Scientists in Communist China

Alfred Zee Chang*

215 C Street, S.E., Washington, D.C.

ALTHOUGH no leading Chinese scientist worked for the Chinese Communist Party (CCP) before 1948, following the accession of the Communists to power in China, all but a very few scientists remained to work under the Communist Government. A study of the present whereabouts of the directors of research institutes of the Nationalist Academia Sinica reveals that of the 13 directors, 10 are working for the Communists on the mainland of China. Several scientists with internationally known reputations, such as Dr. Hua Loo-keng (mathematics), returned to Communist China from the United States. Dr. Li Ssu-kuang (J. S. Lee, geology) returned from Britain in 1950, while Dr. Wong Wen-hao (geology) returned in 1951. This action represents a deplorable loss for the Chinese Nationalists, for the rest of the free world, and for the scientists themselves. Whether the hopes and aspirations of these scientists will be realized, even with their rigidly nonpartisan attitude, is a question yet to be answered.

While it is difficult to establish a standard of comparative value in discussing a nation's scientists, it is adequate to evaluate the leading scientists of China from their standings in various professional associations. Communist China has a united professional association for the natural sciences—namely, the All-China Association for Natural Sciences (abbreviated "Ko-lien")—having a national committee of 50 scientists (*1*). These 50 members are, of course, not the only outstanding scientists that China has produced. According to a preliminary survey by the Communist Academia Sinica, there are at least 233 who may be called experts in their own fields and probably 865 more who may be listed as potential experts. Of the latter group, 174 (about 20 percent) are overseas, mostly in the United States (*2*). In maturity of research and accomplishment, however, the 50 scientists of the "Ko-lien" National Committee are regarded in Chinese academic circles as masters in their own fields, and some are known internationally.

General Characteristics of Leading Chinese Scientists

Most of the "Ko-lien" group of 50 scientists are natives of the more westernized provinces of China. Of the 39 scientists whose native provinces can be identified, 10 are from Chekiang, and 9 from Kiangsu. This is in contrast with the sectional origins of the Communist leaders—that is, Central Committee members—who are mainly from hinterland provinces such as Hunan and Szechuan. Nearly all of this group of scientists have studied overseas, the majority in the United States. Of the 39 scientists about whose educations there is information, 23 were trained in the United States, four in Great Britain, three in Japan, two in France, and one in Canada. This is also in sharp contrast with the foreign-educated Communist leaders who were mostly schooled in the Soviet Union, France, and Japan.

Most of these scientists are old men by Chinese standards. The average age of the 33 in the aforementioned group whose age can be determined is 55.4 yr. The oldest is the 71-yr old Dr. Yen Fu-ching (M.D., Yale), and the youngest are atomic physicist, Dr. Chien San-chiang (Tsing San-tsiang, Ph.D., University of Paris) and the jet-propulsion specialist, Dr. Chien Wei-ch'ang (Chien Wei-zang), both young men of 42. There are nine in the 63–67 age group, 16 in the 50–57 group, and five in the 43–49 group. It is apparent that none is a product of postwar education. The last, Dr. Chien Wei-zang, graduated from the University of Toronto in 1942.

Upon their return to China from overseas graduate work, these foreign-trained scientists began teaching at universities, and some entered national research institutes, such as the Academia Sinica. Only one, Dr. Hou Te-pang (chemical engineering, M.I.T.), can be identified as having worked in private industry. The 36 scientists whose careers can be studied have spent an average of more than 15 yr in academic work. These are very stable careers for an unstable nation.

Most of this group of 50 scientists are sons of privileged families. Their overseas training was excessively costly, even for well-to-do families in China. Although most of them were sponsored by foreign funds, such as the Boxer Indemnity Fund, it was still a great burden for any family to send a son to a university (Tsinghua, Yenching, Chiaotung, or Peiyang) where foreign study scholarships were available rather than to a less expensive provincial college.

While these scientists, in most cases, were fortunate enough to have had family financial support while attending college, the competition of the entrance examinations for these universities was a test of their talent and scholarship. For instance, in the entrance examination of Tsinghua University in the 20's, usually only about 10 percent of the 1000 or so candidates passed. Most of the successful examinees were scholastic leaders of their high-school classes. Of the 50 members of the "Ko-lien" National Committee, 17 earned their Ph.D's. in the United States.

