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CHINA REPORT

SCIENCE AND TECHNOLOGY

CONTENTS

PEOPLE'S REPUBLIC OF CHINA

ABSTRACTS

MA HONG DISCUSSES CHINA'S STRATEGY FOR DEVELOPMENT

Tianjin KEXUEXUE YU KEXUE JISHU GUANLI [SCIENTIOLOGY AND MANAGEMENT OF SCIENCE AND TECHNOLOGY] in Chinese No 1, 1984 pp 2-4

[Article by Ma Hong [7456 3163], Chinese Academy of Social Sciences: "Study and Formulate the Guiding Ideology in the Development of our National Strategy"]

[Text] Editor's note: The article carries excerpts from the speech by Comrade Ma Hong, a noted economist, delivered at a symposium on the overall strategy of economic, social, scientific and technological development, held under the auspices of the Technical Economics Research Center of the State Council. The content of his speech was very rich. This is only a small part of the "Study and formulate the guiding ideology in the development of our national strategy" and "Problems that need to be addressed in particular." The subtitles have been added by this publication.

Guiding Ideology

(1) We must combine the universal truth of Marxism with our country's actual practice, taking our own road. This means that the building of socialist modernization must proceed from China's realities. Our understanding of the importance of this issue has deepened continuously with growing experience and lessons learned in the process of our socialist construction. For example, our building of socialist modernization started at a low level, the completion of socialist modernization, therefore, will be a comparatively long process. Comrade Deng Xiaoping once said "we must always remember that our country is large, populous and has a poor foundation to start with. Only with a long struggle can we reach the level of developed countries." Previously our demands for economic construction were too high and too fast; we made the mistake of "speed-up theory," because we had overlooked this characteristic. In the future we must avoid repeating this kind of mistake. Another example is: Because of the imbalance of development in various areas of our country formed in the course of history, modernization will inevitably be accomplished earlier in some places and later in other ones. The guiding principle of the Party and the state is to allow a part of areas to get rich first. To be sure, all the areas will eventually accomplish the modernization and get rich, but it is difficult to change the formed imbalance entirely within a short period. Naturally, we still need to do a

great deal of investigation and study to gain a clear idea of the state of our country and determine the correct development strategy. In his opening speech at the "12th Party Congress," Comrade Deng Xiaoping stressed that "our building of modernization must proceed from China's realities. No matter in revolution or in construction we should learn and draw on the experience of other countries. But we can never succeed if we imitate and copy other countries' experience and models. In this we have had a lot of lessons. Our basic conclusion drawn after summarizing the long historical experience is to combine the universal truth of Marxism with our country's concrete practice, take our own road and build socialism with distinct Chinese features." These words profoundly and brilliantly expound our strategy in the overall development, which is to combine Marxism closely with China's actual practice, with Marxism guiding us. In particular, the strategy in the overall development to be studied and formulated must have the following three basic features: (a) It should have distinct Chinese features, not a copy or imitation of other countries' models. (b) It must adhere to the socialist road, continuously perfecting our socialist system and fully bringing out socialist superiority. We must not engage in capitalism. (c) We want to accomplish our modernizations and not lag behind. We must work hard for rapid development and progress.

(2) We must combine the strategies in economic, social, scientific and technological development in our comprehensive study. We study the overall development strategy. But as economic development and social, scientific and technological development influence and condition each other, paying attention to one development or two, and neglecting the rest, will inevitably result in falling short of the goal. Even if we achieve some temporary success, it will not last. Therefore, we must study comprehensively these development strategies and make them develop in a coordinated way. The basic contradiction of socialist society is still the contradiction between production relations and productive forces, between superstructure and economic base. Coordinated economic, social, scientific and technological development can help eliminate this contradiction. We have now made progress in our study of economy, science and technology and the relation between them. We must continue our study thoroughly. The economic development strategy is the basis and the main component of the overall strategy. Undoubtedly, we must put our main strength in it. However, various social factors, such as the evolution of history, cultural origins, national traditions, population, human quality, social structure, management systems, etc. are also closely related to the development of economy, science and technology. In the past, our study of these factors and the relations between them and the development of economy, science and technology was far from enough. This should be brought to our attention.

(3) We must handle correctly the relationship between the speed of development and the actual results. In dealing with the relationship between the speed of the whole economic, social, scientific and technological development and actual results we must always place the enhancement of actual results in the first place. We can not infringe economic results to pursue temporary high speed. We have already learned lessons about this in the course of our

construction. We can neither reach for what is beyond our grasp, nor believe that we can quickly catch up with and surpass the level of developed countries. With regard to this, I think we must understand well the two passages of one of Comrade Deng Xiaoping's speeches. In his "Current situation and tasks," Comrade Deng Xiaoping pointed out that "We have all kinds of advantageous conditions, and unquestionably we will catch up with the world's developed countries. But we must also understand that in order to narrow and eliminate the gap created in the past 2-3 centuries, at least more than 1 century, we must have the determination for a long-term struggle. For a fairly long time we cannot but encourage and make arduous effort." During his conversation with a delegation from a Western European country in 1979, Comrade Deng Xiaoping said that by the end of this century our economic level naturally cannot yet reach your country's present level. It will be terrific if our technological level can reach your present level. The central authorities have emphasized again and again that every economic work must be put on the track of enhancing economic results. This is the policy put forward to counter the past and still existing situation of fast economic growth but with poor economic results.

Problems That Need To Be Carefully Considered

(1) We must give consideration to the characteristics of our development strategy. As mentioned above, the guiding ideology in the development of our strategy is to combine the universal truth of Marxism with our country's concrete practice, taking our own road. The concrete practice is the state of a country. Every country has its different national conditions, for instance, different social systems, population, educational level, territory, natural resources, world situation, the time it is in and international status, etc. All these are concrete realities to be taken into consideration when a country's development strategy is being formulated. Each country's present basis of productive forces, scientific and technical situation, cultural, educational and management levels, etc. are also factors to be considered in formulating the development strategy. It is, in particular, the social system that should not be ignored. Thus, the formulation of each country's development strategy must be based on the national conditions, and should not be copied or imitated, or else it can hardly succeed. The result of such practices in many developing countries that imitated the traditional strategies of developed countries has been their inability to achieve accelerated economic growth; and what is more, it has resulted in many foreign debts, inflation, increase of unemployment, severe social problems, and further dependence on developed countries. So now they are seeking new strategies. We must, on the one hand, study other countries' development strategies and relevant theories, for example, works on "growth limit," "the third wave," etc., so that we will "know ourselves and know others," broaden our thinking, and on the other hand, be on guard against spiritual pollution spread by capitalist scholars.

At different historical times a country has different missions and corresponding strategies. The Party's "12th Congress" has pointed out that our country has entered a new historical era. Therefore, we should not copy our previous strategy without any analysis.

Our development strategy must be a strategy of Chinese styled socialist modernization. We must take Marxism-Leninism and Mao Zedong Thought as the theoretical basis to formulate our strategy. In considering the characteristics of our strategy we should keep these requirements in mind.

(2) We must formulate a set of perfect objective and index systems. The Party's "12th Congress" has defined our general mission and our general objective of development in the new era, which are also the general objectives of our development strategy. The general mission and general objective are to build a modernized strong socialist country with distinctive Chinese features. The objective was determined after summarizing the experience of more than 30 years since the founding of the People's Republic of China, and after studying comprehensively the characteristics and trends of the present social development. It is in accordance with the law of social development.

An objective consists of a complicated and enormous set of goals, and the general objective is the high-degree condensation of the whole set of goals. The set of goals includes subsets of goals in economy, society, science and technology, culture, environment, etc. And under the subsets there is another level of goals. Thus, a multi-level structure of goals is formed.

China is a country that has a planned socialist economy. The system of planning targets plays an important role in the country's development. The system of planning targets must reflect the demands set by the objective system to ensure the accomplishment of the goals.

Our index system must be a comprehensive system that embodies the overall development needs. It includes both quantity index of economic growth and quality index of economic results. There should be both economic index and social, scientific, technological, environmental and living quality indexes, index for material civilization and index for spiritual civilization, etc.

It needs careful work to formulate a fairly perfect index system. The State Planning Commission and the parties concerned are at present working on this. We can make suggestions on the principles in index system formulation and on the main contents it should include.

(3) We must choose an appropriate way to develop productive forces. In studying our development strategy we face a key question, that is, how do we speed up the development of productive forces. Can we have the following choices to develop productive forces?

a. The road the developed countries have taken, that is, to start the so-called "4th industrial revolution" after the so-called "3rd industrial revolution." In other words, we would first go through the traditional industrialization period, then enter the period of newly rising industries.

b. The strategy of "try hard to catch up," that is, to surpass or catch up with the level of the developed countries in main areas, or even in every area.

c. The strategy of standing for "self-reliance" in everything, not to use actively, or even reject to use advanced foreign technology.

d. Instead of following, in a prescribed order, the roads--no matter successful or failed--developed countries have taken, we can use the present opportune moment to our advantage, in the light of our national conditions, skip certain phases of traditional industrial development, use directly various new results of the so-called "4th industrial revolution." In other words, under our present circumstances and within possibilities, we can use the technology of the "4th industrial revolution" of other countries that is suitable to our needs.

Are there other roads? If any, I would like to ask comrades to put them forward for discussion.

I think when we make our choice we must take care to separate the process of actual development in other countries from objective law. As in the capitalist society contradictions existing between production relations and productive forces cannot be overcome by their own strength, they restrict and hinder the smooth development of productive forces. The roads that were taken by those countries, therefore, may not be in accordance with economic laws. We should never follow the roads that developed countries have taken.

