

## SCIENTIFIC THOUGHT AND NATIONAL INDEPENDENCE

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### National Independence in The Twentieth Century

The efforts and sacrifices that have been made for the attainment of independence by the nations of the twentieth century must be counted amongst the greatest events of the history of mankind. The intensity and influence of the desire for national independence, which from ancient days has been a fundamental social driving force, have increased so much with the progress of civilization and culture and the growth of thought and of society, that the contemporary search for independence displays a depth which makes it incomparable with that of past centuries. Today it is not only the strongest and most fundamental motive in the theatre of international relations, but also it determines in the internal policies of governments in the socio-economic, political and cultural fields. The life and fate of each individual and each family is at the disposal of, and depends on, the national independence movements.

The protection of borders and of national rights and dignity is the highest duty of the state. The best portion of the material and spiritual resources of nations are allocated to defence. Young men are summoned to serve the flag, leaving their lessons, offices, factories and fields to provide armies with several hundred thousand, or even several million trained soldiers. Strategic installments such as roads, ports and airports are built, armament factories work day and night to turn out the newest and most destructive weapons; and the poor nations are ready to endure sacrifice and hunger in order to secure the price of the munitions they need. Even in places of learning, scientists are engaged in the invention of more and more effective weapons, and all the efforts of the Great Powers to explore space and to develop atomic science are directed towards military goals. In short, the defence ef-

fort is now an all-embracing human endeavour.

Even in the economic field there is massive competition to raise national growth-rates and, to this end, governments limit family consumption, raise savings and investment, build large industrial plants, great dams, motorways, airports and new communications systems. They nationalize heavy industry and natural resources, and their administration replaces private management in many sectors. Indeed, one might surmise that the profound sentiment for national independence is one of the psychological characteristics of the contemporary age. In our time all great revolutions and lesser social upheavals have been closely related to nationalism. Man and woman, young and old, rich and poor, high and low, have all devoted their lives and property to the attainment of what must be counted as a great individual and social ideal.

This historical trend, has, moreover, altered the very structure of the social community. In the past national struggles concerned only the political elite of societies, and victory or defeat often lead to changes in kings or dynastys. But today these struggles embrace all individuals and classes. Moreover, the fall of personal rule and its replacement by popular government, the establishment of the right of general participation in the political sphere and in the determination of social destiny, the progress of education, the bitter experience of the nations of the Third World with imperialism and neo-colonialism, and the appearance of some inhumane philosophies such as *Liebensraum* and racialism, have brought about a deeper consciousness of the value and significance of the national struggle. Nations must win their independence through a bitter struggle since if they submit to the yoke of foreign countries, gradual death accompanied by oppression and corruption will be their lot.

Contemporary historians, in their descriptions of the self-sacrifices involved in this effort, have often concentrated on the African, Asian or Latin American scene. But the heroic defence of the people of Britain against Nazi attacks, and the historic resistance of the cities of Leningrad and Stalingrad, are not lesser examples of this phenomenon than are the struggles of the people of India, Indonesia, Algeria and Vietnam. Every country of the world, whether great or small, rich or poor, industrialized or non-industrialized, has been taken up by this titanic effort.

## Extreme Nationalism

Mme Roland has said "Oh freedom, what crimes are committed in your name!" But these words do not only apply to freedom, other social values can equally well be abused, and the slogan of "national independence" has time and again been used as an excuse for aggression and injustice. Some states have made national power, *liebenarawn*, and their "world mission" pretences for expansionism and imperialism and have identified national independence and freedom with the amoral pursuit of these aims. Thus, during the twentieth century, the most shining period of human civilization, we have witnessed the most cruel of human acts. Aggression and injustice in the name of this great ideal are committed both on a national and international scale. Military and despotic governments and party dictatorships make national independence an excuse for arrogating unlimited power to themselves and for violating fundamental individual rights. Freedom of thought and action, the essential basis for the growth of thought and science, is banished in its name.