As a group, these scientists alienated themselves from political participation more than any other in-

* Formerly with the Division of Orientalia of the Library of Congress and currently engaged in research on Chinese society for the Center for International Studies of the Massachusetts Institute of Technology.

tellectual group. Only six of these scientists can be identified as having had Kuomintang (KMT, Nationalist) membership: Mao I-sheng (mechanical engineering, Ph.D., Carnegie Institute of Technology), Jen Hung-chien (physics, Ph.D., Harvard), Wu Yu-hsun (physics, University of Chicago), Chu Ko-chen (meteorology, Ph.D., Harvard), Chang Han-ying (civil engineering, Cornell University) and Chao Tsu-kang (electrical engineering, M.I.T.). The memberships of the last two were automatically imposed because of their official position under the Nationalist Government, while the other four, being presidents of national universities at one time or another, were perfunctorily invited to join the KMT or the KMT Youth Corps. On the other hand, only Tseng Chao-lun (chemistry, D.S., M.I.T.) can be identified as a bona fide leader of the pro-Communist Democratic League since 1947, while Liang Hsi (forestry, Tokyo Imperial University), Ping Chih (physics, Ph.D., Cornell University), and Yen Chi-tzu (physics, Ph.D., University of Paris) are now leaders of the Communist-approved political association, the Chiu San Society.

In material life, the leading Chinese natural scientists have been better off than their colleagues in the social sciences. It was much easier for natural scientists to reach full-professorship in the leading universities than it was for social scientists. A full professor in a national university, before the war, was paid annually about 2000 U.S. dollars (*3*). During the inflationary years of wartime and the postwar period, Chinese professors, while suffering more than most groups, received in kind about 200 catties of rice per month in addition to other family necessities, clothing, and living quarters. Professors in natural science were more liberally treated through awards of auxiliary research pay (*4*). While there are no official data concerning the remuneration of professors in Communist China at the present time, they are rumored to be no better off than under the Nationalists.

It is partially true that the leading Chinese scientists who were trained in "capitalist countries," according to Li Ssu-kuang's apologia to the Communists, made "a cult of individualism" and "considered the quest for abstract truth to be the sole purpose of their work (*5*). Contrary to Li's implication that Chinese scientists are lacking in patriotism, most foreign-trained scientists, upon establishing their fame in China, would deliberately remove the marks of "foreign orientation." On any Chinese college campus, people were surprised to discover that the most old-fashioned appearing scholars invariably had some achievements in foreign countries.

Present Occupations of Leading Scientists

After the reorganization of the Academia Sinica (the old Academia Sinica established by the Nationalists in 1928 should be literally translated as "Central Research Academy"; the present Communist organization should be translated as "Chinese Academy of Science"; but both are known by the name Academia Sinica), Marxist litterateur Kuo Mo-ju was appointed president of the Academia. Although trained in medicine in Japan, Kua never practiced his profession in China and may be regarded largely as a figurehead of the organization. Three of his five vice presidents are leading scientists—namely, Li Ssu-kuang, Chu Ko-chen, and Wu Yu-hsun. The other two vice presidents are Ch'en Po-ta, Mao Tse-tung's wartime private secretary, and social scientist Tao Meng-ho, former director of the Institute of Sociology under the Nationalist Academia. The last two have had little to do with natural science research. The administrative office of the Academia is in the hands of Dr. Yen Chi-tzu, and Yen's deputy, Communist Yun Tzu-chiang, former president of the "Academy of Natural Sciences" at Yenan.

Of the 11 institutes within the Academia, six are directed by leading scientists. These directors are Chien San-chiang in modern physics (atomic physics), Huo Loo-keng in mathematics, Li Ssu-kuang in archeology, Chien Tsung-shu (botany, Ph.D., Harvard) in systematic botany, Wang Chia-chi (botany, Ph.D., Pennsylvania) in hydrobiology, and Wu Hsueh-chou in applied physics. Three other directorships are held by scientists who are not members of the "Ko-lien" National Committee: Feng Te-pai in physiology and biochemistry, Pei Shih-chang in experimental biology, and Chao Chiu-chang in geophysics. One institute, geology, is without a director for the time being, but both of its vice directors, Cheng Yu-chi and Chang Wen-yu, cannot be identified as Communists. The only Communist scientist who is director of a division of the Academia is Lo Tien-yu, head of the Seed Selection Experimental Laboratory.

Most of these leading scientists retain their teaching positions while serving in government positions, such as on regional finance and economic committees or on cultural and educational committees. Of the 50 members of the "Ko-lien" National Committee, 15 retain full-time professorships, while five others serve on committees. Most of them probably have been incorporated into the faculty of Tsinghua University in Peking, for according to a recent report Tsinghua has now become the "Polytechnical Institute" which provides most of the engineers in China (total enrollment in 1952 was 3800) (*6*).

