transformation of the underdeveloped countries into modern industrialized economies would eliminate areas of conflicting interests.

43. In any case, the proposed studies would give guidance to industrialized countries in the efficient utilization of their economic and technical aid to underdeveloped countries. With the progress of industrialization, rolling adjustments would tend to be made in areas of conflicting interests. Gradually, it may be hoped, both blocs would begin to appreciate the advantages of cooperative efforts for the industrialization of underdeveloped countries as an indispensable condition for world stability and peace.

APPENDIX

ECONOMIC DEVELOPMENT OF AFRO-ASIAN COUNTRIES

(Prepared for the Bandung Conference, April 1955)

1. The enduring basis of Afro-Asian understanding must be ultimately established on mutual cooperation to bring about a steady increase in the level of living through economic, social, and cultural development in the Asian and African countries. Anti-colonial and peace movements must be looked upon essentially as attempts to secure favourable conditions for such developments.

2. The aim must be to promote the exploitation of all available natural and human resources for the national development of each individual country. The Afro-Asian region or even Southern Asia as a whole has such large resources that there is not the slightest difficulty, at the technological and economic level, to attain a rapid rate of growth of all the national economies. Much capital goods and technical aid from the more advanced countries would be required in the beginning. Fortunately, with the improvement of international relations, such aid is likely to become increasingly available from different parts of the world. It would be of advantage if such aid could be channelled through the United Nations or similar international agencies.

3. It is, however, not necessary to wait for U.N. to take action. It is possible and, indeed, desirable to initiate action at the level of the countries concerned. For example, a Standing Technical Committee (with a small permanent secretariat) may be appointed to study possibilities of fostering economic, social, and cultural cooperation among the Bandung countries. The work of the proposed Committee would be mainly concerned with the study of problems of long-range development. This would not duplicate but would be complementary to activities which are directed to solving more urgent problems in the Economic Commission for Asia and the Far East (ECAFE) and the Colombo Plan.

4. The proposed committee might, for example, examine possibilities of long-term industrial developments in the countries concerned, and possibilities of expansion of international trade not on the basis primarily of the current pattern of imports and exports but from the point of view of promoting a changing pattern of international trade deliberately directed to the national development of all the countries concerned. India at present has a good export market for cloth and some other manufactured products. In a static approach, the current pattern of trade would be sought to be maintained which would retard industrial development in the importing countries (as had happened in India in relation to the United Kingdom). In a dynamic approach, India would actively promote a rapid industrialization of the more backward countries, fully recognizing that the pattern of Indian exports must change thereby but also appreciating the possibilities of a steady expansion of the foreign trade of all the countries concerned at increasing levels of manufactures.

5. The dynamic approach necessarily calls for a wide horizon of time. Trade agreements and understandings have to be visualized as extending over a period of 5 or 10 years or even more. Prices, terms and conditions must have much greater flexibility than short period trade contracts. The aim would be to maintain an

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agreed level or expand in a suitable way, over a number of years, the total volume of imports and exports (measured, say, at constant real prices); and, at the same time, to try to change the pattern of trade in such a way as to promote increasing industrialization of the countries concerned. For example, if India can be assured of a steady supply of, say, rice from Burma over a number of years (preferably at constant real price), then India may undertake to supply not only manufactured consumer goods but also to help in the industrial development of Burma through the supply of minerals, raw materials, capital goods, and technical assistance. In this approach, India must give up the idea of earning large profits through the continuing export of particular types of products; and adopt the policy of mutual help and benefit to attain increasing levels of industrial development of both Burma and India.

6. A dynamic policy of mutual development over a number of years can be promoted most effectively at government level with, however, the fullest participation of the private sector which would be entirely in keeping with the economic policy of India.

7. As already mentioned, a first step may be to set up a small working group or technical committee to initiate economic, social, and cultural studies to supply a scientific basis for preparing long-term developmental schemes on a regional scale. A large membership is not essential; and work can be started with a small group of countries or even on a bilateral basis by agreement between two countries.

8. To make a beginning, India may offer certain physical facilities like accommodations, library, and a small professional and office staff to serve as the nucleus of a secretariat. It would be desirable to have a director from outside India; and the professional staff must come chiefly from the participating countries.

STUDY OF THE PROBLEMS OF INDUSTRIALIZATION IN THE UNDERDEVELOPED COUNTRIES

This article is an English translation of the second article "Izuchenie problem industrializatsii slaborasvitiikh stran" published in *Sovremenniy Vostok* (Contemporary East) Moscow, September 1959.

1. I am sincerely obliged to Soviet colleagues for their valuable comments on my article "Industrialization—a key to consolidation of independence" published in the Journal 'Contemporary East' (in December 1958). While agreeing in general with many of these remarks I think it would be useful to submit some additional remarks on a concrete level. I fully share the opinion of the Soviet economists that initiative and constant efforts for economic development must come from each country; I also agree that for such a country as India there is urgent necessity for agrarian reforms through the consolidation of holdings and organization of agricultural cooperatives. These problems are receiving serious consideration on our part.

2. I would like to emphasize that, in general, the conditions in India are quite typical. For the economically less developed countries, though there are essential differences (for instance, in the number and intensity of population), definite differences are also inherent in the socio-political conditions, system of government, education, scientific activities and the like. There is no doubt that while studying the problems of economic development in different countries such differences must be taken into account. Nevertheless I consider that it is possible and even desirable to work out on the basis of planning experience in the USSR technical and economic norms, coefficients and balance-sheets laying down guiding principles and methods for planning and this might, in general, be useful for all the underdeveloped countries.

3. We cannot but note that the classical and Keynesian theory developed in the advanced capitalistic countries might possibly suit these; but they are of little help for tackling the problems of economic development. For instance, the Keynesian theory may be applied for the purposes of eliminating unemployment—a consequence of economic crisis and depression. But this is inapplicable when we have to deal with the chronic under-employment in the underdeveloped countries.

4. The economic theory of the highly developed countries appears to be basically static in character and they are concerned, above all, with the most efficient distribution of the stock of capital and of other resources and not with the problems of economic development through an increase in capital accumulation. A theory of the same brand did not help the economic development of India or any other underdeveloped country; it hindered such developments on the other hand.

5. The accepted economic theory in the capitalist countries does not help the idea of economic planning. But, as we know, many underdeveloped countries with their differing socio-political conditions (Burma, Ceylon, India, Indonesia, UAR, some countries of Latin America and others) have come to be seriously interested in planning and have set up planning commissions and boards. It is for this reason

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that new guiding principles on concrete technical and economical levels have become urgently necessary, so that these might help planning the economically underdeveloped countries.

6. After this let me venture to suggest some proposals regarding the utilization of the very rich experience of planning accumulated by the USSR and other socialist countries. I would like to treat separately three different aspects of such experience (they are, in fact, inter-connected among themselves but even so may be differently viewed for operational purposes).

7. Firstly, we have general theory of social-economic changes which I will call the economic theory aspect or the abstract economic theory of economic growth.