(4) We must coordinate economic, social, scientific and technological development. Coordinated economic, social, scientific and technological development is a law. Any country, if going against the law, not only will fail to achieve comprehensive, healthy growth, but also will encounter many serious problems. This can be fully illustrated by the economic crises, political and social upheavals, spiritual and cultural decadence, etc. in capitalist society.

One of the important questions to be addressed in the development of our strategy is how to carry out the coordinated economic, social, scientific and technological development.

At present we should, in particular, pay attention to the impact of social factors on the development of economy, science and technology. The changes in economy and social relations brought forth by the development of productive forces will inevitably bring changes in ways of social life, thus posing new demands on social control. Furthermore, social development will also bring forth changes in the people's concept of value. Studying these changes will be meaningful in building socialist spiritual civilization, improving human quality and promoting economic, scientific and technological development.

(5) We must give consideration to the impact of international circumstances. In formulating our development strategy, we must study the economic, social and political trends of the world, the development strategies of other countries and their tactics that we may apply. This is very important not only to our foreign trade development strategy, but also to our general development strategy, because if we have the necessary conditions, we can take the

favorable opportune moment of the international situation to enhance the progress of our modernization. The opposite would hinder the progress of our modernization. Therefore, we must also conscientiously address questions as to which favorable international conditions to take and which unfavorable international influence to overcome.

(Editor-in-charge: Fu Li [2105 3680])

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KEY TO TECHNICAL TRANSFORMATION IS SCIENTIFIC, TECHNOLOGICAL PROGRESS

Tianjin KEXUEXUE YU KEXUE JISHU GUANLI [SCIENTIOLOGY AND MANAGEMENT OF SCIENCE AND TECHNOLOGY] in Chinese No 1, 1984 pp 5-8

[Article by Luan Zaochun [2940 2483 2504], Heilongjiang Provincial Academy of Social Science: "The Strategic Ideology Governing Our Progress in Science and Technology and Improvement of Industrial Technology"]

[Text] Under the prerequisite of scientific and technical progress, the technical transformation of industry in a planned way, step by step, with priorities, is an important strategic measure to accomplish our objective to quadruple the gross industrial and agricultural output value by the year 2000 on the basis of increasing economic results. How do we speed up the realization of scientific and technical progress in China? How do we combine effectively progress of science and technology with technical transformation of our industry? How do we carry out technical transformation? These are the important questions at present that need to be carefully solved.

I. Basic Concept and Historic Mission of Scientific and Technical Progress

In economic construction, countries throughout the world have basically developed two different economic development strategies: one is the development strategy of extended reproduction mainly relying on extension; the other is that of extended reproduction mainly relying on intension. It is more appropriate for a country with a comparatively backward economy and a weak basis to have a development strategy of extended reproduction mainly relying on extension at the early stage of its economic development, for example, during our First Five-Year Plan period when the foundation was being laid. At that time we concentrated on building 156 large above-norm construction projects. For a country with more developed economy and relatively strong basis extended reproduction should rely mainly on intension, fully explore the potential of existing enterprises, and constantly improve labor productivity with progress of science and technology. Industrially developed countries use the development strategy of extended reproduction mainly relying on intension. Among the factors that influence the rise in productivity, progress of science and technology has taken up a relatively dominant position (as generally believed around 60-80 percent).

After more than 30 years' economic construction, our industry has begun to take shape, with a fairly solid base. As we march on towards our objective of modernization by the year 2000, our economic development strategy must be shifted from extended reproduction mainly relying on extension to that mainly relying on intension, bring into full play the role of the present 400,000 industrial and transportation enterprises, carry out technical transformation so that they will reach or approach the advanced world levels.

Since 1980 China has begun to shift its economic development strategy. However, due to the influence of force of habit, traditional ideas and traditional management styles, the shift has been very slow. A considerably large number of departments and areas are still implementing the strategy of extended reproduction mainly relying on extension. In the name of building the four modernizations and "quadrupling," they continuously expand capital construction, one-sidedly pursue speed and output value. Furthermore, the dispersion in financial and planning management makes it difficult to control the scale of capital construction or to achieve the goal of increasing economic results.

We have been stressing in these years technical transformation of our old enterprises, but for various reasons, such as a shortage of funds (most projects need bank loans, unlike capital construction projects that have state investments), gaps in the supply of goods and materials (fairly large gaps in the supply of goods and materials needed for technical transformation projects, unlike capital construction projects with guaranteed material supply), insufficient technological forces, etc., it is difficult to carry out a real technical transformation. In a large number of departments and enterprises, technical transformation exists only in name, not in reality. Extended reproduction mainly relying on extension is still going on at original level, which is, in fact, capital construction in disguised form, as described as "extension within the plant." This method is still quite common today.

Therefore, we must reform the "extension within the plant" way of technical transformation and emphasize that technical transformation be carried out on the condition of scientific progress, and apply the "four new" scientific and technological results. We want to improve product quality, economize on energy and raw materials and improve the working conditions, but the basic objectives must be rise in productivity and overall social results. We must fight against "duplicating antiques" and will not arm our new enterprises with outdated equipment discarded by others.

We stress that technical transformation must be carried out under the condition of scientific progress. So what is progress of science and technology? At present, views on its definition still differ; the general explanation in various countries is: It should not be considered the progress of science and technology only. Countries like the United States and Japan believe that everything, except labor and capital, that brings forth economic development has a role in progress of science and technology. Countries like the Soviet Union and Eastern European countries believe that the ultimate role

of scientific and technological progress is mainly embodied in increased collectivity in production and rise in labor productivity, in other words, scientific progress also includes management progress.[1]

We also think that scientific and technological progress should be understood in a broad sense. It includes not only progress of science and technology, but also the improvement of the scientific management level. Based on this broadly defined understanding, we have calculated the ratio of various factors in the development of Helongjiang's light industry between 1976-81, according to which the role of progress of science and technology made up only 22 percent, with 78 percent relying on capital and labor. This shows that in those years we were still taking the road of extended reproduction mainly relying on extension.

Proceeding from our actual national conditions, in order to reach the goal of "quadrupling," progress of science and technology, as a factor in development, must make up more than one half. This can be clearly seen in the area of energy funds.

How much capital do we need in order to reach the goal of 2.8 trillion yuan of gross industrial and agricultural output value by the year 2000? If we take the national average level using 1:1 ratio between output value and investments, then we need an enormous investment of 2.8 trillion yuan. If the entire nation can reach Shanghai's advanced level (in light industry the ratio between output value and investments in 1981 was 1:0.6)[2], then we need 1.7 trillion yuan investment, which is also a very large amount. What do we do to reduce 40 percent of investments? We must rely on progress of science and technology.

How much energy do we need in order to reach the goal of "quadrupling" the gross industrial and agricultural output value? Using the present energy consumption level (100,000 tons of coal for every 100 million yuan output value), by the year 2000 we need about 2.8 billion tons of coal, a difficult target for our energy industry to fulfill. The present comprehensive energy utilization rate is only around 30 percent (only 33 percent in Shanghai), but the advanced level in foreign countries is around 50 percent. If we can increase the energy utilization rate to the advanced international level, we can reduce 40 percent of our energy consumption. To accomplish this task we must also rely on progress of science and technology. Thus, one can see that science and technology are entrusted with an extremely important historic mission.

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1. Yang Weizhe [2799 4850 0772]. QIANTAN KEJI JINBU DE ZUOYONG HE RENWU [ELEMENTARY DISCUSSION ON THE ROLE AND MISSION OF SCIENTIFIC AND TECHNOLOGICAL PROGRESS], NEIBU TAOLUN [INTERNAL DISCUSSION] No 80, 1982.
2. Bureau of Light Industry of Shanghai. GAIZAO SHANGHAI QINGGONGYE FAHUI GENG DA DE ZUOYONG [TRANSFORM SHANGHAI'S LIGHT INDUSTRY, BRING IT TO PLAY A LARGER ROLE].

II. The Question of Combining Scientific and Technological Progress With Technical Transformation of Industry

How is scientific and technological progress to accomplish its historic mission to "quadruple"? Acceleration of scientific and technological progress and close integration of scientific and technological progress with technical transformation in industry are the very important strategic guiding principles.

First, we must accelerate the pace of progress of science and technology, so China can attain the advanced world level just as quickly as possible and greatly shorten the distance to the advanced world level.

As to how to achieve progress of science and technology in various countries, we find different models throughout the world, each according to different national conditions:

A) Original Creation Model

This is the model used by countries whose science and technology are in the leading world position. These countries rely mainly on their own strength to achieve scientific progress. Exploration of new technology and invention of new products are often made through a whole research process from basic research through application research to development research. This type of country can be represented by the United States.

B) Import Model

This is the model applied by countries with comparatively low scientific and technological level and comparatively backward industry. These countries rely mainly on advanced foreign technology introduced into their countries to achieve their own technological progress. This type of country can be represented by Japan.

C) Comprehensive Model

This is the model applied by countries with fairly high scientific and technological level, and fairly developed industry. These countries apply comprehensively the two models mentioned above, relying both on their own strength and on imported advanced foreign technology to achieve their own scientific and technological progress. The representatives of this type are the Federal Republic of Germany, France and England.

Countries throughout the world, in accordance with their national situation, have applied different models in different periods to enhance their scientific and technological progress. The 19th century United States was still a second-rate country; then it imported a large amount of advanced technology from European countries, such as England, Germany, etc., thus was applying the import model. Japan, after having achieved scientific, technological and industrial modernization, has begun to move to the model of original creation, with emphasis on using its own scientific and technological strength to achieve technological progress.