The ideology known as "nationalism" appeared simultaneously with the growth of centralized national governments in the eighteenth century. At about the beginning of the twentieth century and after the First World War, this school turned to extreme nationalism and its thought became the basis of some extreme political groupings in Western Europe like the German -Nazi party and the Italian Fascist party. According to this version of the nationalist ideology, all individuals in the community should place their material and spiritual resources at the disposal of the national goal of attaining maximum power on the international scene at any cost and by any means, including a resort to armed force and violence. Thus it sets no store by the freedom of other nations and regards the violation their rights as legitimate.

The recognition of the devastating consequences of the crimes and the injustices committed in the name of national interest has, in recent years, resulted in an attempt to channel nationalism into more constructive paths. It is now admitted that the unlimited pursuit of national goals endangers rather than safeguard national integrity because, if one nation uses unscrupulous means, others are forced to follow suit. Under such circumstances the world community is liable to be dominated by wars and other forms of struggle and to consist of a group of strong nations constantly exerting themself-

ves to protect and expand their national sovereignty, and a group of weak nations, constantly struggling to obtain their freedom. So humanity has come to condemn this kind of nationalism as an aberration of the same order as religious, racial or ideological fanaticisms. Some nations have even moved to the opposite extreme and have not only opposed nationalism as an ideology, but have also upheld the belief that nationality should be negated and all national communities merged into an international community. But this ideal would, once more, lead to the domination of the smaller countries by the great powers and their eventual assimilation and dissolution.

The right path lies somewhere in the middle. A truly free nation is one which respects the freedom of others and thinks and acts towards them in a way in which it would like them to think and act towards itself. The kind of international community formed on the basis of this attitude would be one in which all nations, be they great or small, strong or weak, join freely in a world organization and submit themselves to a freely accepted international law.

### The Independence Movement in Iran

The Constitutional Revolution of 1907 put Iran in the vanguard of the independence-seeking nations. Before that event the despotic Qajar monarchy, in its efforts to maintain its absolute powers, had been driven to satisfy the imperialist desires of Tsarist Russia and the British Empire. It secured their support for its own ends through the signing of humiliating treaties, granting concessions, giving away the independence of the customs, and obtaining loans, weapons and military advisors. With the strength it gathered in this way it tried to prevent the propagation of knowledge and freedom of thought and action so that the Iranian people would remain ignorant of modern scientific, economic, educational and political progress. But despite such efforts, the progress of Europe was too attractive and too forceful to hide from the people of the country for any length of time. In reality the public was aware enough to shake the foundations of despotic power and, in the Constitutional Revolution, to overthrow its state apparatus and thus take the first step along the road to national independence by replacing personal with popular rule.

The first measures of the constitutional regime were to abolish the ob-

stacles to the spread of knowledge and the growth of thought. They despatched students to Europe, founded new schools and introduced the new science into their curricula, set up a college of political science, and allowed a free press and freedom of political activity. Under the impact of new ideas, they tried to introduce general participation in public affairs and to mobilize and organize the forces of the nation by means of national parliament. They provided a political system, and administration, and a legislature modeled on the constitutions of the most progressive European states and passed important and much needed laws.

The Iranian government, pressed by the demands of public opinion, adopted a foreign policy of "negative balance of powers" and attempted to rid the country of the political and economic concessions held by the British and the Russians. The wisdom of this policy showed itself both during the First World War, when Iran remained neutral and thus maintained her national unity and integrity, and in her early recognition of the new Soviet government in 1917. In the period between the two world wars, the Iranian government extended its central authority throughout the country and eradicated the power of the local lords. It built roads between Tehran and the provinces and sent students abroad to learn science and modern technology. During the years after the Second World War the most successful and important events of the independence effort took place. Pressure to sign a concession treaty for the northern oil resources was resisted, Azarbayjan was liberated and the oil industry was nationalized. Further the land reforms of 1341 (1962)<sup>1</sup> were an important and fundamental step towards eliminating the barriers between classes, wiping out local power, and adding to the strength and unity of the nation as a whole.