8. Secondly, there are the technical and economic norms, coefficients, balance-sheets and the like. All these, as a rule, are concrete and appear in the form of quantitative indicators. But these must be carefully distinguished from the third aspect which would be called by us the 'technical project aspect' dealing with specific engineering and technical data.

9. My proposal is directly related to the technical and economic aspect of planning. It is clear enough that what we call the abstract economic theory had played the most important role in the historical development of the Soviet economy. It is quite obvious also that technical project work is extremely important for the implementation of economic planning. However, while considerable volume of information and literature are available on the general questions relating to the progress of the socialist economy in the Soviet Union and in other socialist countries, very little is known regarding technical and economic aspects of economic planning. Meanwhile there is, in my opinion, the urgent necessity for studying the above-mentioned aspect of planning. This is the aspect which may render the greatest help in economic planning to the underdeveloped countries.

10. The technical project level would become important only after definite decisions for projects are arrived at in economic planning. We shall cite an example from Indian experience with the purpose of classifying what we understand by the terms technical and economic information and guiding principles and also showing the extent to which these ranges of information are significant for planning for such a country as India.

11. In India the Steel Industry was founded in the year 1908. However, in the year 1951 when the implementation began of the First Five-Year Plan (1951-56), the production of steel in the country did not exceed a million tons (for a population of 360 million).

12. The proposal for constructing a new steel plant with a million ton capacity was rejected from the First Five-Year Plan under the influence of the economic theory of the capitalist countries. This was done on the ground that demand for steel (estimated for the year 1950) was put at a total of 1.6 million tons. But by 1953-54 with the growth of economic activities during the First Five-Year Plan the deficit in steel was found mounting. Much foreign exchange was required for cover-

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ing this deficit in steel through import. All these happened, because at the time of preparing the First Five-Year Plan the ideas of material balance-sheets and technical-economic information relating to these balances were not existent in India.

13. By 1954 it came to be realised that we needed to build up new steel plants. At this stage we proposed to build up heavy machine building for production of machinery which were to be supplied to the new steel plants. The Government approved this idea very enthusiastically. But, unfortunately, at the time of preparing the draft of the Second Five-Year Plan in 1955 we could not have technical data. As a result of this, a doubt arose in certain circles regarding the possibility of building the heavy machine building plant.

14. Immediately after the launching of the Second Five-Year Plan we received proposals from the Soviet Union for the construction of an integrated heavy machine building plant with a productive capacity of 80,000 tons of heavy machinery (of items individually weighing upto 130 tons) at a cost of 700 to 800 million rupees. For this the foreign exchange, that was required, constituted 450 million rupees for the import of machinery. At the same time, it was decided to increase the production of steel up to 5 million tons by the end of the Second Five-Year Plan period (1961).

15. Now it has come to be acknowledged that if we proceeded more wisely and began building up of a heavy machine building plant with a capacity of 80,000 tons considerably earlier, then after the plant came into full production we could have annually produced such a volume of machinery as would have been sufficient for the new metallurgical plant with a capacity for a million tons of steel or for other plants of comparable magnitude. It is quite possible that if we possessed the requisite technical and economic information during the years 1954-55, we might have decided even then to construct the heavy machine building factory with a capacity of 80,000 tons. This would have saved us 4 to 5 years of time and much of foreign exchange also.

16. I hope this example will be a sufficiently convincing proof of the necessity for having reliable technical and economic information in the form of numerical indicators as well as the need for using proper methods of technical and economic analysis as well as for comparative study. There are also other important questions arising out of the necessity for having at disposal data on the material balances and the structure of industrial productions including data on norms of technical nature (for instance, consumption of 150 tons of steel for one steam locomotive, 50 thousand kilowatt hours of electrical power for a ton of aluminium, 3 tons of coal for a ton of finished output etc.). Some of this information is also available in India though scattered here and there. But we still lack much. If the Soviet specialists would offer us information of this type, they would render a very valuable service for our planning. There is a two-fold task. It is necessary to lay down on the one hand, a general method for working out the necessary balances and, on the other, special methods which would answer to the specific conditions of different countries (for

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instance, to conditions of India with her 400 million population and with large stocks of high quality iron ore). As regards lesser countries it appears to me that priority should be fixed, say, for production of steel or for heavy machine building. There are other important problems also, for which guiding principles are absent. In my opinion this work must and should be included in the programme of joint investigations.

17. Let me examine in brief one of the most important problems for the underdeveloped countries, namely, the problem of proper training of technical personnel. If we assume light industry may be built up during a period of 4 to 5 years, then for the building up of power, metallurgy and transport industry we would obviously require 8 to 10 years, and more for heavy machine building, chemical production and production of heavy power equipment. But the most long-drawn-out process of all would be the training of technical personnel. This is the reason why the question of scientific and technical personnel, which would be required by the country as its economy goes on developing during the next 5 to 10 or 15 to 20 years, has become a matter of deep concern for the economically underdeveloped countries. Future requirements would naturally depend on the changes in the structure of production. It is quite important that we should have a dynamic approach to this sphere (as in other spheres also). Information on the requirements of technical personnel for each separate industry must be the initial starting point.

18. We spoke of the necessity for a dynamic approach. Such approach has certain technical consequences. Material balance-sheets or balance-sheets of separate industries may be studied through an analysis of the inter-relations between the material expenditures and output (input and output analysis). And this type of information should have valuable application in the underdeveloped countries or for individual industries, in which cases the technological inter-relation is more or less stable.

19. It should be emphasized that the analysis of the inter-relation among the material expenditures and output (input and output analysis) or linear programming has a basically static value. In all probability they do not offer great help for studying the problem of rapid industrialization, when the structural inter-relations themselves among the material expenditures and output come to alter in a radical fashion. However, the study of the ratios among the expenditures of production and output at different levels of development in such a country as the USSR may throw light on the problems of economic growth.

20. I may venture to state that a study of such relations in their historical perspective in the different republics of the USSR in different plan-periods may be of great interest for purposes of economic planning of the underdeveloped countries. The relatively important point is that technical and economic methods be worked out for studying the problems of planning for economic growth—methods based on concrete data in the form of numerical indicators.

21. We can note in this connexion that our efforts towards perspective planning in India have come to provide us with some experience. It has been found by us

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that it is extremely useful to know a number of economic coefficients not only in respect of every branch of industry but also for industry-groups and even for national economy as a whole. These include the ratio between the total value of product and total capital; the ratio of net output to national income, as well as to the total capital; the ratio between the circulating and the fixed capital; between capital and the number of workers; between physical volume of production and capital; between physical volume of production and the number of workers, etc.

22. I have tried to show through concrete examples the nature of works (studies) which, I think, might be useful on the basis of planning experience in India. There are many other questions also, about which we would like to receive more information, namely, on norms and variations in production (of labour forces, equipment, labour conditions and the like), on norms of performance (in railways, in communications and the like), on incentives which would raise labour productivity (relative scales of wages for different professions, etc.). These questions, according to us, are of great value to the underdeveloped countries. Undoubtedly there are also other items of information, which the Soviet specialists might themselves offer us, and these also would be of great value to us.

