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This serial publication contains translations of articles from the Chinese-language periodical Hung-ch'i (Red Flag), No. 1, 1966. This completes this issue. Complete bibliographic information accompanies each article.

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HIGH STANDARD QUALITY COMES FROM HIGH STANDARD THINKING

[Following is a translation of an article by Su Hsing (5685 2502) in the Chinese-language periodical, Hung Ch'i (Red Flag), Peiping, No. 1, 1966, pages 27-29]

The improvement of the quality of products is an important signpost in the current new industrial production high tide. It shows that the idea of quality first is being understood by more and more people and realized in practical actions.

Similar to all maters, quality first also hinges on perseverance.

Generally speaking, when there is no problem as to the quantity, it is easy to adhere to the idea of quality first, but it becomes not so easy when the quantity has to be increased and the conflict between quantity and quality aggravates. In fact, the idea of quality first must be adhered to even in the latter case. "Cooking the turnips in a hurry without washing off the dirt" is the principle of capitalist business. Our principle is that the dirt must be washed off regardless of whether we are in a hurry or not.

Talking about increase in quantity, we want to increase the quantity which is up to the quality standard. If the quality is not up to standard, and the products become rejects, what is the use of increasing the quantity? Will it not be the greater the quantity, the greater the waste and damage?

As shown by experience, when the quality is not stable, it is difficult to increase the quantity. If we turn to large scale production when the quality of small scale production is not stable, the quality problem will be rapidly exposed, and we will be forced to fall back to remedy the quality. We will then be slowed down in our haste. Only when the quality is good will the output soar.

Adherence to quality does not indicate maintaining the existing quality without thought of improvement.

After trial manufacturing and putting to production, a new product will undergo a quality stabilization process. During this process, the crucial technical problems must be thoroughly solved, the technical management made sound, following strictly the standards, designs, technology, and systems, and a relatively stable and skilled technical force formed. However, once the quality is stabilized, it does not remain immutable. Science and technology make new developments every day, and the products must improve more and more. What is regarded as a high quality product today may become a low quality article tomorrow. We must not follow the old tracks on the quality issue. Like sailing against the current, if one does not advance, one retreats. Whoever following the old tracks will be left behind.

Stability must be sought in quality, but we must strive for improvement on the foundation of stability. Once improved, it must be stabilized; once stabilized, it must then be further improved on the foundation of stability. Stability - improvement - re-stability - re-improvement. Such is the dialectics of quality development.

Hence, on the problem of quality, one must not feel pleased with oneself over some small achievement, and one must guard against pride and conceit and satisfaction with the status quo. One must possess the spirit of ceaseless revolution, strive for the upstream, and seek a high standard.

By high standard, we mean that the quality must catch up with and surpass the level of the advanced units, and, in some articles, the world advanced level. This is a strategic issue. It will be impossible to build our country into a modern socialist power within not too long a period of time without such an ambition. Of course, quality improvement must undergo a development process. At all times, it rises and falls; it cannot remain even and uniform.

Where does high standard quality come from?

Some people declare: "I pay serious attention to quality, because if the quality norm is not attained, the planned task will not be completed." This view is correct. Nevertheless, one must not stop at this point. The simple purpose of task completion cannot be considered as the idea of high standard.

Others say: "I give serious attention quality, because substandard quality will damage the reputation of the plant." To give attention to quality for the honor of one's own unit is better than giving no attention at all. Nevertheless, nor can it be considered as the idea of high standard.

If such views are followed, even if the quality norm is attained, it will not be easy to continue to improve the quality more and more.

What is the idea of high standard? It means raising high the great red banner of the Mao Tse-tung ideology, feeling a concern over

the father country while setting the sight on the world, and taking responsibility toward the people.

The products of our plants serve economic construction, national defense, and the people's living. Wherever they are used, it is for the purpose of building our country into a socialist power with modern agriculture, modern industry, modern national defense, and modern science and technology.

When the products serve agriculture, we must keep in mind the five hundred million farmers and assume an extreme responsibility toward them. We must ask whether our products can withstand the tests of their courageous struggles to open the mountains and level the sea, change heaven and earth, and build a modern agriculture.

When the products serve industry, we must entertain the ambition to change the backward technology of our country and catch up with and surpass the world advanced level, and assume an extreme responsibility toward the industrial construction. We must ask whether our products can withstand the tests of the struggles of our brother plants to catch up with and surpass the advanced.

When they serve national defense, we must feel a hostility toward the enemy and assume an extreme responsibility toward the frontier defense of our country. We must ask whether our products can withstand the tests of the struggles of our courageous People's Liberation Army and large militia to defend the nation and repel the enemy.