### The Speed of Scientific Progress in the Twentieth Century

Apart from the effort for independence, other important factors have influenced the nature of twentieth century society. Among these the most fundamental is the scientific progress which began in the sixteenth century and which has gathered momentum ever since. Multiplication of speed is an inherent characteristic of the development of knowledge, each step making a fur-

1. See Darlush Homayoun, "Land Reform in Iran" *Tahqiqate Eqtesadi*, Nos. 5 & 6, 1963.

ther longer step possible, and each discovery of one unknown leading to that of several others. In the modern world this "multiplier effect" has been reinforced by other developments. Changes in the methods of thought and logic, the birth and gradual evolution of empirical method, the practical benefits of scientific discoveries, the availability of capital to finance research and to use its results, the importance of science for the building of powerful and effective weapons, and last, but not least, the problems caused by the increase in population as a result of advances in medical science: these have all accumulated to cause the increasing speed of scientific progress. Steady acceleration has continued for four centuries until it has arrived at the bewildering speed of today. Whereas in the past a few individuals were acquainted with the speed of scientific progress, today new developments are open to, and affect all. Because of this some researchers have tried to estimate just how quickly this development is taking place. A widely supported view is that at present, the scientific knowledge of mankind doubles every thirty years. If we think of the beginning of human civilization, about seven thousand years ago, the speed of scientific growth is such that the road mankind trod over the length of those centuries is now covered in thirty years.

But from the point of view of the countries of Africa, Asia and Latin America, the confinement of scientific development to a specific region of the world, namely to the Western Europe and to those countries settled by peoples of Western European origin such as America, Canada and Australia, is a historical phenomenon of the utmost importance. Whilst other countries, leaving aside a few notable exceptions, do not contribute a great share to this rapid and fruitful progress, they enjoy its advantages and their need for the results of science becomes steadily greater. Each day, from the centres of scientific thought in the industrialized world, from laboratories, research institutes and the brains of academics, a new product, a fresh machine, a novel apparatus, is offered for sale on the world market. New methods for more, better, and cheaper production are developed, and more effective medicines are discovered. More efficient means of communication such as television, faster means of transport, swift jets that travel over the speed of sound and intercontinental missiles are perfected and geared to national economic systems. Satellites equipped with sensitive and accurate apparatus move through space and communicate the results of their measurements to the centres of scientific thought. Each day the brains of scientists and

inventors unravel a greater and more dazzling mystery and express it in ever more complex and perfect theories.

The very speed of western scientific development coupled with the backwardness of the rest of the world has meant that scientists from other regions have not only been unable to contribute their share to the progress of knowledge, but have also been incapable of undertaking the burdensome task of keeping up their own fields because such an effort exceeds their material and educational resources. The able young, returning to their own country after obtaining their degrees in the West, gradually fall more and more behind their European and American counterparts. This is of course a major cause of the "brain drain" from underdeveloped countries, and for them it constitutes a serious loss of resources. The shortage of a scientific cadre is fast becoming more acute, and as the standard of education, particularly at the university level, becomes lower, the efforts of the youth of these countries to seek instruction abroad increases. Although it may seem desirable to stay the flow of talented brains from the country by restricting the number who go to study abroad, such a policy would only aggravate scientific backwardness.