Which model should China apply to achieve its scientific and technological progress? Proceeding from our national situation that our scientific and technological level is 20-30 years behind other countries, we should apply the import model as the main form. This way, we can attain the advanced international level within a fairly short period, and fairly quickly narrow the gap between our level and the advanced world level. In view of the present situation within the country there is a 10 to 20 year technological gap between advanced and backward areas (e.g. Shanghai and the interior), and there is a considerable technological gap between advanced and backward departments (e.g. most advanced branches of war industry or electronics industry and units of basic industries), we must also achieve progress of science and technology in those backward areas and departments by applying the import model. Thus, the import model has general significance to our scientific and technological progress. It includes not only importing technology from outside, but also shifting technology from within. If the import model is applied, we can achieve our scientific and technological progress through the following three ways:

A) Import important advanced technology from foreign countries. Our general objective is that our economy attain the late 70's and early 80's level of the advanced countries by the end of this century. To reach this goal, part of our products and technology must attain such a level now. Under the condition that we do not violate economic law, we should directly utilize some scientific and technological results of the advanced countries of the world.

B) Transfer advanced technology within the country from advanced areas and departments to backward areas and departments. There are multiple levels co-existing in technological development. It is impossible to have the entire industrial structure knowledge-densified. Some backward areas and departments should first develop towards industrialization. Advanced technology should be shifted there from advanced areas and departments.

C) Transfer advanced technology from military areas to civilian areas. Scientific research of the original creation model should be in the second place and in fairly small proportion. However, our scientific and technological progress has for a number of years followed the original creation model. Scientific research departments of various places are used to research by setting up research tasks in an original creation fashion. This method is not suitable because we want to progress in science and technology as soon as possible, and this method is divorced from our national conditions.

In order to combine scientific and technological progress with the improvement of industrial technology we must now overcome three obstacles:

A) Obstacle in systems:

We must promptly restructure irrational management system in scientific research and irrational economic management system, so that scientific research--technological progress-technical transformation--economic development can merge into an integral whole.

Right now we have more than 10,000 scientific research organizations of all scopes, with a very small number of them engaged in basic theoretical research. The overwhelming majority are engaged in applied and development research. Most of them (more than 80 percent) are independent scientific research organizations under the bureaus in charge and scientific and technological commissions. Their contact with enterprises is not close. Research institutions (or research departments) in enterprises make up only a very small proportion. Joint research and production organizations have just been started in our country. In terms of management system, the relation between research and production is not close.

We have no research organizations yet that deal specifically with importing and transferring technology. Importing and transferring technology is not included in research plans. For a number of years work of importing technology has been ineffective; foreign advanced technology has not been fully digested and absorbed, thus re-creation on the basis of imported technology is very poor. Attention was never paid to transferring and popularizing technology. Scientific researchers were not very willing to be engaged in such activity, because there was no incentive; no results in this area could be reported.

Also, we have no research organizations that are set up with technical transformation of industrial enterprises as their main research orientation. Neither ministerial nor local research institutions have included technical transformation of industrial enterprises as their main research task. Thus, technical transformation of our industry has not received strong support from scientific research departments.

I propose to restructure the current scientific research insitutions. On the one hand, we should develop vigorously enterprise research units and joint research and production organizations, on the other hand, we should readjust the research direction of the current ministerial and local research institutions, making it clear that their main research task is to engage in technical transformation of industrial enterprises, importing from foreign countries technology and transferring technology at home.

Economic management departments must change their previous way of management that put emphasis on production, not on scientific research, so that enterprise scientific research, production and marketing can become an integral whole. If conditions are available, units of scientific research, designing and testing should be increased, labs or test production workshops should be set up throughout the enterprises.

B) Obstacle in policies:

We must promptly reform irrational policies on management of new technology and products, change tax and price policies that are unfavorable to new products. We should put not only pressure but also motive force on technical transformation of enterprises, thus achieve better economic results. We must ensure the smooth technical transformation in policy. Technical transformation projects should be carried out with planning, funds, and materials, etc.

First, we must formulate an overall plan for technical transformation of industrial enterprises, which should be a 5-level plan, including technical transformation plans of industrial branches, products, areas, key cities and key enterprises, this way technical transformation can be carried out step by step in a planned way, with priorities.

Technical transformation projects in the style of "extension within the plant" must be stopped. Technical transformation should be accomplished under the condition of scientific and technological progress. At present we must give priority to those projects that deal with energy saving and reduction of raw material consumption.

C) Obstacle in qualified personnel:

Right now one of the important reasons that the vast medium-sized and small enterprises find it difficult to carry out technical transformation is a shortage of scientific and technological personnel. We should formulate a policy to import intelligent and qualified personnel, a policy to use rationally scientific and technological personnel, deploy such personnel in all areas to support technical transformation. We can also launch the technical transformation in industrial enterprises by bringing in and shifting around qualified personnel, as well as by seeking scientific and technological advice.

Only by combining progress of science and technology closely with technical transformation in industrial enterprises, can we really carry out our economic development strategy of extended reproduction relying mainly on intension and reach the magnificent goal of quadrupling the gross industrial and agricultural output value by the year 2000.

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USE OF SYSTEMS ENGINEERING TO PROMOTE SCIENCE AND TECHNOLOGY URGED

Tianjin KEXUEXUE YU KEXUE JISHU GUANLI [SCIENTIOLOGY AND MANAGEMENT OF SCIENCE AND TECHNOLOGY] in Chinese No 1, 1984 pp 18-21

[Article by Tang Wanfang [3282 8001 2455], Shanghai City Scientific and Technological Commission: "Attempt To Employ Systems Engineering Methods in Arranging the Development Plan of Shanghai's Science and Technology"]

[Text] Only by applying the method of systems engineering can Shanghai's long-term plan be formulated in a systematic, comprehensive and superior way and in accordance with the law of economic development. Plans for scientific and technological development must take a step in advance, thinking in an even longer term. This is because: 1) it takes 12-15 years or even longer for basic research to reach an initial standard and be transformed into a productive force; 2) we will encounter many difficulties in our economic construction and social development. Scientific research must be organized to tackle key problems, which requires a certain period, therefore we must make arrangements in advance; 3) we need more than 10 years to educate and train scientific and technological personnel.

Early this year the Shanghai Scientific and Technological Commission began to organize forces to draw the city's 15-year (1986-2000) plan for scientific and technological development, it tried the method of systems engineering and made the best effort to achieve the following three points:

1) To attempt to find ways in systems analysis that are suitable to Shanghai's rapid development; 2) to reach the best overall results in light of our systematic objectives; 3) to have the best methods or ways to realize these objectives.

I. Use the three-dimensional structure to work out the procedure for a scientific and technological development plan.

To work out the whole plan is a complicated job of organization, investigation and research. The work involves organizing the division of labor and the cooperation of various specialists to find, on the basis of the law of the development of things, the thinking process that is in accordance with logic, and to divide the work into several phases to carry it out step by step. According to A. D. Hall's "A Methodology for Systems Engineering,"

we can use the 3-dimensional--dimension of speciality, dimension of logic and dimension of time--structure to arrange and resolve the procedure of plan formulation.

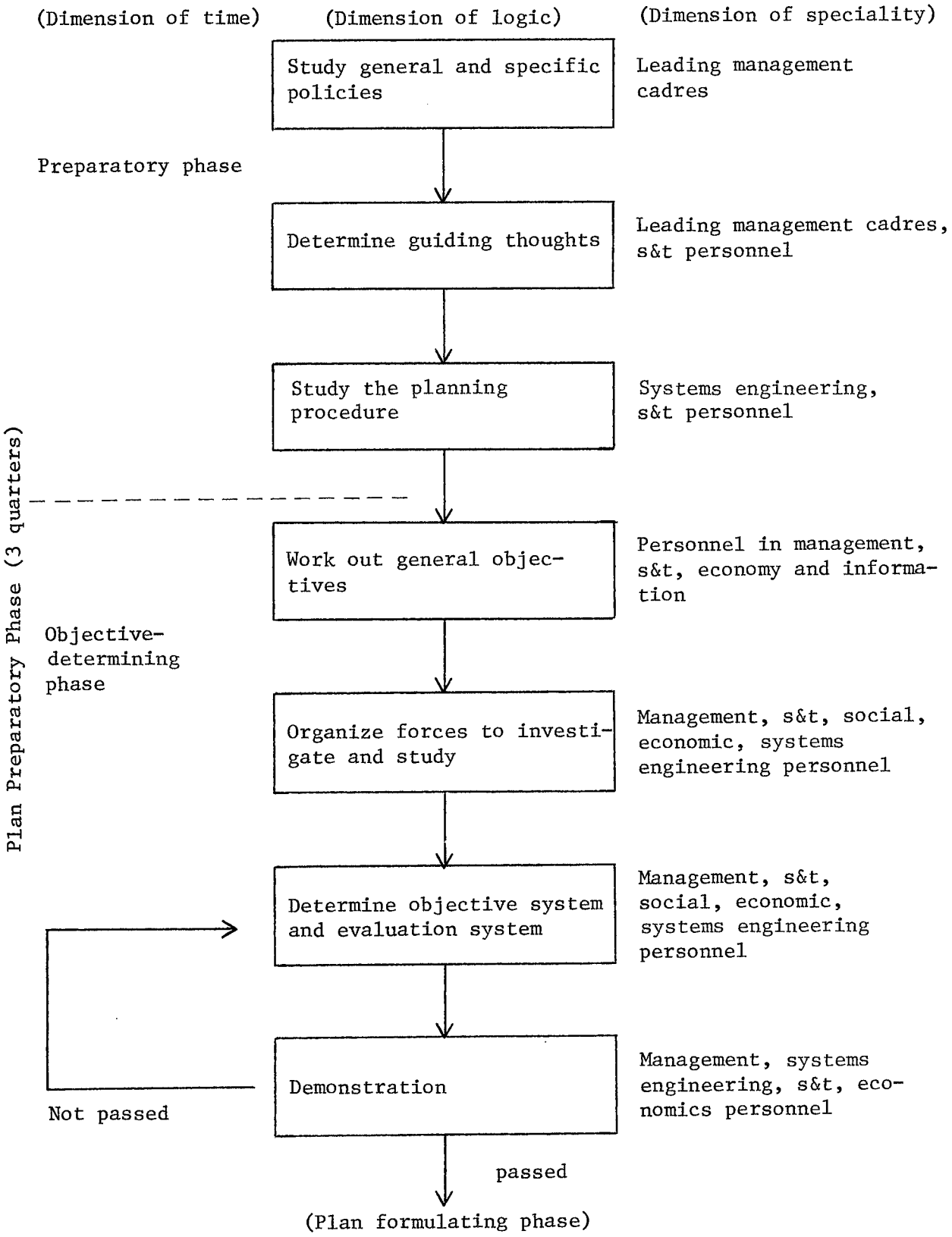
The first is dimension of time. The whole process of a plan formulation should include preparatory phase, designing and perfecting phase, implementation phase and renewal phase. According to the state's requirement and the steps to put forward and in the light of this city's concrete situation, we divide the formulation of the plan into three main phases: 1) plan preparatory phase, that is, earlier stage. The duration of time: 3 quarters; 2) plan formulating phase, that is, designing. The duration of time: 3 quarters; 3) assembling phase, that is selecting the best. The duration of time: half a year. The whole planning is to be completed in 2 years.