The power of the idea of high standard is without limit. If all the leadership cadres and the vast staff and workers of an enterprise possess the idea of high standard and link the quality of every ton of steel, every screw, every drop of oil, and every foot of fabric with the domestic socialist revolution and the revolutionary cause of the proletariat and oppressed people of the world, the idea of quality improvement will have truly penetrated man's heart and manifested in the mind and hands of each and every individual. Then, the revolutionary creative spirit, means, and measures will appear, and the foreign red-tapes and midway thinking will vanish.

On the issue of quality improvement, our socialist enterprise must follow a fundamentally different path from the modern revisionist enterprise.

In enterprise operation, modern revisionism relies on material stimulus and inspection. The modern revisionists hang out the socialist sign but follow the capitalist road.

Material stimulus is the great enemy to quality. The greater the use of bonuses and high wages as a stimulus, the greater will be the falsification and fraud, thus lowering the quality of the products.

We also need the inspection system and personnel in our enterprise, but there is a fundamental distinction between us and the mo-

dern revisionists. They rely only on inspection, without faith in the staff and worker masses. The enterprise and the workers actually occupy opposite positions. We cannot adopt such means; it will not work anyway. As a product is often composed of thousands of big and small parts, requiring many work processes, it will be difficult to discover all the problems by inspection alone. In addition, when the awareness of the workers is not high, they can always find the means to handle the inspectors. As stated by some workers, "the quality level depends on the ideological level. If the ideology is not improved, even if there is an inspector for every worker, it will not work."

Our enterprise operation must follow the Marxist-Leninist principle, the Mao Tse-tung principle. We believe in the masses. The workers are the proprietors of an enterprise. As long as they consciously sense their class position and realize that their labor is for the revolution, they will become positive and increase the output and improve the quality with a self-less spirit. Many enterprises, after undergoing the socialist education movement, have improved both the output and the quality without any change in the equipment. Why? Because the people have changed; their thinking has changed. Once their thinking changes, any miracle can be created.

Whether to believe in and rely on the masses reflects the struggle between the socialist and capitalist systems and between the proletarian and bourgeois ideologies.

Quality improvement requires the effort of the staff and workers. If the idea of quality first is not turned into something of the people and mastered by them, it will be mere empty talk.

The value of the experience of the Ta-ch'ing oil field rests in their trust in and reliance on the people, turning quality improvement into a mass action. It rests in their bringing out politics and undertaking the ideological work, requiring a high standard in ideology and solidifying the political work in production, in the three-combine of the leadership, the workers, and the technical personnel, in enterprise management, in the training of basic skills, and in the adoption of new skills and technology.

Politics is the soul, the commanding general. By consciously realizing this point, closely relyong on the staff and worker masses, bringing politics out, and taking it to the front line of production, we will be able to adhere to the idea of quality first and persevere in the high standard of quality.

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WE CANNOT SIT AND WAIT FOR THE DEVELOPMENT OF THE SOCIALIST ENTERPRISE

[Following is a translation of an article by Wang Yung-hsing (3769 3057 1630), Chinese Communist general branch secretary, Hsia-ting-chia big brigade, Ta-lu-chia commune, Huang hsien, Shantung, in the Chinese-language periodical, Hung Ch'i (Red Flag), Peiping, No. 1, 1966, pages 30-36]

Our Hsia-ting-chia big brigade was formerly an impoverished unit, but now it has changed, and we have become wealthy. Some one asked me how this was accomplished. I said that it was by relying on the party leadership above and the mass creation below, spade by spade and shovel by shovel, after a long period of time. In the words of our commune members, "we cannot sit and wait for the development of the socialist enterprise."

To Be Born to an Impoverished Area Does Not Matter, But What Does Matter Is the Lack of Willpower

Our big brigade has a population of 2,695 persons in 560 households, distributed in 21 production brigades in eight natural villages, and 2,413 mou of cultivated land. Prior to the liberation, the area was poor, and the cultivated land per capita averaged .9 mou, mostly on hillsides. With the high mountain and the barren soil, the constant drought, the exploitation of the landlords and rich farmers, and the destruction of the reactionary Kuomintang faction and the Japanese devils, the people lived a hard life. Many people made a living as permanent hired workers or temporary help, or they fled their homes or begged.

After the liberation and the land reform, the people no longer had to suffer oppression and exploitation, and they had land to farm.