But there is another factor which makes the underdeveloped countries attempt to gain knowledge difficult. Today the boundaries of knowledge are pushed outwards through the exploration of outer space and in the fields of nuclear physics, biology and psychology. But advances in these subjects are of great importance to the security of the Great Powers who guard their secrets as if they were a precious treasure. The greatest task of their espionage services is to prevent the leakage of research results. Even the closest of allies refuse to communicate secrets to one another and care little for the offence of this practice might give. Indeed a point has been reached at which knowledge has become a saleable commodity, exchanged between countries with jealous regard for equal value. Under such circumstances the future of scientific research in underdeveloped countries looks dark. Backwardness has brought a situation in which their representatives participate in scientific conferences as "extras" who boast over the administrative and ceremonial posts entrusted to them, and who make their election or appointment to the chairmanship of meetings and committees look like a scientific discovery in the eyes of their people.

### Imperialism and Anti-Imperialism

The upsurge of scientific discoveries and industrial inventions which occurred in the West during the sixteenth century enabled the Europeans to rule the seas and, with the aid of new weapons, to conquer the countries of Asia, Africa and Latin America. The inhabitants of the colonial territories lacked the scientific know-how to exploit their natural resources so the Europeans, armed with their new technology, were able to obtain and use this wealth. They built industrial and mining installations, drew their labour from the indigenous peoples, and, in return, paid a portion of their profits to the native rulers. Scientific thought enabled them to discover oil, to develop methods for its refinement and transport, and to build machines such as the internal combustion engine to utilize its power. Even today, the people of the underdeveloped countries, despite "nationalization" claims, have failed to deprive European and American companies of the control of their oil. Indeed the extent of foreign exploitation of this invaluable resource is even increasing. (see Table)

Oil Reserves and Oil Extraction by European and American Companies  
in the Middle East and North Africa

Year	Oil Reserves (millions of barrels)		Amount Extracted (I,000 barrels per day)	
	M. East <sup>a</sup>	N.Africa <sup>b</sup>	M.East	N.Africa
1954	103,890.131	123.915 <sup>c</sup>	2,701.1	41.8
1959	175,000	6,500	4,617.541 <sup>d</sup>	77.23 <sup>e</sup>
1964	256,000	22,115	7,576 <sup>f</sup>	1,543

From: *World Petroleum* Jan. 1955, pp. 31&34; Jan 1960, p.38; Jan 1961, p.40: 1966 p.20 &21.

*World Petroleum Report* March 15, 1966. p. 20&21.

- a. The Middle East includes the countries of Kuwait, Saudi Arabia, Iraq, Iran, Turkey, the Neutral Zone and the Sheikdoms of the Persian Gulf.
- b. North Africa includes the countries of Libya, Algeria, Morocco & Egypt.
- c. million 42 gallons barrels.
- d. This figure includes Israel's production which is roughly 2,500 barrels per day.
- e. Egypt's production has been estimated at 58,780 barrels per day.
- f. This figure includes Abu Dhabi's production of 189,000 barrels per day and Israel's production of 4,000 barrels per day.



But it is not only a matter of sovereignty over the oil itself, the underdeveloped countries have also failed to influence the price of their product. The price-index of goods on the world market increased from 100 in 1958 to 167 in 1965,<sup>1</sup> whereas the posted price for one barrel of oil in the Persian Gulf declined from \$2.04 in 1957 to \$1.87 in 1961, and remained at the same level in 1965.<sup>2</sup> The income of European and American companies from Middle Eastern and North African oil, on a fifty-fifty basis, amounted to £1,000,000 sterling in 1965. Some experts think that the proceeds of refining and distribution, and of producing oil-based industrial goods, exceed this sum.

Europe was almost certainly able to make these financial gains because of the existence of geniuses like Lavoisier, Galileo and Einstein and because of her social system, which encourages the rise of such men. In contrast, the lack of scientific personnel in underdeveloped countries compels them, despite their paltry national income, to allocate huge sums to advisers and experts from the scientifically advanced countries in order to purchase ideas for their development plans. We do not even know whether such plans protect the national interests of these countries since, sometimes, they involve abundant profits for European and American business concerns.