A few of these leading scientists hold key positions in functional departments; for example, Chang Han-ying serves as vice minister of the Ministry of Water Conservation, whose minister is a layman in this field, ex-Nationalist General Fu Tso-i. The American-trained bridge-building specialist, Dr. Mao I-sheng, who had taken part in almost all railroad-building projects under the Nationalist Government, is today the director of the Bureau of Railroad Research of the Ministry of Railroads. The most politically prominent figure among this group is probably agriculturist Liang Hsi, who was a supporter of the KMT when he was head of the Department of Forestry of the National Chekiang University before the war and is now the minister of forestry, Central People's Government.

The Communist members of the "Ko-lien" National Committee occupy mostly positions of an administrative nature in functional departments. Su Chiang-kuang, an old Red Army surgeon, who used to be the head of the Health Department of the People's Revolutionary Military Council (Red Army Headquarters), was appointed deputy minister of health. The head of Ministry of Health is Li Te-chuan, widow of the late Christian General Feng Fu-hsiang. Liu Ting, who was formerly the head of the Bureau of Arsenals of the Red Army, is now vice minister of the Department of "Second Machinery Manufacturing." Some of this group whose political affiliations before 1948 cannot be identified are probably Communists. Examples are Chang Ko-wei and Chen Kang-pai, who hold key positions in functional departments in Manchuria, and Wei Hsi (a graduate of Yale Medical College in China) who directed fieldwork in the so-called "International Scientific Commission for the Investigation of the Facts Concerning Bacterial Warfare in Korea and China," sponsored by the "World Peace Council" at Oslo in Mar. 1952. Wei later headed a "Korean Epidemic Prevention Corps."

Two younger scientists who were not Communists before 1948 presumably have been absorbed into the CCP. One of them is atomic physicist, Chien San-chiang, who worked under Mme. Irène Joliot-Curie in Paris for many years, and is now not only the head of atomic research in Communist China but also politically prominent on a national level. He is deputy chairman of the Communist functionary, the All-China Democratic Youth Federation. Chien is also active in Communist international parleys and accompanied the aforementioned germ warfare investigation commission from Europe to Peking, Another is a former jet-propulsion researcher at the California Institute of Technology, Chien Wei-zang, who is an elected deputy secretary-general of the All-China Democratic Youth Federation. He made a "cultural tour" to Burma in 1950, where he had no ties whatsoever, and on his return he was elected duputy chairman of the Chinese-Burmese Friendship Association.

On the surface, leading scientists with training in "capitalist countries" are still as dominant in every field as under the Nationalist Government. The contributions in most professional journals give the impression that the older generation still holds the lead in research, but the recent developments in China, especially in the wake of the "Anti-America-Aid-Korea Campaign," indicate that these leading scientists are being subjected gradually to as great pressure as any intellectual group. To understand the forces at work against these "bourgeois scientists" requires an analysis of the Communist policy and practice toward technical and scientific personnel.

Communist Policy and Practice toward Scientists

Before the Communists entered Peking in Jan. 1949, their preoccupation was with "political organization" and the Red Army; and the success of both relied almost solely on their "ideological work," while technical considerations came to their attention only when the Red Army needed such things as medical care and radio communications. The literature of the Long March, such as Edgar Snow's, describes the improvisations of the Communists in such matters. Even after the Communists were relatively settled in Yenan, it took them years to create any kind of scientific organization. The first medical training program was started with the establishment of the Eighth Route Army Medical School at Yenan in 1938, which in 1940 was renamed the China Medical College at Yenan. The "Academy of Natural Sciences" in Yenan, throughout its existence since 1940, was hardly more than a name.

The inability to establish a program of scientific development does not mean a complete unawareness by the Communists of the potential of technology. As early as the beginning, in 1930, of the Nationalist suppression campaign in Kiangsi Province, the Communists advertised the policy of special treatment for, or "do honor" to, technical and scientific personnel, in the event that they wanted to join the Communists. The first official decision of the Communists with regard to the importance of the participation of technical personnel in their "revolutionary activities" was indicated by an announcement of a Central Committee resolution dated May 1, 1941 (*7*). In this resolution, the Communists declared: "We must explain to the whole party that various types of economic and technical work are an indispensable part of our revolutionary activities." Meanwhile, in the adoption of this policy, the Communists emphasized, "the party must strengthen its leadership among party and non-party members who participate in economic and technical work, and promote their progress in political training." Here is found the early expression of the Communist political indoctrination of technical personnel.