The second is dimension of logic. Using systems engineering to analyze questions, the procedure of identifying the issues, choosing the objectives, investigating and studying, systems analysis, systematic selection of excellence, decisions, implementation, etc., is, in general, adopted. Our procedure of planning basically follows such logic.

The third is dimension of speciality. Scientific and technological work should be geared to economic construction. Economy, science and technology, and society should develop in a coordinated manner. A scientific and technological development plan, therefore, cannot purely rely on scientific research personnel, it must also rely on personnel in social sciences, economics, management, information, forecast, etc.

The following is the concrete procedure we have worked out for the three main phases of our plan formulation, based on the 3-dimensional structure:

1) Plan preparatory phase, divided into phase of preparation and phase of objective-determining. The 3-dimensional structure is illustrated as follows:


(Dimension of time)
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Study general and specific policies
Leading management cadres
Preparatory phase
Determine guiding thoughts
Leading management cadres, s&t personnel
Study the planning procedure
Systems engineering, s&t personnel
Plan Preparatory Phase (3 quarters)
Work out general objectives
Personnel in management, s&t, economy and information
Objective-determining phase
Organize forces to investigate and study
Management, s&t, social, economic, systems engineering personnel
Determine objective system and evaluation system
Management, s&t, social, economic, systems engineering personnel
Demonstration
Management, systems engineering, s&t, economics personnel
Not passed
passed
(Plan formulating phase)

The basis for successful planning is to identify issues and unify ideological understanding. Shanghai's system is grown in the circumstances of the entire country (or called exterior system). It maintains its strong vitality only if it adapts itself to the changes of the circumstances. Thus, in working out the procedure, we must first study the related documents of the Central Committee, have a good grasp of the state's policies and principles on science and technology, economy and restructuring of the systems. On the basis of our study and after discussions again and again, we have come up with four guiding thoughts concerning the plan formulation:

1. Change the previous practice of proceeding purely from scientific and technological development without consideration to economic construction, social development, market needs and economic results. Scientific and technological work must fully embody the coordinated development of s&t, economy and society. It must be geared to economic construction, making contribution to the goal of "quadrupling the gross industrial and agricultural output value."

2. Change the previous practice of relying on a few people's brains. This time we rely not only on scientific and technological specialists, but also extensively on economists, management specialists, social scientists, and information specialists. In terms of methodology, we must make the widest possible use of scientific management methods, such as systems engineering, mathematical statistics, forecast and optimization, etc.

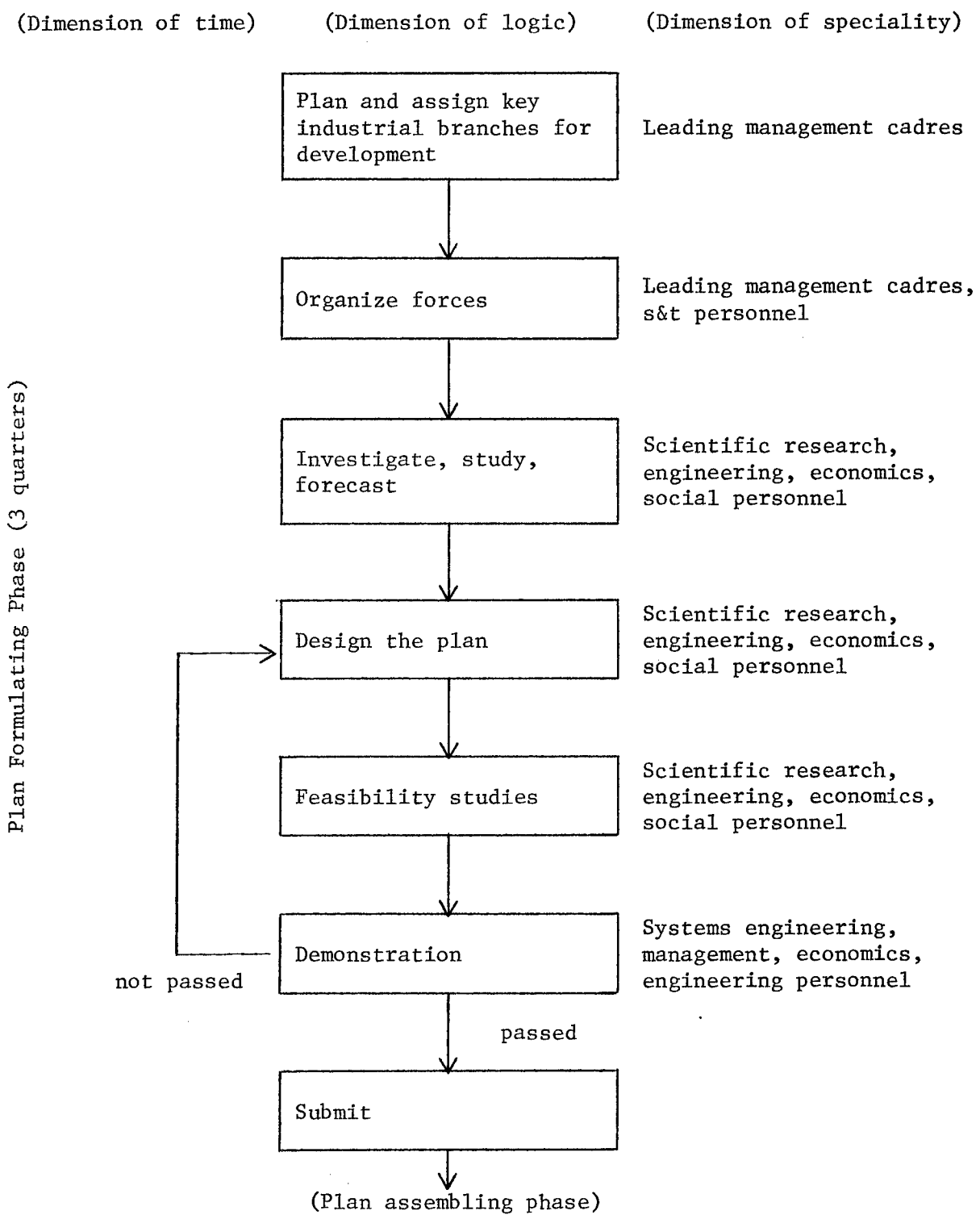
3. Change the previous practice of "big assorted cold dish," attending to each and every aspect from top to bottom. After overall consideration and systems analysis, we should stress the main points, unify standards, and do our best at investigation, forecasting and demonstration.

4. Change the previous practice of blindly striving for "catch up and surpass," and reaching for what is beyond our grasp. We must not only liberate our thinking, do away with superstitions, but also be practical and realistic, recognize things as they are and continuously raise the scientific and technological level, gradually reducing the gap between the world's advanced level and ours.

After the guiding thoughts are clarified, we can organize our forces to study the procedure of planning.

The first phase is the plan preparatory phase. The emphasis is to determine an objective system and a target evaluation system. The so-called objective system consists of the main strategic points, the main direction of attack and appropriate policies on technology and equipment. The so-called target evaluation system consists of measures, criteria and binding conditions for various plans.

