

Development of a More Market-Oriented Economy in China

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Before 1978 in China, the economic institutions for agriculture and industry operated essentially under a centrally planned system. The reasons for a change toward a more market-oriented economy and the key elements of economic reform are discussed. Today the major issues being deliberated by the leading economic officials include reform of the price system, the administrative structure of state-owned enterprises, the banking system and macroeconomic control mechanisms, and foreign trade and investment.

THE TRANSFORMATION OF THE ECONOMY OF THE PEOPLE'S Republic of China from a planned to a more market-oriented economy is one of the most significant developments in world history during the last quarter of the 20th century. What the Chinese economic system was like before 1979, why reforms were introduced, what their essential elements are, and what issues are currently being addressed by reform officials are questions to be addressed in this article. The Chinese economy is a complicated entity with many dimensions, but only those aspects pertinent to the transition to a more market-oriented economy will be discussed here.

Economic Institutions Before the Reforms

A market economy differs from a centrally planned one in three important ways. Major economic resources are privately owned rather than owned by the state. Prices are determined by the market forces of demand and supply rather than by administrative orders. Economic decisions concerning consumption, production, distribution, and investment are decentralized, being made by private citizens or individual enterprises rather than by central command. Although most actual economies have characteristics of both market and planned economies, these two prototypes serve as convenient devices for understanding them.

Agriculture in China in the two decades before 1978 operated essentially as in a centrally planned economy. In the early 1950's, land was confiscated from the landlords and redistributed to the peasants. In the middle 1950's, the peasants were organized into cooperatives. In 1958, Chairman Mao Zedong started the Great Leap Forward movement and reorganized the cooperatives into communes. Formally, a commune is not a state enterprise but a collective economic and political unit. Its land is owned collectively by its members. However, in the two decades from 1958 to 1978, communes were operated by administrative controls. There were 53,300 communes in China in 1979, which were divided into

699,000 brigades, the latter being further divided into 5,154,000 production teams (1). A production team often consisted of a traditional village. On average, there were 157 persons per team in 1979, and most farming was performed by a team, whereas larger scale construction work was done by a brigade.

Although team members officially owned the land, they had no control over its use. Commune authorities, following directions from the central government, determined what to produce on each piece of land. An assigned quota of the output had to be delivered to the government procurement department at a centrally fixed procurement price, the remaining output being left for distribution by the commune to its members. Members received incomes in money and in kind proportional to the numbers of work points earned, which equaled the numbers of days the team worked. Members followed orders and made no economic decisions. However, in varying degrees, some features of a market economy existed in rural China between 1958 and 1978. These included small private plots for the farmers and some rural markets where agricultural products were traded. A major objective of central procurement of agricultural products was to provide adequate supplies of essential food products to the urban residents under a system of rationing; among items rationed were food grain, vegetable oil, meat, sugar, and cotton cloth.

After the People's Republic of China was established in 1949, the new government took over industrial enterprises belonging to the previous government of the Republic of China. Private enterprises were tolerated for a brief period of several years. They soon became joint ventures. Then owners and managers were forced to surrender control to the new government, with some managers remaining to administer the enterprises under new directions. For the key industries, methods of central planning were adopted from the Soviet Union. The first Five-Year Plan was started in 1953. The government managed various state enterprises through some 20 ministries in the State Council. A State Planning Commission was established to direct and coordinate these ministries. Targets were planned in terms of output, and some important inputs and financial indices were transmitted to the enterprises. Under a system of material balancing used in the Soviet Union, important material inputs required were centrally distributed to the enterprises through a bureau of material supplies. Products of state enterprises were distributed by the state, with prices determined by a price commission. The bulk of the profits of state enterprises was surrendered to the state, providing a major source of government revenue. Funds required for capital construction and expansion had to be approved by the state and constituted an important part of government expenditures (2).

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Since enterprises obtained their inputs through central allotment, surrendered their outputs for central distribution, and had no control over their profits, they did not respond to prices. The main concern of enterprise managers was to obtain through skillful negotiations more than sufficient material and labor inputs to fulfill the production targets. They tended to understate the productive capacity of their enterprise in order to reduce output targets, and to overstate the input requirements in order to ensure their fulfillment. Inefficiencies and wastes occurred under this system, as partly reflected in the underutilization of productive capacity and the large stockpiling of inventories in Chinese state enterprises (3). However, central planning, as described above, did not cover Chinese industry entirely—only major products were centrally distributed. Many smaller enterprises were operated by provincial and local governments (4, pp. 50–51).