Throughout World War II, however, there was no sign that the Communists made any progress in training or absorbing scientific personnel. The reasons for this condition were, first, that most of the youths who went to Yenan were persons with only high-school education or less, and their main interest was to join in army work. The leading scientists had alienated themselves from political participation; Yenanese adventure for them was unthinkable. Second, the average Communist leader was not only preoccupied with army work but possessed the traditional suspicion of the Chinese farmer toward technical progress. While high Communist leaders stressed the importance of technology, it is doubtful that the Communists had the same enthusiasm and determination for attacking technical problems as they had in other fields. The reluctance of Communists to undertake technical problems is reflected in this passage from the 1941 resolution (*7*):

> Some party organizations and party members who possess only a narrow and abstract understanding of our revolutionary work, or even look down on eco-

> nomic and technical work, considering it to be without serious political significance, should be corrected in their error. The tendency to use ideological studies as an excuse for not participating in practical work should be corrected.

It should be pointed out that Yenan was no more jeopardized in wartime than Chungking, Kweiyang, or Kunming, where most high-educational institutes took refuge during the war. The Communists had access to equipment and opportunity to enlist personnel for basic scientific training, but they did not make serious efforts to launch any commendable scientific study.

The overemphasis of political training in Yenan, moreover, gave no room for any serious scientific study. Communist leaders, as well as party cadre, were preoccupied with daily political lessons and discussions and seldom could find time to give serious thought to any long-range training program in science. The decision to make use of technology in their struggle for political dominance finally came at a time when the Nationalist economic blockade had impoverished Yenan; it thereby grew out of a primary economic necessity. Yenan and the surrounding area are extremely arid and unproductive, but the Communists were incapable of facing even this problem from a scientific approach. They entered the field of agricultural improvement by utilizing political weapons, such as the so-called "Wu-Man-Yu Movement" (a counterpart of the Soviets' Stakhanov Movement of the 30's) to solve a problem purely materialistic in nature.

The inability to train or absorb scientific personnel during the first 28 yr of the CCP was, thus, due to the temper of Communist leaders. The priority of political indoctrination of non-Communists was insisted upon even during an adverse time, such as 1939–1941. Today, they have become the *de facto* rulers of the China mainland, and having the advantage of obtaining scientific cooperation from the Soviet Union, it seems unlikely that they would yield ground to scientists merely because of the reconstruction program.

At first, the symptoms were encouraging to most scientists. When the Communist rule became effective, they advertised, on various occasions, their special treatment toward scientists, which proved to be a phenomenal success for the Communists in persuading leading scientists to stay or return to the mainland. In the Common Program of the Chinese People's Political Consultative Conference (the body that nominally established the present Communist regime), for instance, the love of science was one of five "virtues," as was the promotion of these leading scientists politically. Of the 50 scientists under discussion, 18 (including two Communists) were rewarded by appointment to the Conference, a higher proportion than from any other profession. The budget covering expenditures in scientific research in the first year of the Communist rule was reportedly double the Nationalist prewar allocations for the same purpose (*8*). Mao Tse-tung emphasized the importance of technical and scientific research in his *"On People's Democratic Dictatorship"* in commemoration of the 28th anniversary of the CCP (*9*):

> We must overcome all difficulties and learn the things we do not understand. We must learn to do economic work from all who know, no matter who they are. We must respect them as teachers, learning from them attentively and earnestly.

Since the "Anti-America-Aid-Korea Campaign" and later "Anti-Three and Anti-Five Movements," leading scientists in China have been treated ruthlessly in certain isolated cases. Self-criticism and ridiculous confessions have been written by scientists and made public in newspapers. At least one outstanding scientist, Chicago-trained Dr. Lo Chih-wei, was definitely liquidated in Mar. 1952, because of his refusal to sign an anti-American declaration. On the China mainland today this ordeal happens to all non-Communist intellectuals. It is not the intention here, however, to detail the ubiquitous "brain-washings." The most serious challenge to these scientists—a challenge to truth itself on which these men have built their lives—is the particular Communist concept of science in general and their inherent antagonism against "bourgeois science" in particular.