The "Imperial Era", that is the period of European hegemony in the world can be directly related to the scientific thought at the disposal of the nations of that continent. England is, of course, the prime example of this phenomenon. Her rule spread to all corners of the globe during the nineteenth and at the beginning of the twentieth century and this was a result of the unique course taken by her modern history: a course which led to the establishment of a social system favourable to the growth of science. As far back as 1215 A.D. constitutional law was established by the Magna Carta and, from that time the British people suffered nearly four hundred years of bloodshed and civil war for the sake of protecting the rights they had established from the machinations of despotic kings and the catholic church. The stabilization of a society favourable to creativity provided an opportunity for philosophers like Francis Bacon and Thomas Hobbes to revolutionize methods

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1. *Statistical Yearbook*, 1966, United Nations.

2. *Petroleum Press Service*, January 1967, p.8.

of thought through the exposition of empirical method. Newton wrote his great work *Principia Philosophica Naturalis* and so gave birth to modern science, and Harvey founded modern medicine with his discovery of the circulation of the blood. As a result of these developments the industrial revolution began early in Britain and, because of this vanguard position, she was able to achieve scientific dominance and world rule.

However, world rule based on scientific supremacy is not a purely modern phenomenon. During the life-time of Aristotle, Alexander achieved his victory over the Persians by means of a much smaller army than his enemies and established Greek influence in the world for centuries. The Ashkanian kings, the successors of the Seleucids, though an Iranian dynasty, even gave themselves the title of the "Hellenophiles". But the interesting is that Alexander was the pupil of Aristotle, and Xenophon was the pupil of Plato, and that it was the existence of a short period of democracy in one of the small cities of the ancient world that gave rise to these great thinkers. So the world power of Britain after Newton bears comparison with that of Greece after Aristotle. In both cases, the crucial element is greatness of thought. Intellectual dominance produces fearlessness in face of the unknown and ensures power to its possessors by providing them with the best means of action and of influencing others.

The growth and success of anti-imperialist movements is also linked to scientific thought. In order to exploit the market and the resources of their colonial possessions, the Europeans had to embark upon large-scale development programmes. They built roads, railways, ports, dams, magnificent houses for their country-men, set up large plantations and extracted mineral ores with new machinery. Their labour requirements forced them to teach reading and writing to the indigenous peoples, to introduce technical knowledge, and to give more wages to industrial workers than to peasants. The result was that a group of literate workers sprang up in the industrial centres and social organization and personal security came to be based on the rule of law rather than on personal or feudal rule. Seeing the life of the Europeans persuaded well-to-do native families to send their children to study and, on their return, these young people brought with them the science, industry and styles of government of the West. Once they had attained positions for themselves they aspired to spread what they had learned among their own people, and one group, possessing stronger personalities and inspired by higher id-

eals than the rest, started the anti-colonial movement. The industrial working class and the urban middle class organized themselves for the national struggle and received the support of the peasantry. Thus the success of the independence movement, whether from the point of view of its formation and growth, or from the point of view of securing the means of revolt, was a direct result of the spread of scientific thought.

But scientific thought has also been responsible for the success of anti-imperialism in another way. The Europeans, who were very conscious of the origins of their hegemony over the colonies, developed their economies very rapidly by allocating an ever increasing proportion of their national income to scientific research. With the discovery of synthetic substitutes for raw materials like silk, cotton and rubber, they became needless of the produce of the colonies. On the contrary, the latter found themselves in increasing need of the artificial materials produced in Europe. Further, in recent years the development of larger machinery, nuclear power stations, aeroplanes, rockets and electronic devices has meant that European industry has moved ahead so rapidly that the underdeveloped countries were in ever increasing need of western industrial and military aid. Eventually this situation came to a point at which political rule implied not only little return for the imperial powers, but also prevented them from making a rational allocation of their resources to scientific research and industrial expansion. Their realization of the need to allocate a maximum of national resources to these activities has been an important factor prompting European powers to hand over independence to colonial territories.