From the 1950's on, the Chinese economic system did not remain static but was subject to two very serious political disturbances. One was the Great Leap Forward movement from 1958 to 1961. The rapid formation of agricultural communes from April to September 1958 was itself a serious political disturbance. The second Five-Year Plan (1958–1962) was severely interrupted. Mistaken agricultural and industrial policies of the Great Leap caused famines and the curtailment of industrial output (5). The other disturbance was the Cultural Revolution of 1966 to 1976. Having lost political power in the early 1960's as a result of the failure of the Great Leap, Mao attempted to regain political control by appealing directly to the Chinese youth to engage in a Cultural Revolution. Economic planning and agricultural production were disrupted. Intellectuals and social groups other than the peasants and workers were victimized. Higher education practically ceased, with total enrollment reduced from 674,000 in 1965 to 48,000 in 1970 (6, p. 483). However, to the extent that the economic system functioned, its main characteristics were as described in the last two paragraphs.

Major Elements of Economic Reform

Mao died in 1976. The Chinese people as well as many party leaders had been extremely dissatisfied with the affairs prevailing during the Cultural Revolution and the new situation called for a drastic change in political leadership and economic policy. Two years later, Deng Xiaoping became the leader of China, having removed the political leaders responsible for the more extreme policies of the Cultural Revolution. More liberal economic policies were introduced because the Chinese leaders and economic officials, after experimenting with the commune system and central economic planning for more than two decades, recognized their deficiencies. They had begun to appreciate some virtues of a market economy, which had existed to a small extent throughout the previous 25 years. Their recognition was further enhanced by the successful experience of economic development in the neighboring economies of Hong Kong, Singapore, Taiwan, and South Korea. The open door policy of Deng permitted them to learn more about the successful development of these and other economies.

Inefficiencies of Chinese agriculture under the commune system were well recognized. Farmers were more knowledgeable about what crops to plant with their land than political leaders and economic planners. Farm workers had no incentive to work hard under the work-point system because they were not rewarded for their labors. There was a brief period in Chinese agriculture, after the land reform in the early 1950's, when farm households owned land and were able to sell products in the market. Reform of the commune system occurred initially in 1978 and 1979 when commune leaders in some regions recognized that they could fulfill their

output quotas for delivery to the government procurement departments by reorganizing the commune internally following and improving upon practices in the 1950's. In essence, each farm household was assigned a piece of land and was held responsible for delivering a given quantity of a certain product to satisfy the procurement requirement. After fulfilling the delivery quota, the farm household would be free to keep products for its own consumption or sale in the market at market prices. This "responsibility system" is similar to private farming in a market economy, with each farm household leasing its land and paying the delivery quota as rent. Under this system the farm household has control over the land it uses and can choose what to produce and how to market its products as is the case in a market economy. This system was officially adopted by the Fourth Plenum of the Eleventh Central Committee of the Communist Party in September 1979. The rapid increase in agricultural output and in the incomes of the farmers in the years following have provided support for this responsibility system.

Elements of urban reform were adopted by the Chinese People's Congress in September 1980. In the opening session of that congress, Vice Premier Yao Yilin, chairman of the State Planning Commission, announced that experiments of more autonomous state enterprises and market competition would be greatly expanded in the following 2 years. Industrial reforms had begun in late 1978 with six pilot enterprises in Sichuan Province. By the end of June 1980, 6600 industrial enterprises that had been allowed to make certain output, marketing, and investment decisions through partial profit retention had produced in value 45 percent of the output of all state-owned industrial enterprises. By the end of 1981 some 80 percent of state-owned industrial enterprises were involved. The major elements of the industrial reforms include (i) a certain autonomy regarding the use of retained profits, production planning, sales of output, experimentation with new products, and capital expansion; (ii) adoption of features of an "economic responsibility system" by assignment of identifiable tasks to lower level units and payment to them according to productivity; (iii) increase in the role of markets; (iv) the streamlining of the administrative system at local levels for enterprises under local control; and (v) the encouragement of the establishment of collectively owned enterprises (4, pp. 148–151).