Michurinism is now the canon of science in Chinese Communism. The Communists worship the Russian horticulturist in a way the Chinese used to do honor to Confucius. There are Michurinian associations and experimental stations throughout the China mainland, and the practice of Michurinism is not confined to biological science alone. It is understandable in the Western world that when Michurinists are dominant, the usefulness of modern scientists is doomed. Paralleling this concept has been a growing atmosphere of incredible helplessness and acceptance of authority in Chinese scientific professions. A few examples may be cited:

1) In the All-China Conference of the Society of Mathematics, under the leadership of Dr. Hua Loo-keng, only three topics were discussed: "How to realize patriotism through education in mathematics"; "The connections between theory and reality"; "Dialectic materialism and mathematics" (*10*).

2) The National Conference of the Society of Meteorology, under the leadership of Dr. Chu Ko-chen, made a "concrete" resolution to "inform all workers in the field of meteorology that they should learn from Chairman Mao's *On People's*" (*11*).

3) In the National Conference of the Society of Chemistry, Dr. Tseng Chao-lun, president of the society, confessed that in error the society had adopted the Anglo-American system in the past, and that the reorientation of study, starting with the compilation of a chemistry dictionary, was the most important problem at hand (*12*).

Direct attacks against the usefulness of "bourgeois scientists" have been visible since 1952. An article from *People's China* (*13*) (in English) reveals the spirit of the time.

The Yellow River Bridge, three kilometers in length, is of vital importance to the Peking-Hankow Railway. Bourgeois engineers considered that on account of its age, it should be dismantled and rebuilt. But Zingorenko, a 60-year old Soviet railway expert, examined the spans one by one and advised that the bridge was serviceable and needed only to be strengthened. The suggestion of the Soviet expert was adopted, the speed of train crossing the bridge is now twice as high as before. The load which the bridge can support is also twice as great as before.

When repairing a certain bridge on the Canton-Hankow railway, Chinese engineers were going to follow the American standard of putting four steel beams in each span. It was the Soviet experts, who, realising that China was short of steel, made minute examinations and calculations and proposed to use two beams instead of four. This represented a huge saving with no loss in safety.

In main construction projects, the Communists rely more on their ability and ruthlessness in organizing masses than on technical know-how. In most cases, the Communists have conspicuously deprived the established experts of their share in major events in the nation. The Huai River Project, which the Communists claim as one of the "greatest epics of modern time," is headed by a Communist Central Committeeman and one-time head of the secret police, Tseng Shan, aided by another Communist guerrilla leader, Tseng Hsi-sheng, a graduate of Whampoa Military Academy and a division commander of the ill-fated New Fourth Army during the war. The Tsengs mobilized, between 1951 and 1952, 4,600,000 workers and peasants in this project (*14*). Here is found an expression of the idea that Communist activity cannot be entirely separated from the Communists' experience in military tactics, from which most of their education was derived. It is no doubt appalling for those "bourgeois scientists," remaining inactive, to watch the wastefulness of the Communist military tactics of "human sea waves."

It is apparent that the Communists have little appreciation of the talents and ability of leading scientists. In fact, these scientists, with their objective method of reasoning, represent a potential threat to Communism. All that stands between the scientists and their eventual euthanasia at the hands of the Communists is their immediate usefulness in technical matters and their congenital nonaggressiveness. Indigenous technology and the scientific approach on the China mainland is in a highly static condition today, and the future of science in this area presumably will be that contained within the general Soviet scientific pattern.

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Bienvenido Maria Gonzalez: 1893-1953

G. O. Ocfemia

Department of Plant Pathology, College of Agriculture, University of the Philippines, Los Baños, Laguna

ON December 30, 1953, death claimed Bienvenido Maria Gonzalez, retired president of the University of the Philippines, at the age of 60, in the San Juan de Dios Hospital in Pasay City. In his death, the Philippines lost a renowned educator, administrator, and scientist.

From his father, Bienvenido acquired an early interest in science and administration. His father was a physician, an eye specialist, and president of the short-lived Universidad Literaria de Filipinas, the first state university in the Philippines during the revolutionary period. His father was also the first director of the civil service appointed by the first governor general of the Philippines, William Howard Taft.

After finishing his elementary education in Manila, Bienvenido attended the College of Agriculture, University of the Philippines, Los Baños, Laguna, where he received the degree of bachelor of agriculture in 1913. In 1914, he was sent as a fellow of the University of the Philippines to the University of Wisconsin. He studied animal genetics under Professor Leon J. Cole and received the degree of master of science in 1915. Returning to America in 1921, he studied at Johns Hopkins University under Professor Raymond Pearl, biometrist, and received his degree of doctor of science in 1923.

His great energy and intensity of purpose enabled Dr. Gonzalez to carry on simultaneously his activities as organizer, administrator, and scientist. As professor of animal husbandry, then dean of the College of