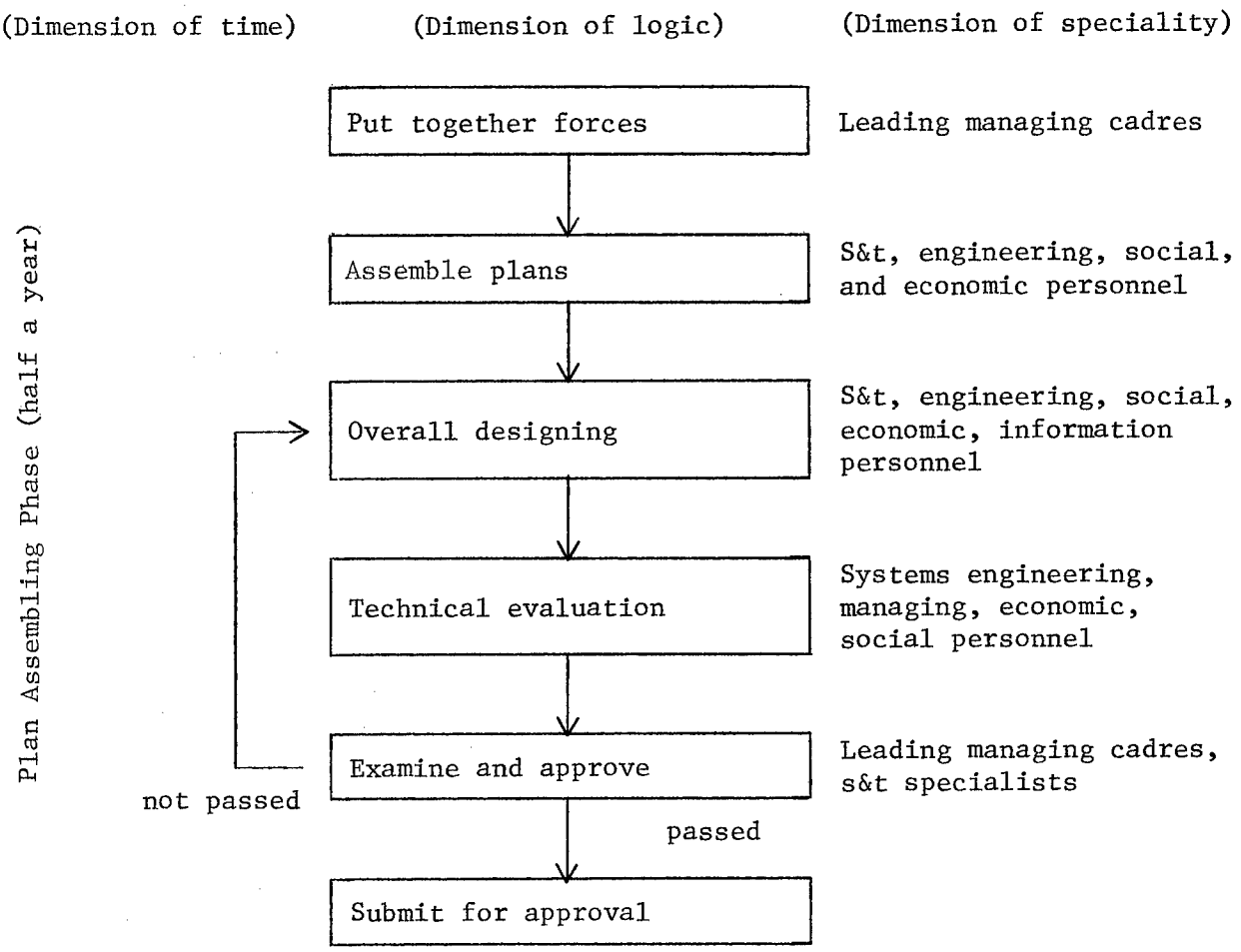
The objective system and the target evaluation system are also the main standards for directive documents and plan demonstrations in the second phase of plan formulation. The procedure is set as follows:



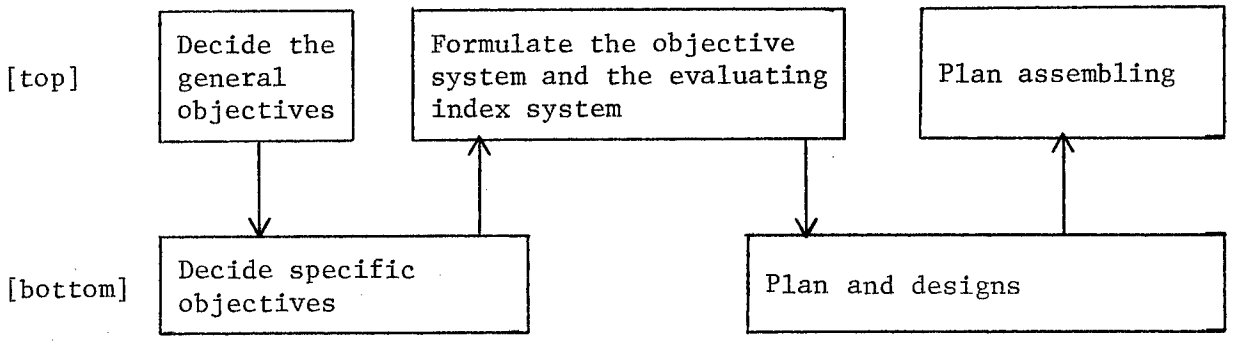
The focal point of the second phase is design work of the plan. It will put forward plans for important scientific research of key developing industries (including newly developed industries); plans to tackle key problems; plans to popularize and apply important results; plans to introduce, digest and absorb important technology; plans for intellectual exploitation; plans to

develop scientific and technical enterprises; and production plans for key products, etc. For some important issues, various plans should be proposed and feasibility studies conducted.

The third phase is the plan assembling phase. The city then must put together a group of forces to select the best and keep an overall balance of plans submitted by the priority industrial branches. The procedure is as follows:



The formulation of the whole plan is a process twice from top to bottom and from bottom to top, as illustrated below:



II. Determine the general and specific objectives

In order to carry out any work successfully, we must first determine its final objectives, as we say, shoot the arrow at the target. Planning is, above all, national; a local plan can only be one of its subsystems. The objectives of Shanghai's scientific and technological development plan have been determined, in the general spirit of "to quadruple" and in the light of Shanghai's practice, after repeated discussions and consultations with specialists and with the planning leading group's examination and approval. We have three general objectives:

1) By the end of the century, by and large, popularize in Shanghai the advanced technology that is already universally applied by developed countries in the late 70's or early 80's and is suitable to Shanghai's needs, and form a technological system that has our own special features. At the same time, we should actively spread the existing scientific research achievements of our country and our city.

2) Carry out forcefully technological exploitation in areas, such as reduction of energy and raw material consumption, improvement of the quality of products and depth of processing, pollution reduction and prevention, etc., and build up a number of rising industries with densely concentrated technology and good economic results.

3) In the light of the state's requirement in economy, that is, to lay the foundation in the first 10 years and to develop vigorously in the second 10 years, in our scientific and technological development planning, we should carry out the technical transformation of the current industries (those that have a future for development) in the first 10 years; and tackle the key task of shaping up scientific and technological projects of rising industries in the second 10 years. On the one hand, we will transfer the current productive forces to a new and advanced technological basis so to raise their economic results. On the other hand, we will make new breakthroughs in new technology, new techniques, new materials, etc. so to bring about a big drop in the consumption of raw materials and energy and a big increase in labor productivity. The priority of the second 10 years is placed on the development of new rising industries and building up of science and technology for the future ahead. Furthermore, in the course of the entire plan we must gradually complete the restructuring of systems to suit the needs of technological and economic development.

Along with the general objectives we also need priority fields. Only if we have priorities can we have policies. The key of the earlier planning stage is to determine the priorities. The main content of the preparatory phase is to determine the strategic focal points and policies. Local priorities must be subordinate to the national ones. At present as the state has not defined its policy on technology and strategic focal points, we can only do a preliminary selection of the focal points. The range of this preliminary selection can be wider. There is a process of selection from a preliminary one to an elaborate one.

The State Scientific and Technological Commission has designated fields for priority development, key industries and products and key regions as the priority spheres of its scientific and technological plan. In light of Shanghai's actual situation, we have designated priority development fields, key development industries and major social issues (important technological problem in urban transformation) as the three pillars of Shanghai's scientific and technological plan.

Within the above-mentioned three pillars, we will further select projects for priority investigation and study, and then work on the concrete plan. Here I will discuss briefly the initial selection of these projects:

1) Initial selection of key projects of fields that are given priority for development

A so-called field given priority for development is one which has basically proven its basic theoretical research, and has now entered the applied or development research stage, but has not yet formed an industry or is only at the initial or pilot experiment stage, but its development has demonstrated broad prospects and it will become an industry before the end of this century and will bring fairly good economic results. We first proposed 49 projects, after consulting specialists and in light of Shanghai's advantages and development possibilities, have reached an initial selection of 12 fields with 17 projects, for instance, microelectronic technology, computers and software, information processing technology, bioengineering (biotechnology, biomedical engineering), laser techniques, optical fiber communication, artificial intelligence, application of nuclear technology (nuclear power plants, isotopes and irradiation technique), energy technology (new energy resources, new technology to save energy), new materials (new metals, new organic and inorganic materials), ocean exploitation and consultative industry.

2) Initial selection of key development industries

What key industries should be developed in Shanghai? Based on Shanghai's actual situation, we have drafted several requirements, such as industrial branches that are in accordance with "four littles and three highs" (those that consume little energy, use little material, have little transportation volume, cause little of the three wastes, but have high technological density, high labor density and high exchange rate; pilot industries (that is, the development of those can bring along the development of a number of industrial branches), basic industries; industries that have a future for expansion; and industries that can improve the material, cultural, and living standards of the people of Shanghai, etc. First, 49 such industries were decided by various bureaus, later based on experts' questionnaire survey statistics, 23 were initially decided, for example, alloy steel, petrochemical engineering, offshore platforms, fine chemical engineering, instruments and meters, automatic machinery processing, plastic, food industry, construction equipment and materials, electronic audio-visual technical equipment, new basic electronic devices, basic and key mechanical devices, printing, clothing, posts and telecommunications, etc.

3) Initial selection of important social issues (important technological problem on urban transformation)

Shanghai, this large city, is densely populated; it has a housing shortage, traffic jams and severe pollution. There are numerous transformation problems. Due to financial and economic reasons and policies on transformation, etc. we can only resolve our problems in order of importance and urgency. After various consultations seven categories have been initially chosen, that is, residential buildings, communications and transportation, municipal public works, large public buildings, environmental protection, family planning, medicine and health.