Reform in the industrial sector has turned out to be more difficult than in the agricultural sector. It is much easier to make small farm households behave like private enterprises in a market economy than to make large state enterprises so behave for four types of reasons. First, ideologically, members of the Communist Party of China believe in the ownership and the control of the means of production by the state. They are unwilling to surrender control of large state enterprises to nongovernment individuals and allow them to keep substantial profits for themselves, as in the case of small farms. Second, politically, government bureaucrats are unwilling to give up their power and vested interests by allowing the state enterprises to operate independently. Economic ministries tend to hold on to their control over the operations of the state enterprises. The bureau of material supplies tends to retain its control over the distribution of major material inputs. Third, economically, large industrial enterprises are more dependent on factors outside their control than are small household farms. Given a piece of land, a farm household can produce as it pleases, subject to climatic conditions. A large industrial enterprise needs the supplies of equipment and of material inputs produced by other enterprises. The entire system of pricing and distribution of industrial products and material inputs has to be changed to provide more autonomy to the state enterprises. Fourth, administratively, the efficient operation of a large industrial enterprise is much more difficult than operation of a small farm. Chinese

managers often do not have sufficient knowledge and experience to run a modern enterprise as an independent entity. Even with additional training, managers and administrators of state enterprises are reluctant to give up their old habits of dependence on the economic ministries. The mode of operation of a large economic organization is difficult to change, as it is true for a large American corporation and more so for a large country like China.

Four years after the adoption of the urban reform decisions by the National People's Congress in September 1980 only limited progress in industrial efficiency had been achieved (7). Observing this limited progress in the urban industrial sector and stimulated by further success in the agricultural sector, the Twelfth Central Committee of the Chinese Communist Party at its Third Plenary Session on 20 October 1984 adopted a major proposal to achieve overall reform of the economic structure. Economic reforms in China in the late 1980's will be based on this major decision. Implementation is to be formulated and carried out to a significant extent during the seventh Five-Year Plan of 1986 to 1990.

Seven key elements of the decision of 20 October 1984 concerning reform of the economic system are to (i) give individual state enterprises autonomy in decisions regarding production, supply, marketing, pricing, investment, and personnel as independent profit-seeking economic units; (ii) reduce the scope of central planning and, except for certain major products, change the method from mandatory planning to guidance planning; (iii) allow prices of more products to be determined by the forces of demand and supply rather than by central control; (iv) develop macroeconomic control mechanisms through the use of taxes, interest rates, and monetary policy under an improved financial and banking system; (v) establish various forms of economic responsibility systems within individual enterprises to promote efficiency and encourage differential wage rates to compensate for different kinds of work and levels of productivity; (vi) foster the development of individual and collective enterprises as supplements to the state enterprises; and (vii) expand foreign trade and investment as well as technological exchanges. An often-quoted slogan to capture the essential characteristics of the reform is, "Invigorate the microeconomic units. Control by macroeconomic means."

Current Issues

To design a structure of a "socialist economy with Chinese characteristics" and to facilitate its implementation, a State Commission for Restructuring the Economic System was formed in the State Council in 1982, with Premier Zhao Zhiyang as chairman (8). I will discuss some of the issues currently being studied by the members of this commission following the October 1984 decision.

It is well recognized by the leading economic reform officials that price reform is basic to other components of the decision on economic reform of October 1984. If input prices do not reflect the scarcity of the resources and output prices do not reflect the usefulness of the product, it is not economically beneficial to allow the state enterprises to seek more profits. Large profits do not mean economic efficiency if the input prices are set too low and output prices are set too high. The price of an input will measure its cost to society (termed the opportunity cost) if potential users are allowed to bid for it in the market. The price of an output will measure its benefit to society when users express their willingness to pay for it in the market. To ensure that autonomous state enterprises can perform their cost and profit calculations correctly, prices have to be determined by conditions of demand and supply. What steps should be taken to achieve such a system of prices is a crucial question. In particular, the prices of steel, oil, coal, and electricity are set too low

and need to be adjusted upward and perhaps set free eventually.

Concerning the second component of the decision of October 1984, central planning will remain an important part of the Chinese economic system even though its scope will be reduced. The continued building of an economic infrastructure will be accomplished by central planning. Output targets for certain important industrial products will likely be set by mandatory planning in the sense of being compulsory rather than by guidance planning in the sense of being suggestive. Even in the fulfillment of mandatory output targets, the Chinese economic planner can beneficially use a set of market prices and respect the autonomy of state enterprises. The mandatory products would have to be paid for at prices agreed upon by negotiations with producers. At the beginning of this article, a centrally planned economy was distinguished from a market economy in that the former does not rely on prices to play an important role in the allocation of resources. This characteristic of Soviet-style central planning is being changed in China. State enterprises will obtain more of their material inputs from other enterprises directly rather than through central distribution and will sell more of their products directly to other enterprises or to consumers. Market prices will play a more important role, as has already occurred for agricultural products.