Even now, although millions throughout the world are still rejoicing the attainment of national independence, the intellectuals of the New States are crying out against neo-colonialism, and politicians are complaining about the imperialistic attitude of the Great Powers. But cries of pain are not enough, the causes of neo-colonialism, a much more efficient and destructive genre of imperialism than that of the nineteenth century, must be found. In reality the trouble lies in the underdeveloped countries' need for scientific aid in order to discover, exploit and develop their natural resources, and to build their armed forces. The situation is brought into sharper relief when we take note of the fact that the intellectuals of countries with a small population and little territory but a high level of scientific thought such as Finland, Austria, Denmark, Sweden and Switzerland, have never had reason to complain of neo-colonialism. So the solution for the develo-

ping countries must lie in an attempt to develop a scientific ethos, although this task is made difficult by the efforts of neo-colonialism to prevent them from understanding the real causes of their backwardness.

### Scientific Thought and National Defence

In the final analysis, national independence depends on national defence, in its turn, is based more than anything else on scientific thought. As we have already said, the extensive efforts now being made in the fields of biology, space exploration and atomic physics are directed towards military goals. The power that comes from scientific thought has reached such dimensions, that even the greatest nations of the world, despite their vast resources, large populations, tremendous defence forces and large stockpiles of annihilating weapons, pin their hope for future survival on scientific achievement and live in constant fear of the possibility that one of their rivals will make a more destructive weapon, thus putting their national life and their world position in peril. It is for this reason that, in later years, the attraction of "brains" from other countries has become one of their major policies.

If we look closely at post-war international developments we can see that the rapid progress of science has been the cause of frequent changes in the defence policies of the Great Powers. Their frontiers have spread in an unprecedented manner and now even include the depths of the oceans, the atmosphere and possibly the moon. "Global borders" have achieved the same significance for them as the political borders of former centuries. The cold war, whose central concern was the protection of national frontiers and the creation of military bases, initiated defence pacts all over the world and so drew the small and medium-sized countries into the East-West conflict. But the invention of the intercontinental ballistic missile and satellites has diminished the importance of extra-territorial military bases and has consequently lessened the strategic need for the support of peripheral nations. Thus military aid has been curtailed and defence pacts have evolved into treaties for economic co-operation. The political and economic relations of the countries tied to the two blocs have normalized and nowadays even the purchase of weapons for purposes of regional defence takes place on an economic rather than a political basis. In short, the industrialized countries

have realised that it is better to allocate their resources to scientific and industrial development than to occupy themselves with useless rivalries in the underdeveloped countries. While the yearly defence budget of America and Russia has reached 16,000 million dollars, the total national income of the underdeveloped countries, excluding Communist China, is 180,000 million dollars.

Since national defence depends so much on scientific thought, the scientific underdevelopment of the backward countries has mostly affected their defensive power. Not only are the countries of the Third World unacquainted with atomic defence and forced to buy even their conventional weapons from the industrial countries. However, defensive backwardness does not end here. The technique of war has evolved a great deal in recent years and necessitates a knowledge of mathematics and methods of computation. Military commanders must have able minds and must undergo intensive scientific training. But the academic resources of underdeveloped countries are not adequate to such a task and, as a result, they are faced with the lack of scientific cadre able to manage the war machine.

### Scientific Thought and National Economics

Societies can only attain an independent existence when the goods and services they require are obtained through production or exchange and when a standard of living appropriate to the requirements of the time is provided for their members. Social progress and population growth increase the variety, number, and volume of goods and services required by the community. According to the 1345 (1966) census, Iran has a population of 25,881,090 of which 15,318,231 can be counted as rural dwellers.<sup>1</sup> Despite the fact that peasants and farmers have little acquaintance with the goods and services of an industrial civilization, Iran's imports increased from 41,960 million rials in 1341 (1962) to 73,644 million rials in 1345. During the same years her non-oil exports were 8,606 million rials and 11,810 million rials.<sup>2</sup> Eventually, rapid population growth, the world-wide progress of industry, and ri-