23. It appears to me that the really urgent task is to set up even a small group of workers comprised of three or four economists, three or four specialists having experience in planning work and three or four statisticians. They would begin studying the Soviet experience in planning at a technical-economic level in concrete and quantitative forms. I think that a group of 8 to 10 even working part-time are capable of preparing a programme, for, useful investigations. And it is only when the foundation has been laid that we can start defining the lines of approach. New ideas and new approaches to scientific research work would spring up in course of work. Moreover, necessity will arise for drawing in this work other specialists also, for instance, geographers, geologists, technologists and scientists. In my first article I have touched on the question of collaboration among the underdeveloped countries. I think it might be useful to carry on this work in two directions or at two different levels. First, such a collaboration would provide the Soviet specialists with concrete cases and set before them definite tasks in connexion with the development of the economically underdeveloped countries. This would lick the scientific research work into a concrete shape. Secondly, the specialists from the underdeveloped countries will be able to make their contributions with actual data and information for studying the special problems of economic development in their respective countries. Work of a similar nature may be started on a bilateral basis and thereafter it may be expanded, as and when opportunities arise.

24. While we were occupied in our work of perspective planning in India, we have been eager for joint work with the Soviet specialists. For the last 5 or 6 years from 1954 onwards we have been inviting them to India for joint work. The organization of a working group in the USSR would create an active nucleus, which would permit us to push ahead in the study of this problem. We would eagerly look forward to collaborate in this work in any directions deemed suitable by our Soviet friends.

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25. I shall now examine another most important aspect of economic development, namely, external trade. The smaller the country, the greater is the significance of external trade for her. This raises the question of a specialization according to the nature of resources and skills and other possibilities existing in each country. In their remarks on my article some Soviet economists rightly observed that it was necessary to find out new principles of division of labour on an international scale. This is a most difficult and, at the same time, the most important task for the future peace and prosperity of entire humanity. It is impossible to solve it without international collaboration, which, of course, cannot be achieved to the extent necessary in the near future. But we propose to start even now some joint work regarding this problem—as a start on a bilateral basis between the countries who are ready to take up such work voluntarily. I propose that Soviet and Indian specialists may start joint studies regarding planning in the Soviet perspective. These studies might be completely distinct from and independent of the current agreements between the countries for a period of 1 to 2 years. Joint investigations may deal with the problems of the future development of trade (perspective). A dynamic approach to this problem is extremely necessary. The purpose of joint investigation must be not only an increase in the volume of trade of the existing pattern but also alterations in the structure in relation to the economic development of both the countries. The pattern of trade must be altered or should increase in such a way as would be advantageous for both the countries.

26. Joint investigations would define the future possibilities at a concrete level and as a result of such it would be easier to take action in the appropriate directions. The above-mentioned investigation will be conducted purely for informative and consultation purposes. It is quite conceivable that if tangible progress be achieved in this matter, other countries may be brought to participate on a bilateral or multilateral basis.

27. I have spoken at length on the possibilities of collaboration between the Soviet Union and India on different problems, because I wish that such collaboration might be started right now though on an experimental basis and on a small scale. But I have spoken also of the multilateral basis, which might be useful not only for tackling the problem of industrialization of the underdeveloped countries but also for the development of international trade. The greater the number of countries which participate in such investigations, the more effective this investigation. Hence it is necessary to direct all efforts to the implementation of such investigation in a spirit of broad international collaboration. This would be greatly helped by permanent committees and international symposia on the study of problems of this kind.

28. We consider that it would be expedient at present to hold an international Economic Conference for the study of economic development of the underdeveloped countries. Such a conference, in my opinion, may be held primarily at a technical and non-governmental level though with the sanction of respective governments. It is quite clear that a great amount of preparatory work would be required to make this conference really effective.

THE NEED OF SCIENTIFIC AND TECHNICAL MAN-POWER FOR ECONOMIC DEVELOPMENT

This article is based on a talk broadcast from the All-India Radio on 23 September 1959.

1. Four years ago the All-India Radio gave me an opportunity of speaking on problems of National Planning. I am glad, again, to have an opportunity of saying a few words regarding one important, perhaps the *most* important, aspect of economic development, namely, the need of expanding our scientific and technical man-power.

2. The object of economic development is the improvement of the level of living of forty crores of our countrymen. This means having a bigger and bigger supply of food, clothes, housing, and such other things, and greater facilities for medical care, education, and cultural amenities. That is, having more and more of what economists call consumer goods and services. Our aim then must be to increase continually the production of consumer goods.

3. How can this be done? To some extent by using traditional methods of production such as weaving and handicrafts and by employing idle hands to the fullest possible extent. This would give employment to millions of our countrymen who are sitting idle for the whole or a good part of the day for lack of gainful work. But this can go only a part of the way.

4. To increase production in a really big way we must use machinery. For more than a hundred years we have been manufacturing cloth in textile factories. Where did we get the machinery for this purpose? We have been mostly importing them from abroad. Why? Because we did not have factories to produce machinery. This brings us to the heart of the problem.

5. Machinery is made of steel, metals and raw materials. The cost of such raw materials is small, and often only ten or fifteen per cent of the price we pay to purchase the machinery from abroad. If we use our own steel and raw materials and make the machinery ourselves, we can have very much more than what we can purchase from abroad. Obviously, then we must set up factories to manufacture heavy machinery and heavy electrical and other equipment.

6. Until the beginning of the Second Five Year Plan in 1956 we had not given enough attention to this aspect of our problem. Fortunately, it is now being appreciated that we must ourselves manufacture as much machinery as possible.

7. We shall require steel for this purpose. But we have large reserves of high quality iron ore in India, and we can make more and more steel, and use this steel to make more machinery and produce more electricity to drive the machinery. That is, we must produce more and more of what are called "capital goods". This is the second level.

8. However, it is only with the help of engineers, technologists, technicians and skilled workers that raw materials can be converted into machinery and

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electricity and power; and can then be used for the production of consumer goods. We must then have a larger and larger supply of engineers and technical personnel in future. This then is the third level.

9. We have to go a little deeper. Natural resources are not identical everywhere. There are wide variations from one country to another. It is essential that we should make the best use of what we have in our own country. We can find out how this can be done only through scientific and technological research. We must continually expand research of this type, which is called applied research, in which use is made of basic scientific knowledge to solve practical problems.

10. We cannot stop even here. We have to go one step further. Applied research can use only whatever basic scientific knowledge happens to be available. But we can increase such knowledge through, what is called, fundamental or basic research. The more we do this, the greater will be the possibilities of applied research. The most dramatic example is atomic energy. The possibility of utilising the energy of the atom had first emerged from abstract theoretical developments of physics. It has now thrown open a new vista of technological progress for humanity. We must continually expand both applied and basic research. This is the fourth level.