The remaining components of the 1984 decision on economic reform also depend on the functioning of market prices. The development of macroeconomic control devices through the uses of taxes, interest rates, and monetary policy will be effective and economically efficient in regulating the behavior of industrial enterprises and individual banks only if physical, human, and financial resources are appropriately priced. The encouragement of differential wage rates to reflect labor productivity is a step to improve the pricing of labor services. Individual and collective enterprises can function efficiently only if prices are determined by the forces of demand and supply, and many enterprises are already functioning in this manner. Foreign trade will be beneficial only if domestic prices reflect the relative scarcity of economic resources.

Besides price reform, three other sets of problems receive the attention of the Chinese economic reformers. First, they need to formulate a set of rules for state enterprises so that these can operate more efficiently. Second, they need to design macroeconomic mechanisms and institutions to regulate the microeconomic units. Third, they need to improve the operations of foreign trade and foreign investment.

So far state enterprises have been given some autonomy in the purchase of inputs and in the sale of outputs. They are also allowed to retain a part of their profits for distribution to the workers in the form of bonuses and for reinvestment. They are allowed to borrow from banks to finance their investments in lieu of obtaining funds through central appropriation. This increase in autonomy, however, has not led to marked increases in economic efficiency (7). Large profits may have resulted from inappropriate prices. Retained profits have been distributed to workers in the form of large bonuses without regard to labor productivity. Often large-scale capital constructions have been undertaken with the use of retained profits or bank loans without regard to the economic worth of the projects. In short, what will ensure responsible behavior on the part of state enterprise managers once they are given more power? They may lack sufficient incentive if they are not allowed to share a part of the profits of the enterprise. They may undertake unprofitable and risky investments if they are not penalized for the losses. Chinese economic reformers recognize that state ownership may be divorced from state management. Managers of state enterprises could be made responsible to some independent boards of directors. Shares of the enterprises may be held by fairly independent government agencies, by workers, by managers, and by other economic units.

Shareholders may help elect members of the board of directors. These and other possible arrangements for the management of state enterprises are being considered.

The development of a macroeconomic control mechanism for the execution of monetary policy depends on the institution of a new banking system. Under central planning before 1979, the banking system in China did not exercise much economic power. Essentially it served as the treasury for the government, keeping deposits from the Finance Ministry and from state enterprises, issuing currencies and extending loans to state enterprises as they were needed and were approved by the economic planning authorities. In 1983 and 1984, the banking system was reorganized. The former People's Bank was subdivided so as to separate its central banking macroeconomic control element, now under the People's Bank, from its commercial banking element, now called the Industrial and Commercial Bank. Other banks include the Agricultural Bank, the People's Construction Bank, the People's Insurance Company, and the Bank of China, the last dealing with foreign transactions. The People's Bank was given more power in regulating money supply and controlling interest rates. The specialized banks were given authority to extend credits to state and collective enterprises at their own discretion. However, an effective mechanism of monetary control by the central bank is yet to be developed. A set of rules for the improved operations of the individual banks has yet to be formulated. How can the previously passive banks be made to operate effectively in attracting savings from the economy and channeling them for profitable investments? What kind of reserve requirement or what other regulatory scheme should be introduced for the central bank to control total money supply and bank credits? These are among the most important questions being studied.

Concerning foreign trade and investment, by what mechanism or set of rules should the exchange rate of the Chinese currency be determined? The People's Bank has the authority to set the official exchange rate for the Chinese yuan. The yuan was devalued three times from 1.9 yuan per one U.S. dollar in 1981 to 3.7 yuan in July 1986, mainly to make the official exchange rate closer to the market rate. In the past foreign exchange was tightly controlled; all uses by enterprises, universities and individuals had to be approved centrally although an unofficial market for foreign exchange has existed. Some relaxation of foreign exchange control has taken place in recent years as exporting has been partly decentralized, and exporters are allowed to keep a part of their foreign exchange earnings, which constitute an additional supply of foreign exchange. The setting of an exchange rate closer to the market rate will reduce the shortage of foreign exchange as shortage will cease to exist if the price of U.S. dollars is allowed to rise freely. Hence there will be less need for strict control of foreign exchange in China. How should foreign investment be further promoted? Bureaucracy, red tape, the lack of a sound legal system, unreasonable profit-sharing arrangements, high and nonuniform costs of labor and materials, difficulty in profit remittance, problems in managing Chinese labor, and unexpected changes in policy and terms of agreements are among the obstacles to foreign investors. How can these conditions be improved? How can the special economic zones be made more attractive to foreign investors and more beneficial to the growth of the Chinese economy?