After investigation, research, forecasting and demonstration the initially selected projects of the above-mentioned three pillars will be screened again with the evaluating index system, and after the plan is designed they will be selected again.

III. Use network techniques to organize and arrange the work of investigation, research, forecasting and demonstration of the plan. (Summary)

Using the method of systems engineering to draw up a development plan for Shanghai's science and technology is only an attempt. At present, the main work schedule is still at the plan preparatory stage; it cannot yet demonstrate its effect. However, from what the bureaus concerned and various groups that deal with specific topics have reported, we find that they are, in general, satisfied with the arrangements of the whole work. They believe that the guiding thoughts are fairly explicit, the procedure and steps to be taken are fairly clear, the supply of data is timely. Though there are still certain difficulties in using these new methods, such as market survey, demand forecast, technology forecast, etc., the approach is correct and we should try our best to explore them. We are determined to carry out well the work of the earlier planning stage; we will give more time, organize a large number of forces to investigate and study, observe and analyze problems at a macroscopic angle, and lay a good foundation for plans and design.

(Editor-in-charge: Fu Li [2105 3680])

12200
CSO: 4008/176

FUNDING OF LOCAL S&T COMMISSIONS DISCUSSED

Tianjin KEXUEXUE YU KEXUE JISHU GUANLI [SCIENTIOLOGY AND MANAGEMENT OF SCIENCE AND TECHNOLOGY] in Chinese No 1, 1984 pp 38-40

[Article by Wuxi City Scientific and Technological Commission: "Establishing Development Funds for Local Science and Technology Commissions Has Many Advantages"]

[Text] To summarize the past few years' experience we have taken a look at our work in science and technology in the past 10 years. In our investigation we discovered that funds for local scientific research have fluctuated greatly, this does not suit the continuity of our scientific research work and is unfavorable for the sustained development of science and technology.

To change this unsuitable situation, we studied both domestic and foreign experience on establishing development funds for science and technology and on promoting the development of science and technology. We believed that establishing development funds for local science and technology is a good way to ensure relative stability of such a fund. So we submitted our proposal to the municipal government, which has been accepted.

Establishing development funds has many advantages. The main advantages are:

1. It helps expand sources for funding scientific research and maintain relative stability.

Based on our measures, funds can be raised in four ways: (1) Each year a certain amount of money is to be allocated from local revenue. Our local government began allocation in 1982, with 500,000 yuan each year and gradually to be increased with the increase of local revenue. (2) Income of enterprises from the transfer of scientific and technological results, turned over as local revenue after the retained portion is deducted. (3) Recovery funds repaid to the Scientific and Technological Commission and its affiliated organizations according to contract agreement on such repayable subsidies. In the past 3 years, 33 contracts for such repayable subsidies were signed. A total of 2.93 million yuan was allocated; 1.826 million yuan was to be repaid, as planned, at a 62.3 percent repay rate. By 1982, 507,200 yuan was paid back. (4) Fund surpluses after completion of any

scientific and technological project and refunds from any cancelled projects. This way, our fund can be maintained in the next few years at approximately 1 million yuan each year and can increase year after year.

2. It helps prompt s&t to be geared to economic construction and upgrade techno-economic results.

According to the principles for use of funds, all projects subsidized by funds have in general signed a contract to repay. The repay ratio varies between 50 and 80 percent, to be determined on the basis of nature of projects, the level of technical complexity, the scope of gains and the ability to repay. After a project is completed, put in operation, and profits are gained, subsidies must be paid back according to the repay rate stipulated in the contract. This prompts both the scientific and technological management departments who grant funds and scientific research units, plants and enterprises who request funds to consider the vitality, economic value and the developing cycle of their projects. This will change the situation of "eating from the same big pot" without striving for social and economic results in investments on s&t, and will turn limited funds over to where they are most needed.

From the 33 projects we subsidized a few years ago, we have recovered 1.007 million yuan in 1982 and 1983, which makes up 55.14 percent of the total repayable amount of 1.826 million yuan. The pilot project of aspergillus saccharifying enzyme experiment received 150,000 yuan of fund subsidy and was to repay 90,000 yuan (60 percent). Because the subsidized development of the product brought good economic results, the development pace was fast, the funds to be repaid as stipulated in the contract were recovered within a year.

3. It helps promote careful calculation, strict budgeting, and scientific research in an industrious and thrifty way.

Projects that apply for fund subsidy must have clearly defined economic responsibility. Subsidized funds must be kept in separate accounts with separate accounting, and special funds for special uses. Budgets should be made for such funds and should be carried out strictly. In addition to the joint control of the city Scientific and Technological Commission and Bureau of Finance over the subsidies, the financial sections of fund-requesting units must also take the responsibility of supervision. This will prompt the leadership in charge and the scientific and technological personnel concerned of the subsidized unit to strengthen their sense of economic accounting, attach importance to careful calculation, strict budgeting and economizing in funds. Along with necessary acquisition of instruments, equipment and materials, they tap potential and make the best use of the existing ones in their units. So despite the very tightly checked and approved budgets for a number of projects, due to careful calculations, strict budgeting and economizing on expenses there have been even surpluses after the completion of the projects. For example, the pilot project of the cold-proof resin test received a total of 140,000 yuan of subsidy. The contract stipulated that 110,000 yuan (80 percent) be repaid in 2 years. But as the existing

equipment and workshop of the plant were used for the trial-production, and some of the newly installed equipment for experiment was included in cost as production equipment, the result was that 50,000 yuan less was spent and the project was finished on time just the same.

4. It helps to achieve satisfaction in four areas and mobilize enthusiasm.

One, the units that request subsidies are satisfied. Subsidized projects are closely related to the development of economy, their success rate is high, and the result is quick. With subsidiary fund products that urgently need to be developed can be produced, difficult questions in production technology that need to be solved can be solved, and economic profits are attained. In the distribution of economic profits, the subsidized institutions get the larger portion, while the repayment only makes up the small change and is drawn from the newly attained profits after the completion of the projects. For example, the provincial Scientific and Technological Commission signed a contract with the Number 2 Wuxi Cotton Mill for a pilot project of 1,695 mm amplitude modulated air jet loom workshop test; 545,000 yuan was subsidized and the repay rate was 60 percent. With the subsidy the cotton mill was able to solve the problems of accessory equipment and technical difficulties, and the project reached economic results fairly quickly. At present 94 looms are already in operation, producing 4,411,100 meters of plain cloth. The profit of every hundred meter cloth has increased from 7 to 11 yuan. In the past year or so more than 700,000 yuan of profits and taxes were accumulated for the state. Second, the scientific and technological personnel are satisfied. Because allocations for such projects are sufficient, personnel and materials are guaranteed, the leadership in charge attaches importance to these projects, and objective guarantees and conditions are good. These not only help the projects to start on time, but also ensure fair certainty of success, which is just what the scientific and technological personnel diligently strive for. Third, the financial departments are satisfied. Through the actual work, these departments come to see that s&t are powerful and dynamic productive forces, therefore effective management and use of funds not only can support the development of scientific undertaking, but can also accumulate, use and produce wealth effectively. For more than 1 year they have done a tremendous job, on their own initiative, to set up and manage the funds. Fourth, the scientific and technological management departments are satisfied, because establishment of funds has strengthened the economic strength of local scientific research, thus further increasing the vitality of scientific and technological work, and effectively promoting the development of our scientific cause.

During the past year or so we have tried and found some initial experience on how to manage the funds.

1. We must choose the right projects, and that is very crucial. Facts have proven that any subsidized project that is closely related to the present economic growth will produce faster and better economic results. The role of the fund can be brought out effectively, the repayment contract can be implemented smoothly and with assurance. Otherwise, if the fund does not

assist the key points, not only its function and the enthusiasm of all circles will be affected, there will also be difficulties in recovering the repayment. So, we must attach great importance to investigation, study, proof, examination and approval prior to a decision on a project. We should especially pay attention to economic results a project can bring. We should perfect the scientific procedure of choosing research subjects and follow the procedure strictly.

2. The ratio of fund subsidies and the repayment must be carefully calculated and must be rational. Thus, the planning and management personnel must have a thorough understanding of the technical questions involved in the projects, and they should also be familiar with the financial and management work involved. Proof must be presented not only in technology, but also in outlay. We must make the best effort to prevent the subsidies from being too tight or too slack. We should also appraise and rectify the funds and allocate them in installments according to the project schedule, so to guarantee the needs of the project and not to let the fund lie idle.

3. We must implement the contracts strictly and conscientiously. All subsidized projects must have a signed contract and implement it. The objectives of the contract must be clear, the content must be concrete, the responsibilities must be clearly defined and the checking must be based on proof. We signed 19 subsidized projects in 1982, with an allocation of 1.225 million yuan of funds. A total of 754,000 yuan was to be repaid after the completion of the projects. With a few exceptions, our investigation revealed that all the projects were carried out according to the contract.

4. We must rely on financial departments to perform the function of overseeing and managing. The objective of establishing funds is to promote local scientific and technological development. Departments of finance should proceed from the high plane of the party, devote their attention to the scientific cause and consider fund management a part of their own work. Departments of finance have the authority to control finances. They send out specially assigned persons to be in charge of each plant, include the supervision of fund use and repayment according to the contract as their own task. They often investigate and analyze the situation, offer advice, find ways, make suggestions, help solve difficulties, discover problems and correct them promptly. They have played an active role in managing and utilizing funds effectively.