11. We thus have to think of four levels. First, to increase the supply of consumer goods which, so to say, is at the top or the first level. To do this, we must expand the production of capital goods; this is the second level. Both of these will require a larger and larger supply of engineers, technologists, and technical personnel; this is the third level. Engineering and technological developments would call for an increasing volume of applied research. But applied research requires a sound foundation of basic research. We must have an increasing supply of research scientists of ability. Unfortunately, their number is small in every country. We must try to make the best use of *all* whom we can discover. This is the fourth level.

12. Now consider the factor of time. We can set up factories for consumer goods very quickly; in a year or two, if we use imported machinery. To develop the production of capital goods would take more time, from five to ten years, at least. To secure an adequate supply of engineering and technical personnel would require still more time. And, finally, we must have enough scientists of ability for both applied and basic research which would take at least a generation. This is the *four-fold* logic of economic development.

13. How to attract and hold a sufficient number of able person in science and technology is then the crucial problem of national development. This can be done only through a proper social appreciation of science and scientists, which is the fifth and deepest level of the problem.

14. I have been speaking so far at a somewhat abstract level. Let us consider the historical evidence. The level of living in Europe was probably about the same as in India two or three hundred years ago. There is some evidence to suggest that, for the vast masses of our countrymen, the level of living has not changed very much since the time of Akbar.

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15. There has been, however, a revolutionary progress in Europe and America. This was possible only through the use of machinery driven by steam or electricity instead of by human or animal labour, that is, through the progress of science and technology. The British had first developed the modern way of making steel. Germany started later but, through research, developed more efficient methods. America, through more research, increased the efficiency. More recently, Russia has gone further ahead with the help of still more research.

16. It will be instructive to make some comparisons between the two giants, USA and USSR. America has attained the highest level of living and has the largest supply of consumer goods in the whole world. Russia is still very much behind, especially in luxuries like butter, chocolates, nylon and such other things.

17. In capital goods, on the other hand, the gap is smaller. Russia is already producing roughly half the steel which America can produce. In heavy machine building, for example, to manufacture machinery to erect new factories for steel, USSR has probably gone ahead and can expand the production of steel faster than USA. It is only a question of time before Russia can catch up with America.

18. Next consider the third level of engineers and technical personnel. Here USSR has gone indisputably ahead of USA. In 1957 America had approximately six and a half lakhs of engineers while Russia had nearly eight lakhs¹. In the same year, 71,000 engineers had graduated in Russia against about 40,000 in America². Russia already has a larger number of engineers, in absolute numbers as well as on a population basis, and yet Russia is increasing the number at a fast rate. In fact, Russia is training, every year, more engineers than all the other countries of the world, including USA, taken together.

19. We can also learn much from the Americans who have quickly noted the Russian developments in science and technology; and are making better arrangements for the teaching of science, providing more funds for scientific research, and improving the conditions of work for scientists. Similar changes are also occurring in the United Kingdom and other European countries.

20. All this, I think, has an important lesson for us. We have a very low level of living. It is not possible to improve it rapidly by increasing the production of consumer goods with the help of imported machinery. We did try to do this for sixty or seventy years or more and failed. We must first increase, very rapidly, the production of steel, electricity, heavy machinery, and other basic industries. The only way to do this is to increase the supply of scientific and technical man-power. This must be given the highest priority. This is the only secret of the spectacular progress of Europe and America, and now of Russia.

21. Europe and America, and now Russia, have become great by their acceptance of science. Social appreciation has given confidence and encouragement to the scientists. In Russia research scientists have the highest pay and enjoy great social

¹ Number of engineers in 1957 in USA, 6,37,000 and in USSR, 7,93,000.

² In India the estimated number of engineers in 1955 was 72,000 out of which 31,000 were university graduates and 41,000 diploma holders.

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prestige. The President of the Soviet Academy of Sciences gets the highest salary in the whole country, higher than that of the Soviet Prime Minister or the President of the USSR. This, of course, is only a gesture but it has a deep social significance.

22. This brings me to the fifth level. In India also we used to have a great tradition of respect for the Brahmin, pre-eminently as a teacher. The old tradition has lost its values and must go. And it is necessary to build up a new tradition of social appreciation of science and scientists.

23. We have made some progress since independence. The number of educational institutions has doubled. The number passing the Matriculation examination¹ increased four times in eight years between 1947-48 and 1955-56. Enrolment of students, at the intermediate and university levels², nearly doubled in six years between 1950-51 and 1956-57. Enrolment of engineering students, at the degree and diploma levels, rose from about 15,000 in 1955-56 to 31,000 in 1958-59 or had doubled in three years. Over 16,000 persons were awarded the master's or equivalent degree in science, after independence, out of a total outturn of 32,000. That is, we produced more scientists after independence than during the whole previous period. Expenditure on scientific research has increased, perhaps, seven or eight times.

24. The advance in education after independence has been greater in many ways than total achievements during the whole of the British period. This is encouraging but not enough. Some of the improvements are still on the surface. Educated persons are not being fully utilized. The educational base still remains narrow and there are great disparities in opportunities. The quality and depth of education and scientific research have not been improving satisfactorily.

25. There is urgent need of a deeper understanding of the scientific revolution which has opened new paths for human civilization. The content of science changes every day. The spirit of enquiry and the search for truth give it its enduring values.

26. Scientists cannot possibly take the place of political leaders or administrators. It is not desirable that they should do this. What is necessary is that scientists should have the initiative and freedom of action in matters which have concern with science and technology.

27. The scientific revolution has no conflict with art, literature, music and such other things in which values do not change with time. Knowledge as such, either of classical languages or of science, is not culture. The scientist also must acquire wisdom and appreciation of human values.

28. India is fortunate in having a Prime Minister who has a full appreciation of human values and who takes a keen personal interest in science and technology. But, what he or Government can do ultimately depends on public opinion. The most basic need is for the general public to appreciate the role of science in the modern world. This is the deepest issue before us.

¹ Actual numbers were : 1,16,680 (1947-48); 1,61,955 (1948-49); and 4,29,494 (1955-56).

² In 1950-51 about 3,99,500 and in 1956-57 about 7,68,000.

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Address delivered as Chairman of the sectional meeting of the Second All-India Labour Economics Conference at Agra on 1 January 1959. Published in the *Indian Journal of Labour Economics*, Vol. 2, No. 1 (April 1959), pp. 39-45.

1. I feel honoured in having been asked to preside over this Section. I am aware that I am not competent to do this as I am not an economist. However, as the invitation came personally from Shri V. V. Giri, I felt I must accept it.

2. I must also offer my apologies for not having been able to prepare a written speech, owing partly to my absence out of India and partly to heavy pressure of other work. I shall have almost to think aloud for which I hope you will kindly forgive me.