As the Chinese economic reformers are seeking answers to these questions, they are experimenting with reform proposals deemed to have a good chance of success. Reforms are introduced partly by trial and error. For example, the initial reform of state enterprises was carried out by experimentation with a selected number of them. When mistakes are found they will be corrected. One serious mistake was the granting of power to individual banks in extending loans to investors before the establishment of an effective mechanism

to limit the total supply of money and credit. The result was a tremendous increase in credit and an increase in currency in circulation by 50 percent from 52.98 billion yuan at the end of 1983 to 79.21 billion yuan at the end of 1984 (9). To correct the mistake, credit was greatly tightened in 1985, partly by administrative control, assigning credit quotas to banks and limiting the withdrawal of deposits. A second mistake was the loosening of imports in 1984 and 1985, including the import of a great number of foreign cars into Hainan Island, resulting in a large reduction of foreign exchange reserves from 16.3 billion U.S. dollars on 1 October 1984 to 11.3 billion on 31 March 1985. To stop the drain in foreign exchange, use of reserves was greatly tightened later in 1985 and 1986. Many foreign investors suffered as a result since foreign exchanges were required in the operation of joint ventures. For example, the production of jeeps by a joint venture with American Motors practically ceased because of the unavailability of foreign exchange to buy parts. In the course of Chinese economic reforms, continued experimentation will be inevitable. The reformers are realizing that it is costly to correct large mistakes. They are learning to proceed more cautiously.

I have confined my discussion mainly to economic issues with which the Chinese economic reform officials are currently concerned in restructuring the economy toward a more market-oriented one. Major economic problems outside the scope of the restructuring process include urban-rural economic disparities, population control policy, and policy to improve the transportation infrastructure. Other important problems that have received the attention of economic reform officials but are beyond the scope of my discussion include the functioning of the special economic zones, the liberalization of domestic commerce and trade, reforming the labor policy of "eating from the same big pot" and restricting labor mobility, the design of an appropriate legal system underlying the economic institutions, and improving the political system. In addition, the official endorsement of the study of post-Marxian, modern economics at Chinese universities will have an impact in the long run on the development of a more market-oriented economy in China (10).

The Future

What are the prospects for Chinese economic reforms? There are forces to push them forward as well as forces to hold them back. Among the former are an enlightened leadership, strong popular support, pressure of competition on state enterprises from collective enterprises and joint ventures, and assistance and influence from many overseas Chinese and foreigners. In spite of many unfavorable conditions in China, many foreigners have helped and will continue to help China. Among the forces holding back the reforms are ideological resistance, vested interests, bureaucracy, inertia inherent in economic organizations, and the lack of education among the middle management personnel in government and in state enterprises. The existing labor policy of providing jobs to most, if not all, laborers without regard to performance and the lack of labor mobility are major obstacles to reform. The prospects for reform that I have noted previously (4, p. 68) appear essentially valid today:

... The tendency in China is for government enterprises to be allowed to operate more like profit-maximizing enterprises in a market economy and for the private sector to expand. However, the desire on the part of the planning authority to exercise direct control rather than to use only financial means for economic planning, the resistance of a middle-level administrative bureaucracy, and the inertia in the economic and political system will limit the expansion of market forces. Precisely how far the reforms toward adopting features of a market economy will go in the next decade is difficult to predict. However, it appears safe to say that in absolute terms the market elements

will be much more important in 1994 than in 1984, but will still fall short of being the major means used by the Chinese government to achieve its planning objectives. In the meantime, we may observe oscillations in the trend toward a market-oriented economy because the Chinese leaders are in the process of experimenting with and learning about the working of a market economy.

Reform toward a more market-oriented economy will continue in China. The degree of success may be uncertain, but there is no turning back to a system of central control in agriculture or to an industry operating with closed doors. Substantial economic growth will continue even if structural reforms progress slowly. The Chinese economy was able to grow between 1952 and 1979 in spite of the adverse conditions of inefficient central planning and two very serious political disturbances. It can only be expected to grow faster under the more favorable economic and political conditions of the 1980's.