As to how the funds are to play a greater role in the progress of local s&t and how to further perfect the development fund system, we propose:

1. The allocation of funds by the local financial departments must be proportionate. The guiding ideology of revitalizing our economy and making progress by relying on scientific and technical progress has been confirmed. Development funds have been reflected in local financial allocations. The problem is that the current funds allocated by municipal governments do not have an appropriate proportion in the local revenue. At present, fund allocation depends on the revenue of the year and the degree of importance the leadership attaches to s&t, thus its position is undefined.

2. Scientific and technological personnel who undertake subsidized projects should be suitably rewarded. This can be combined with the technological responsibility system, reflecting the principle of large portion to the state, small portion to the collective and small change to the individual, and changing the current situation where it does not make difference if one's work is good or bad. Bonuses can be allocated partly from the repaid funds of subsidized projects and partly from the profits gained through the projects.

3. A contract arbitration body should be designated to work out detailed rules and to be given certain authority. This arbitration body may take appropriate sanctions, or even bring a suit, against any units that do not follow the contract through and refuse to bear necessary financial losses.

4. A fund resource committee for scientific and technical progress should be instituted. We must further open channels to raise funds, broaden the scope of fund subsidies. Scientific and technological personnel, including rural specialized households and scientific and technological households, may submit their projects and request funding directly. Besides the Scientific and Technological Commission and Bureau of Finance, we should draw experts of authority into the fund management.

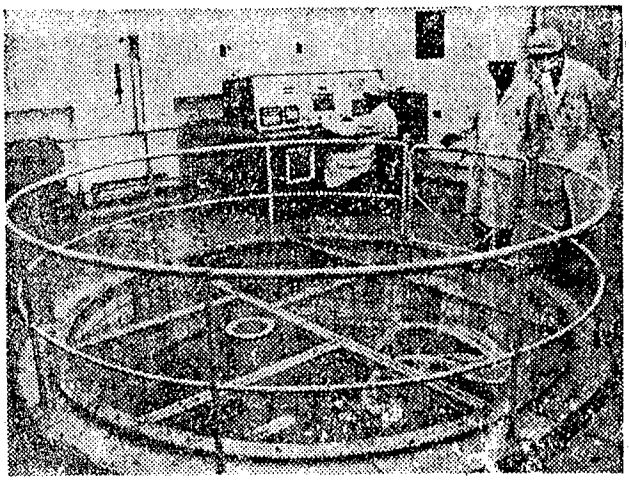
(Editor-in-charge: Zhao Jian [6392 5329])

12200
CSO: 4008/176

CHINA'S FIRST MINI NUCLEAR REACTOR UNVEILED

Shenyang LIAONING RIBAO in Chinese 7 Sep 84 p 3

[Text] Scientists of the Atomic Energy Institute of the Ministry of Nuclear Industry have successfully developed the nation's first mini nuclear reactor pile. The reactor is cheap, easy to operate, safe and reliable and emits no nuclear contamination. It has been operating beautifully for more than 5 months.



The reactor may be used widely in such areas as physics, the environment, medicine, and archeology.

Shown is the reactor room. The reactor pile itself is immersed in a pool of water below the reactor room.

CSO: 4008/21

AUTHOR: JIN Yongde [6855 3057 1795]
Maeda Hiroshi [0467 3944 1738]
Tsuchiya Kazuo [0960 1450 0735 7160]

ORG: Maeda of Kyoto University, Japan; Tsuchiya of Mitsubishi Electrical Corporation

TITLE: "A Nutational Control of Satellite by Using Geomagnetic Field"

SOURCE: Beijing YUHANG XUEBAO [JOURNAL OF THE CHINESE SOCIETY OF ASTRONAUTICS] in Chinese No 3, 31 Jul 84 pp 1-7

TEXT OF ENGLISH ABSTRACT: A momentum wheel control system is widely used for the attitude control of satellites. This system tends to induce a conical motion, also called nutational motion. Then the nutational motion will be damped out rapidly. Active nutation control techniques have been discussed by many authors.

This paper deals with an active nutation control scheme by using the interaction of the geomagnetic field with a magnetic dipole on the satellite. First, a linear control scheme is discussed, and then a bang-bang control scheme is analyzed.

AUTHOR: HU Jingang [5170 6855 0474]
PAN Zengfu [3382 1073 1381]
MIN Guirong [7036 2710 2837]

ORG: None

TITLE: "Research on the Unsteady Method of Thermal Balance Testing for Satellite with Periodic Heat Source"

SOURCE: Beijing YUHANG XUEBAO [JOURNAL OF THE CHINESE SOCIETY OF ASTRONAUTICS] in Chinese No 3, 31 Jul 84 pp 8-13

TEXT OF ENGLISH ABSTRACT: A theoretical and experimental study of unsteady thermal balance testing for a satellite with periodic heat source is presented in this paper. An important approximate formula is derived by use of some simplified conditions based on the fundamental heat balance equation. A comparison between the experimental data and calculated results is given in this paper and shows that the difference between them is within ±2°C. If this method is used in thermal vacuum testing for satellites, the duration of testing will be reduced.

AUTHOR: HUANG Zhenzhong [7806 2182 0022]

ORG: None

TITLE: "A Comprehensive Analysis Algorithm for Ablation, Temperature Fields and Thermal Stresses of the Carbon-base Nosetips"

SOURCE: Beijing YUHANG XUEBAO [JOURNAL OF THE CHINESE SOCIETY OF ASTRONAUTICS] in Chinese No 3, 31 Jul 84 pp 30-38

TEXT OF ENGLISH ABSTRACT: In this paper, the principle of synthetic analysis calculation and some treatment techniques for reentry thermal environment, ablation, conduction and thermal stresses of vehicles are described briefly. The thermochemical ablation calculation for chemical reactions on the ablating surface of carbon-base materials is simplified by using selective calculation results. The temperature fields are calculated by means of the three-level explicit difference schemes for both constant and unconstant space steps within the total region. The thermostresses are calculated by the finite element method, which is based on the noncomplete generalized potential energy variational principles under the supposed condition of linear elasticity. The calculation method of the effects for various displacement boundary conditions is provided. An automatic mesh dividing technique is realized in the comprehensive analysis procedure and selective calculations for shapes can conveniently be made with this technique.

AUTHOR: CHEN Guoqiang [7115 0948 1730]

ORG: None

TITLE: "Error Propagation Properties for ICBM"

SOURCE: Beijing YUHANG XUEBAO [JOURNAL OF THE CHINESE SOCIETY OF ASTRONAUTICS] in Chinese No 3, 31 Jul 84 pp 50-65

TEXT OF ENGLISH ABSTRACT: This paper describes the error propagation properties of IGS (Inertial Guidance System) for ICBM.

The transition matrix analytic solution of IGS is derived. By means of the regression analysis technique, the perturbance model is set up. Based on this, the analytic solutions of impact position error are obtained.

Using the analytic solution, the error analysis of IGS can be complete without integrating differential equations. To finish calculating impact position error, we need only to determine the perturbance parameters and error propagation parameters by means of the algebraic method.

Finally, the numerical results calculated for 42 trajectories show that the maximum error due to the analytic solution is less than 10 meters.

9717
CSO: 4009/135

AUTHOR: HUANG Min [7806 2404]
MA Shuyi [7456 2885 5030]
ZHAO Bangti [6392 6721 1879]
SHEN Tong [3088 0681]

ORG: HUANG of the Department of Biology, Sichuan University; MA, ZHAO and SHEN all of the Department of Biology, Beijing University

TITLE: "The Effect of DNA Concentration on the Recombination in vitro of Mitochondrial DNA"

SOURCE: Beijing BEIJING DAXUE XUEBAO--ZIRAN KEXUE BAN [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS PEKINENSIS] in Chinese No 2, Mar 84 pp 48-52

TEXT OF ENGLISH ABSTRACT: The effect of DNA concentration on the DNA recombination and transformation frequency was studied, using the mitochondrial DNA from duck liver and plasmid pBR322 DNA as a model. The ratio of j to i has a significant effect on the characteristics of recombination products and on the effective transformation frequency. Moreover, in the case of removing the f'-phosphate residues from the cohesive ends of pBR 322 DNA by the bacterial alkaline phosphatase, the DNA concentration still remarkably affects the characteristics of recombination products and effective transformation frequency.

9717
CSO: 4009/87

AUTHOR: LIN Laixing [2651 0171 5281]
BAI Baier [4101 2157 1422]

ORG: Both of the Beijing Institute of Control Engineering

TITLE: "Optimal Mounting Configuration of Reaction Wheels for Satellite Attitude Control"

SOURCE: Beijing ZIDONGHUA XUEBAO [ACTA AUTOMATICA SINICA] in Chinese No 3, 1984 pp 228-238

TEXT OF ENGLISH ABSTRACT: In this paper, optimal mounting configuration of reaction wheels for satellite attitude control is discussed. Ten mounting configurations of reaction wheels are presented. Control performances of these configurations are analyzed with unified criteria (momentum, power consumption and reliability). The results show that a skewed reaction wheel configuration is optimal in the sense of maximizing the performance criteria.

AUTHOR: WANG Chengye [3769 2052 2814]

ORG: Space Science and Technology Center, Chinese Academy of Sciences

TITLE: "The Relaxation Technique and Its Application in Image Processing and Recognition"

SOURCE: Beijing ZIDONGHUA XUEBAO [ACTA AUTOMATICA SINICA] in Chinese No 3, 1984 pp 262-269

TEXT OF ENGLISH ABSTRACT: In this paper the relaxation algorithms and their applications in image matching, edge extraction and remote sensing imagery classification are described. It was found from the experimental results that the relaxation technique was efficient and powerful for removing the effect of noise and distortion, improving the processing quality and increasing the classification accuracy.