3. I should like to say something about the concept, definition, and measurement of unemployment and underemployment. It will be appropriate if I also make some observations on problems of unemployment in relation to national planning with which I have been associated for some time. I was a teacher of physics for one-third of a century, and my approach would be necessarily somewhat physical; and I shall not try to deal with economic theory as I am lacking in knowledge.

4. The attainment of full employment, that is, the fullest utilization of human resources for productive purposes, is a characteristic sign of highly industrialised economies. Unemployment in such countries can occur only when there is a slack in economic activity; that is, only when there is a falling off from full employment. The remedy lies in taking steps to restore economic activity to the fullest extent.

5. An essential characteristic of an underdeveloped country like India is the existence of idle labour which never gets the opportunity of becoming fully productive. That is, a very large number of people can never secure enough gainful employment. In India, we, of course, have some unemployment of the type which occurs in the advanced countries. This occurs mostly in urban areas where many people have jobs on daily or monthly wages or salary, and can lose them or seek jobs of the same type.

6. But we also have a vast number of persons who work in their own household enterprises or on their own account. They may not have enough gainful work and may be sitting idle for a good part of their time. However, as they do not have any jobs, they cannot lose jobs, and cannot therefore be unemployed in the sense of the industrialised countries. Also, the productivity or output per person

is often low so that the work which would be done by one person in advanced countries would sometimes be done by two or three persons or even more in a country like India.

7. I should now like to make some observations regarding the measurement of unemployment and underemployment. As regards unemployment it is possible to use basically the same approach as in the industrially advanced countries. Those who have jobs carrying daily or monthly wages or salaries are, of course, employed; and those who had jobs of this type but lost them or are seeking such jobs are unemployed. It is neither possible nor desirable to copy the definitions used in the advanced countries but necessary adaptations to suit Indian conditions can be made without much difficulty.

8. There are however real difficulties in dealing with those who are engaged in household enterprises or work on their own account and do not have jobs and cannot lose them. They can be never unemployed. But they may not have enough work. Here we may have to adopt other approaches. One can use a concept of a hypothetical or normal "full working-time", and enquire whether a person is active for the full normal working time or for only a fraction of it. There would be, however, some arbitrariness or a subjective element in defining the normal full working time. There are also difficulties in interpreting observed facts. For example, a carpenter who has not enough work on hand may prefer to distribute it, at a slower pace, over his normal full working time. This approach would no doubt supply useful information but comparisons between different types of employment may be somewhat ambiguous.

9. Another possibility is to think in terms of a hypothetical normal output per unit of time (hour, day, week, month etc.), and ascertain whether a person is turning out the full or only a part of the normal output. There is again a subjective element in defining the normal output. There are also great difficulties, even in principle, in defining normal output where the product is not homogeneous but consists of many different kinds or output.

10. Thirdly, there is the approach of thinking in terms of "normal earnings" and enquiring whether a person was earning the full amount or only a fraction of it. The subjective element is still there, but comparisons between different types of work would be possible and meaningful. Information on 'normal working time' or 'normal output' can be of great help in defining 'normal earning'; and ultimately one may have to fall back on the earning approach.

11. I have briefly referred to some of the technical problems and the need of both analytic thinking and experimentation. Collection of data on the basis of different approaches and a careful analysis of the observations would be of great value in formulating adequate concepts and tools for the measurement of unemployment. This deserves urgent and serious attention from economists.

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12. I may now refer to the use of sampling methods in this field. Information on employment and underemployment was collected for the first time on an all-India basis in the 9th round of the National Sample Survey, May to August 1955. The results were given in the form of percentages which however can be converted into number of persons by using the usual estimate of 382.4 million as the total all-India population consisting of 316.1 in rural and 66.3 in urban areas¹. The proportion of the population in the labour force was 44.2 per cent in rural and 34.5 in urban areas or 42.5 per cent for India as a whole. The total labour force thus consisted of 162.6 million persons of whom 139.7 million persons were in rural areas and 22.9 million persons in urban areas. The incidence of unemployment in the total population was 0.29 per cent in rural and 1.99 per cent in urban, was 0.59 per cent in India as a whole. Converted into numbers, this means 0.92 million (9.2 lakhs) persons were unemployed in rural areas and 1.32 million (13.2 lakhs) in urban areas or 2.24 million for India as a whole. Within the labour force itself, the volume of unemployment was about 0.66 per cent in rural and 6.1 per cent in urban areas showing that the incidence of unemployment was proportionately almost ten times greater in the urban areas.

13. I should like to stress once more that in India the number of persons having or seeking employment in the sense of the highly industrialised countries is extremely small. Using the results of the 9th Round of the National Sample Survey, it can be estimated that less than 13 million had jobs of this type of public or large scale private enterprises and offices. Private small scale activities are mostly on a household basis. The total number of persons engaged as hired labour in these small scale enterprises (excluding agriculture, livestock, fishery etc.) was about 5 million so that only about 18 million persons may be considered to have jobs, in the sense of the industrially advanced countries, out of the total labour force of 160 million. Viewed in this way, a volume of unemployment of over 2 million is quite serious.

14. Some experimental studies have been made on the measurement of underemployment which supplied information of considerable interest. I shall give some concrete examples. In the 9th Round of the National Sample Survey (May to August 1955) information was collected about hours of work done per week per person. It was found that the number of persons working less than 8 hours per week was nearly 21 million; they may perhaps be considered to be practically unemployed. The number of persons working less than 29 hours per week or less than 4 hours per day was as large as nearly 45 million.

15. Information was also collected on how many days a person was engaged in gainful work during 30 days preceeding the day of interview. The number of

¹ Growth of population calculated on the inter-census rate based on 1941 and 1951 censuses. Recent surveys (National Sample Survey 14th Round) indicate that the actual rate of growth is probably much higher than the inter-census rate; and the population in 1955 may be appreciably greater than 382.4 million.

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persons working less than 10 days out of 30 days or less than one-third of the month was 39 million which is broadly consistent with the figure 45 million given above in terms of hours of work per week.

16. In an earlier enquiry, in the National Sample Survey, 7th Round (October 1953–March 1954) it was found that about 47 million persons were working on a part-time basis. The same enquiry brought out that among these 47 million persons, 10 million were working part-time; partly on account of ill health of the worker or because of illness in his household and similar causes. About 23 million persons however were working part of the time for reasons of economic nature such as lack of demand for their labour, lack of tools and raw materials, slack season etc.; and 13 million persons gave other reasons. From the above discussion it is clear that at least 23 million persons may be considered to be severely unemployed. The figure would be higher if a somewhat less stringent definition is accepted.

17. In India we thus have an appreciable volume of unemployment (in the sense of the industrialised countries) occurring mostly in urban areas, and also a great deal of underemployment in both rural and urban areas. A radical solution of the problem can be found only through a continuing increase in the economic activity which would create increasing opportunities for productive employment. Economic development consists essentially of an increasing utilisation of idle manpower for productive purposes. Economic development and an increasing volume of employment are but two aspects of the same social process.