1. *Preliminary Report on the Population of Iran*. 1966 Census Publication No.1 Central Statistics Bureau, Plan Organization, 1966. Tables 1 & 2.
2. *Salnamehye Amare Basarganiye Khareji* (Calendar of Foreign Trade Statistics), Ministry of Finance, 1341 and 1345.

ses in living standards will increase the non-industrialized countries' need for imports. In the case of Iran, oil production has provided the means to purchase foreign goods and services, but many Afro-Asian and Latin American states do not have such an income at their disposal and are confronted with intolerable problems when they attempt to secure their national requirements.

Without scientific thought, which is the creative force and the principle stimulator of the national economy, development programmes will lack dynamism and the society will either postpone providing for the needs of its members, thus facing them with poverty, destitution and even starvation, or will leave the task of exploiting its national resources to foreign enterprises. In such circumstances oil companies would have to restrict their activities to non-industrial fields. It is only with the aid of scientific thought that a country can produce the goods and services required in the contemporary world from its natural resources and exchange them for adequate profit on the international market.

A more detailed discussion of the problems arising from the relationship between scientific thought and various aspects of the national economy has already been under-taken in previous issues of *Tahqiqate Eqtesadi*.

### Scientific Thought and National Culture

National culture is the principle pillar of national independence and its fundamental elements are language, literature, art, music, architecture, life-styles, the principles of education, political and administrative conditions, law morals, religion and social traditions. Like material needs, the spiritual needs of the community develop and evolve, and it is the task of national culture to provide for them. If this task is not carried out people will turn elsewhere to quench their spiritual thirst and national culture will gradually weaken and die. So its defence is of as great importance as the armed defence of national territory and requires massive material and spiritual efforts.

Iranian culture, loved and honoured by the people of this land, is one of the oldest and noblest in the world. As such it has protected our national independence and unity over several thousand years and has been able to survive the defeats of our army at the hands of the Greeks, Arabs and Mongols. The land and heritage that have been handed down to our people today

are the result of the wearying, courageous and valuable struggle of our men of science and of letters which were able to compensate for inefficiency and defeat of some previous kings and war-lords. Indeed the noble old civilization of the Middle East, which was rooted in the democratic Islamic principles of equality, fraternity and liberty, only experienced intellectual decline after the conquest of the Mongols and their rough and despotic rule. Five hundred years ago, Avicenna's Opera was a university text-book in Europe and it was through the reading of Islamic works that Europeans became acquainted with the most advanced mathematics and philosophy.

Today even the most worthwhile work on the history and culture of the underdeveloped countries is a product of the research efforts of European, American and Russian academics. Not only concessions for the extraction of oil, but also concessions for archaeological explorations are given to Europeans and the care, protection and classification of and exhibition of works of our art is their responsibility. The discovery of the Cuneiform alphabet, the reading of Elamite Achaemenian inscriptions, Pahlavi language and literature, the styles of art and history of various ages, have all been achieved by academics from the same societies that have witnessed the discoveries of astronomy, physics and chemistry during the last century. So the level of scientific thought is the general criterion of the cultural performance of a society, its progress and decline being always reflected in every aspect of social life.

The contemporary world is a world of science and of industry and each one of us has, in order to work and to enjoy the benefits of the new civilization, need of scientific and industrial knowledge. So nations have to help citizens to acquire this knowledge since otherwise they will find themselves without work and income and exposed to the perils of extinction. With some exceptions arising from social and economic conditions, the income paid on account of work is directly proportional to personal know-how. An engineer's salary is greater than that of a skilled worker, and his, in turn, are greater than those of an unskilled worker. In other fields of economic activity the situation is the same and this is one reason why the world over youth clamours for admittance to training centres and seats of learning. Thus, in its confrontation with scientific civilization, Iranian culture is facing the greatest trial of its history and, to come out of the ordeal victorious, it must absorb what it can of that civilization and offer it to its citizens as

their own "national culture".