9717
CSO: 4009/133

AUTHOR: XU Shihao [1776 0013 6275]
SHENG Zhiyong [4141 1807 0516]
GUO Zhenrong [6753 2182 2837]
LI Changguo [2621 2490 0948]
WANG Shuying [3769 3219 5391]

ORG: All of the Trauma Center, PLA Postgraduate Medical College; 304th PLA Hospital

TITLE: "The Effect of Whole Blood Transfusion on Blood Viscosity in Burn Shock"

SOURCE: Beijing JIEFANGJUN YIXUE ZAZHI [MEDICAL JOURNAL OF CHINESE PEOPLE'S LIBERATION ARMY] in Chinese No 4, 20 Aug 84 pp 270-272

TEXT OF ENGLISH ABSTRACT: Blood viscosity was determined in 50 normal individuals. No significant difference was found between males and females, therefore the values were pooled.

In 10 burn patients (burn extent ranged from 30 to 90 percent), blood viscosity was determined in the first 3 postburn days. All of them received whole blood as a part of the resuscitational regime. The amount of whole blood given was approximately TBSA percent burned x body weight (kg) x 0.3 ml. The blood viscosity returned to within the normal range in all cases on the third postburn day.

Blood viscosity was determined in 20 uninjured dogs to obtain its normal values. A 25 percent napalm burn was inflicted upon the animals, and they were divided into two groups of seven each. Group A received the same fluid replacement protocol as had been given to human patients, while Group B animals were replenished with balanced salt solution in the amount of 5 ml/1 percent TBSA/kg in the first 24 hours, with dextran given as a colloid in the second 24 hours. No significant difference in blood viscosity was observed between these two groups during the observation period.

The above findings suggest that whole blood as one of the constituents of replacement fluids for burn shock would neither enhance blood viscosity nor impede its recovery to normal levels.

9717
CSO: 4009/16

AUTHOR: JIN Jingfu [6855 2529 4395]

ORG: Chengdu Geological College

TITLE: "The Material Source and Mineralization of the Mesozoic Uraniferous Granitic Rocks in the Southeast of China"

SOURCE: Beijing YANSHIKUANGWU JI CESHI [ACTA PETROLOGICA MINERALOGICA ET ANALYTICA] in Chinese No 2, 1984 pp 112-119

TEXT OF ENGLISH ABSTRACT: Based on field observations and laboratory work in recent years, the author discusses the relationship between the material source of uraniferous granitic rocks and uranium-mineralization. The mesozoic uraniferous granites in southeast China are formed by partial remelting and palingenesis of continental crust type sediments, volcano-sediments and a small amount of original granite under conditions of increased temperature and pressure in the tectonic acts.

In this paper the author explains the characteristics of the material source of uraniferous granitic rocks from the following aspects: 1) the association of granitic rocks; 2) the petrochemical composition of granitic rocks; 3) the composition of biotites; 4) Th/U ratio; 5) the accessory minerals; 6) the trace elements; 7) volatile compositions; 8) the distribution patterns of the rare earth elements; 9) the composition of stable isotopes and 10) the temperature for formation of granites.

AUTHOR: LIU Jinding [0491 6855 1353]
LI Qun [0491 5028]

ORG: Both of the Institute of Mineral Deposit Geology, Chinese Academy of Geological Sciences

TITLE: "On Koenenite from Jiangcheng, Yunnan, China"

SOURCE: Beijing YANSHIKUANGWU JI CESHI [ACTA PETROLOGICA MINERALOGICA ET ANALYTICA] in Chinese No 2, 1984 pp 131-137

TEXT OF ENGLISH ABSTRACT: Koenenite [$4NaCl \cdot 4(Mg, Ca)Cl_2 \cdot 5Mg(OH)_2 4Al(OH)_3$] from syrinite ore deposit, Jiangcheng, Yunnan, is light yellow in color, and becomes dark brown due to weathering. It is foliate with cleavage {0001} perfect. The specific gravity is 1.82-2.08, which reduces to 1.97 after being soaked in water. The hardness is 2.06-2.1; No=1.529, reddish brown; Ne=1.557, colorless; Ne-No=0.028. It shows weakly, biaxial $2V < 10°$. The X-ray powder pattern of the mineral has the strongest lines: 5.45(90), 3.25(50), 2.812(100), 2.380(70), 2.130(60). Koenenite consists of two trigonal substructure layers: $[Na_4(Ca, Mg)_2Cl_{12}]^{4-}$ and $[Mg_7Al_4(OH)_{22}]^{4+}$. The Cl-lattice unit cell has the following parameters: a = 4.070Å, c = 32.646Å, v = 541.23Å^3, space group $R\bar{3}m$. The OH-lattice unit cell has parameters: a = 3.051Å, c = 10.882Å, v = 101.132Å^3, space group $P\bar{3}m1$.

The structure of koenenite, as viewed along the c axis, is one of regularly alternating NaCl-like chlorine and brucite-like OH double layers. All possible octahedral sites are randomly occupied by the metal ions.

The strongest lines of the X-ray powder pattern for the material formed by soaking koenenite in water are: 7.73(90), 3.835(100), 2.570(70), 2.285(80), 1.935(80), 1.526(80), 1.495(70), 1.316(50), 1.269(60), 1.200(50), 0.975(50). The unit cell parameters are: a = 3.048Å, c = 23.190Å, v = 186.578Å^3, space group R.

Chemical analysis of a water absorbed product after soaking koenenite in water gave: SiO_2 0.63, Fe_2O_3 0.96, Al_2O_3 23.98, CaO 0.18, MgO 32.49, MnO 0.17, H_2O 25.30, Cl 15.52, sum 99.23 percent, leading to the formula: $[Mg_7Al_4(OH)_{22}][Cl_4 \cdot H_2O]$.

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AUTHOR: HE Hanxin [0149 3352 2450]
CHEN Yongshou [7115 3057 1108]
ZHENG Yuming [6774 3768 2494]
ZHUO Yizhong [0587 4135 1813]

ORG: All of the Institute of Atomic Energy, Chinese Academy of Sciences, Beijing

TITLE: "The Nucleon-Meson Vertex Structure Based on Nonrelativistic Quark Model. I. The Probability Distributions of Mesons Produced by the Quark-Gluon Interaction"

SOURCE: Beijing YUANZIHE WULI [CHINESE JOURNAL OF NUCLEAR PHYSICS] in Chinese Vol 6 No 2, 15 May 84 pp 97-104

TEXT OF ENGLISH ABSTRACT: The nucleon-meson vertex structure is discussed by using the transition potential of one-gluon exchange with the production of a quark-antiquark pair, which is deduced from quark-gluon interaction, based on the nonrelativistic quark model. The transition probabilities for nucleon → nucleon + meson, obtained by the generator-coordinate method, show that the mesons exchanged in the nucleon-nucleon interaction are produced mainly in the surface region of a nucleon. However, there also exist some probabilities of finding mesons inside a nucleon. The fact that the relative probability of π meson is largest in the long range interaction shows its importance in the processes of meson exchange. The effect of meson size on probabilities, which shows the coupling strength of meson and nucleon, is also discussed.

AUTHOR: PAN Zhengying [3382 2973 3841]
WANG Yansen [3769 3508 2773]
CHEN Jianxin [7115 1696 2450]
YANG Fujia [2799 4395 1367]

ORG: All of the Nuclear Science Department, Fudan University, Shanghai

TITLE: "The Diffuseness Correction in Nuclear Charge Radius and Its Application to the Giant Resonance"

SOURCE: Beijing YUANZIHE WULI [CHINESE JOURNAL OF NUCLEAR PHYSICS] in Chinese Vol 6 No 2, 15 May 84 pp 120-128

TEXT OF ENGLISH ABSTRACT: Based on the folded Yukawa density distribution, the law of nuclear charge radius with diffuseness correction is proposed. It can fit to the nuclear charge radius well with the same nuclear radius constant. Also, the coulomb energy difference deduced from this law is in good agreement with the experiment along the beta-stability valley. When applied to the giant resonances, a better fit to the energy of giant resonances as a function of the mass number A is obtained. The comparison with $Z^{1/3}$ law is also given in this paper.

AUTHOR: ZHU Shengjiang [2612 0524 3068]
XU Sida [1776 0934 1129]
CHEN Zemin [7115 3419 3046]
ZHOU Yunlong [0719 0061 7893]
XU Xiangyuan [6079 4382 3293]

ORG: All of the Department of Physics, Qinghua University, Beijing

TITLE: "A Fast Neutron Polarimeter and the Polarization Measurement of the Neutrons from the $D(d,\vec{n})^3He$ Reaction"

SOURCE: Beijing YUANZIHE WULI [CHINESE JOURNAL OF NUCLEAR PHYSICS] in Chinese Vol 6 No 2, 15 May 84 pp 147-155

TEXT OF ENGLISH ABSTRACT: A fast neutron polarimeter and the measurement of polarization of the outgoing neutron from the $D\ (d,\vec{n})^3He$ reaction are described.

The polarimeter consists of two neutron time-of-flight spectrometers with associated particles as the starting signals and a rotating system.

A Si(Au) surface barrier detector simply shielded by an absorbing foil is used to detect ^3He particles. The influence of scattering deuterons is thus eliminated considerably. The timing signals are taken our from the Si(Au) detector successfully. The rotating system is adjusted to acquire minimum false asymmetry of less than 1 percent. The analyzing power of ^{12}C is calculated based on the most recent phase shift data. The polarization of the outgoing neutron is measured to be $p_n\ (\theta = 51.1°) = -0.120 \pm 0.032$ at the average beam energy $\overline{E}_d = 96keV$.

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