18. The National Income is often used as an index of economic activity. Increase in national income is possible only through more fruitful utilisation of idle labour and unexploited material resources. A steadily rising national income is thus also another aspect of a steadily increasing volume of employment.

19. In September 1954 the Planning Commission considered the aims and targets of the Second Five Year Plan. After a very full discussion it was decided that an important aim must be to get rid of the fear of unemployment, if possible, in ten years together with a continuing improvement in the level of living, and a gradual reduction of great disparities in income and wealth.

20. I had participated in this discussion; and I thought this was a meaningful formulation of the aim of planning for national development in India. Employment, unemployment, and underemployment should be capable of measurement so that it would be possible to observe whether the Indian economy was gradually approaching full employment. It should be also possible to estimate the national income and ascertain what was the realized increase in income and the realized improvement in the level of living. In this way, the progress of the plan can be assessed in an objective manner.

21. Let me state the problem again : to try to get rid of the fear of unemployment in ten years—this is the crucial issue in India. But this must be achieved

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with a continuing increase in the level of living. It will not do simply to emphasize the employment aspect alone. Obviously a very large volume of employment can be created simply by destroying all or most of the tools and implements of production. We would then go back immediately to the stone age, and every one would be fully occupied in producing the barest necessities of life. But this would not bring economic prosperity; in fact the level of living would be extremely low. Clearly, this is not the solution we seek.

22. The only way to solve the problem of unemployment and underemployment is to create more opportunities for productive work. This requires the use of tools and machinery. The present production may be increased to some extent by working harder and using the present stock of tools and implements to better effect. But there is a limit to this. The only permanent way of increasing the volume of productive employment is to supply tools and machinery for idle hands, that is, to increase the capital investment. Here also a distinction should be made between investment of two types, namely, one for the manufacture of goods for direct consumption and the other for the manufacture of steel, cement, electricity, and heavy machinery which would produce more machinery, more steel, and more electricity etc. which we may call the basic industries.

23. This must then be broad strategy of planning in India. We have to produce more and more machinery and tools and energy per person so as to increase the productivity of each individual worker, and also to supply more and more people with machinery, tools and power. In India, with our abundant supply of iron ore we should obviously install new steel plants every year. Instead of importing machinery to install these new plants it would be obviously desirable to make such machinery within the country. We must therefore have factories for the production of heavy machinery and heavy electrical equipment. Once we succeed in establishing these basic heavy industries it would be possible to produce more and more essential capital goods out of our domestic resources; and using such capital goods, to increase modern industrial investment at a rapid rate. A rapid industrialization of the country is thus the only radical cure of unemployment.

24. We must be clear therefore that no radical cure of unemployment and underemployment would be possible without a rapid growth of modern industries. We must produce an increasing quantity of steel every year. We must produce increasing quantities of heavy machinery and electrical equipment. More and more goods would be then produced by increasing utilization of our domestic resources. To do this we must of course steadily and rapidly increase our domestic savings.

25. In the Second Five Year Plan it was also recognized that any increase in investment would increase the demand for wage or consumer goods. As our capital resources are meagre to start with, it is desirable to utilize such resources as much as possible for a rapid development of the basic industries (heavy machinery, steel and metals, energy etc.). To meet the increasing demand for consumer goods,

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it would be, therefore, necessary and desirable to expand the production of small-scale and cottage industries which would also create a large volume of gainful employment. Both investment and consumption can and must be increased at the same time by utilizing idle man-power and idle material resources.

26. I have explained the basic logic or strategy of the Second Five Year Plan. Unfortunately, owing to various reasons, this policy could not be fully implemented; and the rate of development has not been adequate to reduce the volume of unemployment and underemployment. We have not been even able to offer employment to more than two million persons, who coming of age, enter the labour force every year and seek work. The only conclusion must be that we must have a much bigger plan next time and still bigger plans in future years. In the Second Five Year Plan it was visualized that the investment in the Third Five Year Plan should rise to Rs. 9,900 crores. We must accept Rs. 10,000 crores in round figures as the size of the Third Five Year Plan. Nothing less would get us out of the fear of unemployment.

27. There was much criticism that such an approach was lacking in balance; and some people asked "How do you know that there is no better solution?" I answered, "Certainly there may be a better way. Please show us a better approach and we would accept it." But in all these years no one has come out with a better solution.

LABOUR PROBLEMS IN A MIXED ECONOMY

Presidential address delivered at the Third All-India Labour Economics Conference held in Madras on 2 January 1960. Published in the *Indian Journal of Labour Economics*, Vol. 3, No. 1 (April 1960), pp. 1-8.

1. Economic development in India means essentially using idle hands and natural resources in the most effective manner for productive purposes. Labour economics in this country must therefore be oriented towards national planning. India can learn much from the highly developed economies in both capitalist and socialist countries. But India has adopted a planned economy with both the public and the private sectors working side by side. Conditions in India are therefore different in some important respects. It is accordingly essential that India should evolve her own policy in economic affairs.

2. The highly developed capitalist countries have (virtually) full employment with appreciable unemployment occurring only during depressions; a rate of net investment of 10 to 15 per cent with a rate of growth of 2 to 3 per cent per year. Labour enjoys excellent social securities and a generally rising level of living. Both employers and employees being well organized, there are highly developed institutional methods of deciding labour problems and disputes.

3. In socialist countries, in principle, there is no basic conflict of class interests between employers and employees as all or most of the means of production are nationalized. The full authority of Government is behind planning for rapid economic development; the rate of investment is around 25 per cent, the rate of growth about 9 to 10 per cent per year; the level of living is steadily increasing without unemployment.

4. In India planning is being used to promote rapid industrial progress. The rate of investment has increased from about 5 per cent, seven or eight years ago, to about 10 or 11 per cent, and there has been some industrial growth. Both public and private sectors are working side by side. Labour is not well organized and Government is trying to give it increasing legislative and administrative protection. The trade union movement and Government policy have been both broadly on the same lines as in the highly developed capitalist countries.

5. It is most desirable that labour should enjoy a high level of social security and should be free from fears of unemployment. It is however, pertinent, to enquire whether imitation of highly developed capitalist economies is the most effective means to this end, or whether new methods require to be developed to suit Indian conditions. My object is to raise some questions to stimulate further thinking and research in the field of labour economics and not to answer them.

6. It is instructive to examine the level of earnings of factory workers during the last twenty years. One approach is to use the index number of real earnings with 100 as the base in 1939, just before the war. There was some improvement in the first two years of the war with a value of 103.7 in 1941. Real earnings then

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decreased to 67 in 1943, and varied between 73 and 78 up to 1947. Then there was a slow recovery to 101.8 in 1952. Owing primarily to the very low price of foodgrains, the index rose to 114.4 in 1955, but came down to 105.7 and 104.0 in 1956 and 1957 respectively.