Language is of fundamental importance to national culture for it is through this medium that men of different nations are distinguished from each other and communicate with each other. In underdeveloped countries words and expressions related to science and industry are necessary for the conduct of every day life and, if the language is unable to satisfy this need then it will be replaced by another. Scientific concepts can be regarded as understood by a society when suitable words and expressions have constructed for them and when a scientific ideas can be expressed in the mother tongue. In Iran this success requires a long and persistent effort by our academics who, if they have a full knowledge of one branch of science, should provide a firm basis for it in our country by writing books and articles and translating fundamental texts. In doing this they would be following the example of old Iranian scientists like Farabi, Rhazez, Al Biruni, Aviccena and others who lived in the fourth and fifth century of the Hajira. The strength of the English, French, German and Russian languages, and their diffusion throughout the world, is a consequence of the strength of European scientific thought and the success of European scientists and inventors. The children of underdeveloped countries are sent abroad to study one of these tongues in order to acquire the skill which is so vital to their daily lives and, in the future, to keep up with new scientific developments.

Unfortunately Iranian writers are not well acquainted with scientific problems and Iranian scientists do not generally write good Persian, so our students and scientists are forced to read scientific works in a European language. Some Asian, African and Latin American countries have even decided to use two languages because they have found themselves unable to make the effort needed for the absorption of scientific civilization. English or French has become their intellectual or academic language and their own tongue is used only for everyday conversation. But it is clear that, as industrial civilization takes hold in their countries, the scientific industrial language will replace their own and the rest of their native culture will gradually weaken and wither away.

### Scientific Thought and National Planning

Legally speaking all nation-states are equally independent. However,



just as the individual's freedom depends on his level of thought and knowledge rather than on purely legal definitions, so the real independence of a nation depends on the level of its scientific thought. The goals of national independence can only be attained through large scale efforts and sacrifices and the organization of material and spiritual forces within the framework of a comprehensive national plan which aims at raising the level of thought. It was a small laboratory test tube which placed the power of the hydrogen bomb at the disposal of the advanced nations, and it is through the same means that the contemporary underdeveloped countries will attain the benefits of the new civilization and acquire national independence.

The degree of creativity of thought is the criterion by which we should judge the progress of nations, the political health of states, and the efficient execution of plans. This type of change must take place not only through large scale investments but also in the depths of the minds and souls of men. Investments are usually justified by the huge sums spent on them, but what really matters is their rate of return. The purchase and installation of heavy equipment, especially for heavy industry, in such a way that it does not become a long-term burden on national income, is unquestionably beneficial, but is still not enough to achieve scientific growth.

The creation of ways of thought that would enable independent industrialists, agriculturists, shop-keepers and peasants to run their business with efficiency and produce marketable goods and services is a difficult task. In the last analysis, the level of a national income, like that of individual income, is dependent on its level of scientific thought. In the same way as an engineer receives more pay than an unskilled worker, a scientifically minded society can make more money and live in greater comfort than an unscientifically minded one. If society wishes to progress it must, like the individual, sacrifice immediate enjoyment of a considerable portion of its income and put its material and spiritual forces to work on the development of thought. In short it must accept the same deprivations and suffering than an individual who wishes to become a doctor, lawyer or engineer, has to accept.

Extensive capital investment in all sectors of the economy is necessary and urgent. But a comprehensive national plan not only consists of a list of more or less justifiable investment prospects but also of an all round effort to create and implement projects such as land reform and a literacy corps, with the aim of developing a suitable atmosphere for the growth of thought

and the blossoming of talent and for preparing the public to make the sacrifices needed for a great leap forward. It is in this way that the nation led by scientific thought will develop with increasing speed to the higher stages of civilization and progress.



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