REFERENCES AND NOTES

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2. Starting with the Cultural Revolution in the late 1960's, enterprises and local authorities began to keep a significant portion of their depreciation funds and used them to finance large amounts of investment.
3. Zhou S., in *Zhongguo jingji jiegou wenti yanjiu* [Studies of the problems of China's economic structure], Ma H. and Sun S., Eds. (People's Publishing Society, Beijing, 1982), vol. 1, pp. 23-55.
4. G. C. Chow, *The Chinese Economy* (Harper & Row, New York, 1985).
5. An official index of national income in 1952 prices was reduced from 202.1 in 1959 to 130.9 in 1962, and the annual death rate increased from 10.80 per thousand in 1957 to 25.43 per thousand in 1960 (6, pp. 30 and 83). A. J. Coale [*Rapid Population Change in China, 1952-1982* (National Academy Press, Washington, DC, 1984), p. 7] states that "the peak death rate in 1960 is about 35 [per thousand] Excess deaths (those above a linear trend) from 1958 to 1963 are about 16 million when based on the understated official figures and about 27 million when adjusted for understatement."
6. State Statistical Bureau of the People's Republic of China, *Statistical Yearbook of China 1984* (Economic Information Agency, Hong Kong, 1985).
7. I reported on a production function of Chinese state-owned industrial enterprises using data up to 1981 (4, pp. 123-126). The same production function fits the post-sample data from 1982, 1983, and 1984 very well, showing that there is no increase in industrial efficiency (G. C. Chow, *J. Econ. Educ.*, in press).
8. Premier Zhao has a good sense of economic reasoning as I learned from our extensive conversations on 5 June 1984. On 15 July 1985, the Premier asked me to invite economists from abroad to work with the Economic Restructuring Commission on problems of economic reform (see *The People's Daily*, 6 July 1984, p. 1; *ibid.*, 16 July 1985, p. 1; *ibid.*, 1 July 1986, p. 1).
9. State Statistical Bureau of the People's Republic of China, *Statistical Yearbook of China 1985* (Economic Information Agency, Hong Kong, 1986), p. 526.
10. In October 1983 two officials of the Chinese Ministry of Education discussed with me possible ways to modernize economic education in China. This led first to three summer workshops in 1984, 1985, and 1986 on microeconomics, macroeconomics, and econometrics, respectively, and also to the sending of Chinese graduate students to American and Canadian universities to study economics. Sixty-three students entered schools in the fall of 1985, and more are to follow. By 1985, some students of the 1984 summer microeconomics workshop had begun to teach applied economics courses at their universities. Now modern economics is official in China.
11. The author would like to acknowledge with thanks the helpful comments of two referees on an earlier draft and the financial support of The Garfield Foundation in the preparation of this article.

Geologic Evolution of Northern Tibet: Results of an Expedition to Ulugh Muztagh

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A reconnaissance expedition across the northern margin of the Tibetan plateau revealed evidence of a late Cenozoic northward progression of the locus of crustal shortening and, therefore, of a northward growth of the area encompassed by the plateau. Active reverse faults crop out at the foot of the Altyn Tagh, on the northern edge of the plateau, and at the bases of several ranges within the Altyn Tagh and Kunlun, where the elevations of the neighboring basins are less than 4000 meters. Farther south, where elevations are higher, there was no evidence of recent faulting, but late Cenozoic rock in the Ayak Kum Köl basin has been strongly folded. South of this

basin, Ulugh Muztagh, apparently the highest mountain in the eastern Kunlun, is underlain by late Miocene, tourmaline-bearing and two-mica granite. These rocks suggest that thickening of continental crust had begun in this area by late Miocene time. Overlying quartz-sandine welded tuffs of Pliocene age imply that uplift and erosion occurred between Miocene and Pliocene time, but with little subsequent erosion. In addition, we found an east-west trending belt of mafic and ultramafic rock that probably marks a suture of a crustal fragment with southern Asia in Triassic or more recent time.

THE TIBETAN PLATEAU, WITH A VAST AREA ABOVE 4500 TO 5000 m, is one of the earth's most extraordinary topographic features (1) and one of its least accessible and least explored large areas (2-6). Thus, while recognition of Tibet's peculiarity and prominence has stimulated much research during the last 15 years toward understanding the mechanisms responsible for creating a plateau of such dimensions (5-9), a lack of geologic work in Tibet has prevented testing most hypotheses. Since seismic studies show

that the crust beneath the Tibetan plateau is very thick (70 ± 5 to 10 km) (10), and because isostatic compensation of such thick crust causes the plateau to float high above sea level, the important

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