7. It is also possible to make a direct comparison of family budgets of factory workers in the rapidly growing Asansol industrial area in West Bengal based on two sample surveys carried out respectively in 1941 and 1958-59. The family structure had changed appreciably, and the proportion of single-person households had increased from 11 per cent in 1941 to 33 per cent in 1958-59 indicating the advent of new labourers from outside the area; the average size of the household in consequence decreased from 5.22 in 1941 to 3.67 in 1958-59. The consumer expenditure per person per month at prices of 1941 was Rs. 7.35 for the households surveyed in 1941 and Rs. 7.81 for the households in 1958-59. Making the comparison the other way round, the expenditure at 1958-59 prices for the two sets of households was Rs. 32.71 in 1941 and Rs. 32.51 in 1958-59. The per capita consumer expenditure has remained practically the same during the last 18 years. The pattern had changed to some extent, and expenditure on foodgrains, sugar and clothing was higher in 1958-59. Personal savings also had remained at the same level of 6 per cent per year. The rupee value for both income and expenditure was about 4.4 times higher in 1941.

8. Changes in real earnings of factory workers can also be compared with the per capita income and consumption expenditure of the country as a whole. Starting with a base of 100 in 1952 (the year in which real earnings had recovered to the pre-war level) the index of real earnings was 103.8 in 1956 and 102.2 in 1957 compared with an index of per capita consumption expenditure of 106.2 and 103.6 and an index of per capita income of 110.5 and 107.4 respectively in the same two years. The gain in real earnings of factory workers seems to have been somewhat less than the general increase in the per capita income or consumption expenditure during the period of five years from 1952 to 1957.

9. The broad picture which emerges is fairly clear. The gain in real earnings was only about 4 or 5 per cent in the 18 years to 1957. A direct comparison of family budgets in 1941 and 1958-59 in the Asansol area also shows that the per capita consumption expenditure of factory workers in 1958-59 was about the same as that in 1941. Statistics of the national income of India are, unfortunately, not sufficiently reliable or sensitive. But it is generally agreed that there has been an appreciable expansion of the national economy since 1952. The available evidence, however, suggests that the real earnings of factory workers may have been slightly lagging behind the general increase in per capita income or consumption.

10. There has been a good deal of labour legislation in recent years; this, however, apparently has not led to any substantial gains in real earnings of factory workers. This raises important questions.

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11. Mere imitation of advanced capitalist countries may not be enough in a mixed economy in an underdeveloped country. The lack of development itself gives rise to a timid outlook and uneasy feelings about the very idea of a rapid economic progress. Four years ago the Second Five Year Plan was considered to be too ambitious. Last year there was much talk of a safe Third Five Year Plan of a small size of five or six thousand crores of rupees. Recently there has been a welcome change and an investment programme of ten thousand crores of rupees in the Third Plan is now receiving serious attention.

12. There remains, however, a good deal of opposition; it found expression, for example, in the recent discussions on the target of steel for the Third Plan. The Perspective Planning Division of the Planning Commission has suggested a target of 10 million tons of steel ingots. Some would have only 6 or 8 million tons. It is argued that the demand for steel would not justify the production of 10 million tons; and that there would be an unexportable surplus. It is pointed out that the intensity of capital investment is very high in steel, and considerable resources would unnecessarily be locked up instead of being deployed for more productive purposes. Bottlenecks in transport and in the supply of coking coal and raw materials, and shortage of trained personnel would prevent the fulfilment of the Plan. Labour inefficiency and restrictive practices would hamper progress and lead to increasing costs.

13. This is a typical dilemma in a mixed economy; it deserves consideration. Those who are in favour of a target of 10 million tons hold that in a planned economy the demand must be created simultaneously with the supply. There need not be any uncertainty in absorbing 10 million tons of steel if the outlets—engineering and other industries consuming steel—are developed at the same time. In a planned economy, the target depends only on the limits of possibilities of physical realization and of the mobilization of the required financial resources. Market demand is scarcely relevant. Yet the proposal to install a second million ton steel plant had been dropped in the First Five Year Plan because of the lack of market demand.

14. In a planned economy it is much better to have a surplus capacity for steel than to face a serious shortage of supply. In about four years up to 1958, India imported about 4.7 million tons of steel at a cost of about Rs. 380 crores. For two million tons additional capacity of steel in the Third Five Year Plan, the foreign exchange requirements would be only about Rs. 150 crores, or if some auxiliary facilities for transport, mining etc. are included, would come, at the most, to about Rs. 250 crores. The actual expenditure in four years in importing steel was much greater. Long term credit for the expansion of steel production can be secured more easily than for current imports of steel. Also, the surplus, if any, can be easily exported as long as Indian costs are lower (or if they are not lower, by giving, if necessary, an export subsidy). It may be also mentioned that USA, UK etc. all have surplus capacity in steel.

15. Finally, without 10 million tons of steel at the end of the Third Five Year Plan the economy would not become self-reliant; the volume of unemployment would

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increase and would have disastrous consequences. The decision has to be made in advance and now. Labour economists have a vested interest in pressing for a rapidly expanding economy; and that means pressing for a 10 million ton target of steel in the Third Five Year Plan.

16. The points regarding bottlenecks of transport, coking coal and raw materials, or shortage of technical personnel are entirely relevant. The only remedy is to have more and better planning and more efficient implementation.

17. The point about restrictive practices of labour is most important. This is the crux of the problem. It is essential that Indian labour should appreciate the need of increasing labour productivity.

18. It is generally agreed that labour productivity is stagnant and may be even decreasing. There is general opposition to piece rate wages or remuneration by results. This is the most difficult and yet the most urgent problem of labour economics in India. There is a good deal of general slackness and disinclination for hard work. There is distrust of the employers, and fears that piece-rate wages would not be equitable and would be used for unfair exploitation of labour in a market of chronic unemployment. There is a sense of security in appointments by time or in time scales. Trade Unions in India are generally imitative of the methods of the highly developed countries without proper appreciation of the real interests of labour.

19. It is also open to question whether, in the same way, the Government policy and labour legislation have not been too imitative of the highly developed countries, without proper appreciation of India's conditions.

20. There can be no difference of opinion regarding the need of social security; minimum or fair wages; reasonable hours and conditions of work; accident, sickness, invalidity, maternity and old-age benefits; health care, educational and cultural facilities; and finally full employment and unemployment insurance. All this, however, depends entirely on increasing the national product as fast as possible. This is the real issue. So labour policy and legislation in India must promote the maximum rate of economic growth and the maximum utilization of unemployed or under-employed labour.

21. Now, under conditions of chronic unemployment and underemployment, there is a tendency to over-staff, that is, to use two or three men to do the work of one. It is sometimes argued that in an underdeveloped country with much unemployment or underemployment, it is justifiable to spread out employment in this way.

22. Is this argument valid? Slack and careless work and inefficiency in performance often necessitate the same piece of job having to be done over again or calls for additional raw materials or unnecessary repairs and replacements with much waste of resources. The total labour cost per unit of end-product may indeed be as high as or even higher than in other countries, and this would hamper exports.

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23. In an underdeveloped country like India there is an urgent need to make the whole social organization more alert and efficient. In starting an army drill there is the well-known procedure of "numbering" the only purpose of which is to make the men alert; this is the object of training in all kinds of sports and games, or of rehearsals for dance and drama, or of practice for musicians. In the same way, efficiency of performance is an essential step for national progress. From this point of view it would seem better to try to attain the highest possible efficiency of labour and increasing productivity, and use the additional value obtained in this way to create more employment rather than lower the industrial efficiency by slack or restrictive practices through overstaffing.

24. There is no ready made solution to copy. The attempt to introduce institutional forms well suited to advanced capitalist countries may sometimes defeat its own purpose. It is also often difficult or impossible to introduce methods in operation in socialist countries for lack of necessary political sanctions. Familiarity with economic theories suited to advanced western countries had acted as a thought barrier to economic progress in India; fortunately this has been broken through, and India has developed a basic strategy of development and is already in the process of "taking off" on the way to a self-reliant economy. It seems equally essential to evolve a labour policy suited to Indian conditions and needs.

25. There may be great advantages, for example, in a Government organization of Labour Reserve Service. A proposal for a National Service for students is already under consideration. I should suggest that a similar Labour Reserve service (LR) be set up to absorb such industrial workers as may be considered surplus and be "laid off" by existing industrial enterprises at their discretion, and also to serve as a pool for other enterprises to draw upon, again, at their own discretion. The Labour Reserve service (LR) would then act as a buffer against unemployment and would serve as a (perhaps socially more useful and psychologically more preferable) form of or substitute for unemployment insurance limited, however, in the first instance, to persons who are already factory workers. The responsibility would rest on Government to make the best use of the Labour Reserve. The workers admitted into the Labour Reserve would receive, not the full, but a suitable part (say, between a half and three-quarters) of the emoluments they were receiving in their original posts; they would also be bound to take up whatever work they were offered by the LR authorities and if they refused they would have to leave the LR. It should be possible to recover an increasing part of the expenses out of productive work taken up by the LR. The balance of the cost may be met partly by a comparatively small (LR or unemployment insurance) levy on enterprises, partly by a direct contribution for each worker sent to LR by an enterprise, and partly by Government out of its general income. An enterprise would send an employee to the LR only when the benefits accruing would be considered to be commensurate with the direct contribution. The LR would provide training of various kinds and would continually try to use the men for productive purposes. Workers in the LR would have an incentive

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to find better jobs at the earliest opportunity. In this way, conditions in at least an important part of the labour market, that is, among the factory workers, would approximate to labour conditions in the more advanced economies in both capitalist and socialist countries.

26. I have raised a question and suggested the Labour Reserve as a possible solution. I leave it to the labour economists to examine whether a LR is feasible; and if not, to find a better solution.

STATISTICAL TABLE

27. The following table gives certain data on expenditure in rupees per person for working class households in Asansol. The data relate to two sets of households relating to 1941 and 1958-59; the expenditure figures have been given at prices of both the periods.

28. Data of two family living surveys conducted at Asansol with a gap of 18 years form the basis of certain figures given earlier in this paper. The first survey was conducted by the Bengal Board of Economic Enquiry in 1941 under the technical guidance and with the active collaboration of the Indian Statistical Institute. The survey covered both factory and mining labourers. The second survey was conducted by the Indian Statistical Institute on behalf of the Government of India (in 1958-59) in connection with the working class cost of living indices. This survey at Asansol centre covered only factory workers and excluded miners. From a total of about 1,500 households of the 1941 survey 280 households were selected in the form of two equal sub-samples, *ss* 1 and *ss* 2, and tabulated. Since the 1958-59 survey did not cover mining labourers, miners were also excluded from the 1941 sample households. For 1958-59, 160 households (*ss* 1 = 80; *ss* 2 = 80) were selected and tabulated.

29. Data in the table are presented by two sub-samples. The degree of sub-sample agreement provides a broad measure of the margin of uncertainty of the estimates. Price relatives of certain groups of items have been used to calculate the consumer expenditure of 1941 households at 1958 prices or of 1958 households at 1941 prices. As an example, let E be expenditure per person on edible oil of 1941 households at 1941 prices. Then the consumer expenditure of 1941 households on edible oil at 1958 prices has been obtained as $E \times \frac{p_{58}}{p_{41}}$ where p_{41} and p_{58} are respectively the retail prices of mustard oil in 1941 and 1958. Data on retail prices have been derived from the schedules as both value and quantity data were collected in the surveys.

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CONSUMER EXPENDITURE IN RUPEES PER PERSON FOR 1941 AND 1958-59 SAMPLE WORKING CLASS HOUSEHOLDS AT 1941 AND 1958 PRICES

item	1941 households			1958-59 households		
	ss 1	ss 2	combined	ss 1	ss 2	combined
	(1)	(2)	(3)	(4)	(5)	(6)
(i) AT 1941 PRICES						
1. foodgrains	2.21	2.23	2.22	2.33	2.58	2.46
2. milk and milk products	0.52	0.50	0.51	0.54	0.39	0.46
3. edible oil	0.20	0.19	0.20	0.27	0.21	0.24
4. meat, eggs and fish	0.35	0.36	0.35	0.51	0.32	0.43
5. sugar	0.19	0.18	0.19	0.20	0.22	0.26
6. other food items	0.84	0.99	0.92	1.73	1.60	1.68
(i) food total	4.31	4.45	4.39	5.67	5.32	5.53
7. clothing and footwear	0.55	0.57	0.56	0.61	0.81	0.71
8. fuel and light	0.33	0.30	0.31	0.22	0.20	0.21
9. other non-food items	2.04	2.13	2.09	1.49	1.19	1.36
(ii) non-food total	2.92	3.00	2.96	2.32	2.20	2.28
(iii) total expenditure	7.23	7.45	7.35	7.99	7.52	7.81
(ii) AT 1958-59 PRICES						
1. foodgrains	9.25	9.34	9.30	10.27	9.75	10.80
2. milk and milk products	2.32	2.24	2.28	2.09	2.42	1.75
3. edible oil	1.06	0.99	1.02	1.24	1.38	1.10
4. meat, eggs and fish	1.78	1.84	1.81	2.14	2.62	1.65
5. sugar	0.66	0.63	0.64	0.88	0.99	0.76
6. other food items	2.64	2.98	2.81	5.03	5.24	4.83
(i) food total	17.71	18.02	17.86	21.65	22.40	20.89
7. clothing and footwear	2.27	2.37	2.32	2.94	2.54	3.35
8. fuel and light	2.06	1.87	1.96	1.33	1.37	1.28
9. other non-food items	10.64	10.50	10.57	6.59	7.70	5.47
(ii) non-food total	14.97	14.74	14.85	10.86	11.61	10.10
(iii) total expenditure	32.68	32.76	32.71	32.51	34.01	30.99