Nevertheless, the soil was barren and the foundation of the people inferior, and the farmers in general were not well off. Then, a new class differentiation appeared. As aptly put by Chairman Mao, poverty leads to the desire for change, and to revolution. The poor fellows among us wanted "to start a revolution," dig wells, and change the drought condition. But the well-to-do middle peasants declared: "Poor mountain gully, poor mountain gully, you'll never get rich in eight generations!" Out of spite, we tried, but we did not succeed. We tried to dig wells and improve the land (cheng-ti 2419 0966), but, relying on individual households, we were short of manpower and funds. Subsequently, the Party Central and Chairman Mao appealed to us to organize and follow the path of cooperativization. At this time, given the path and the direction, our mind was enlightened, and our morale rose. We first formed mutual aid teams, which were later reorganized into elementary cooperatives. In 1955, the seven elementary cooperatives were merged into an advanced cooperative. At that time, the landlords and rich farmers openly and secretly undermined the cooperative. Those well-to-do middle farmers who had not joined the cooperative wanted to compete with us, and those who had joined declared that they had suffered a disadvantage and clamored for withdrawal. Filled with defiance, we poor and low-middle peasants were determined. From that time on, we made up our mind to make the cooperative a success and change the impoverished mountain gully by the collective strength. We could not tolerate the ridicule of the well-to-do middle peasants or permit them to infiltrate and destroy our collective enterprise. We must adhere to the socialist direction, rely on the collective strength, succeed in production, improve the people's living, and build a socialist new rural village. With such determination, we worked; with success, our determination grew. Later on, we realized that imperialism and modern revisionism took advantage of the poverty of our country and tried to put a stranglehold on us. We were determined to succeed in construction and production more rapidly.

The mountains of our big brigade were poor, the soil barren, and the water short. We must control the mountains, the soil, and the water. We started with water conservation, beginning with digging wells. There was a great drought in 1957, and we built and repaired reservoirs and ponds. In the fall of that year, while we were working fervently, the superior level sent me to visit Li-chia-chai in Chu-nan hsien. My mind became even more enlightened by the visit and my thinking was liberated. With the spirit of the fool moving the mountain, Chu-chia-chai opened ten mountains. It was truly admirable and impressive. Upon my return, I spread its revolutionary spirit and studied Chairman Mao's comment that, "to reform China with the spirit of the fool moving the mountain, Li-chia-chai is a good example." This further increased our ambition to reform nature and promoted our water conservation high tide. Every one declared that, to reform the

impoverished mountain gully, we must emulate the revolutionary spirit of the fool moving the mountain. As we were both under the guidance of the party and Chairman Mao, if the people of Li-chia-chai could do it, so could the people of Hsia-ting-chia. In 1958, we studied again Chairman Mao's comment on Li-chia-chai and began to improve the land. In 1959, we summarized our experience of 1958, decided on measures to adjust to the locale, seek current result, and undertake the easy first and difficult later, and promoted the land improvement work. In 1964, the heavy rain storm caused internal flooding. We learned the experience of the Lin-i area in combining drainage and irrigation, and all the improved land could be both drained and irrigated, thus guaranteeing a harvest regardless of drought or flood.

Though ours was an impoverished mountain gully, with our willpower, we controlled the mountains and the water and improved the land without interruption. We worked every year, and produced a result every year. The output increased step by step, and the conditions changed year by year, turning the poor mountain gully into a wealthy one. For the past ten years, we spent more than 330,000 mandays, did more than 450,000 cubic meters of rock and earth work, built 18 reservoirs and embankments, one dam, and four pumping stations, dug 160 wells and ponds, and turned 60% or more of dry soil into irrigated land. We thoroughly improved over 1,600 mou of barren hilly land, constituting 69% of the cultivated area, and did some minor improvement on the rest of the hilly land. We also launched afforestation, built 320 grain mills, and planted over 20,000 fruit trees, thus basically afforesting the barren mountains.

Our grain output gained every year. From 1959 on, the mou output reached 800 catties or more. In spite of the great flood of 1964, the mou output increased to 920 catties. Notwithstanding the severe droughts in the spring and fall of 1965, the mou output rose to 950 catties. With the output increase, we could support the state construction; with the increase in the public reserve, the collective economy stabilized. The commune members had surplus grain, and many households had bank deposits. Every year there were people who built new houses, and the living standard greatly improved.

The ten years of effort in mountain control, water conservation, and land repair were also ten years of growth in the willpower of the people of Hsia-ting-chia. We truly realized that, being born to a poor area did not matter, but to be without willpower did. Suffering under all the exploitation and oppression of the old society, the older generation had no choice but to leave us in poverty. Our generation has grown up in the new China, with the guidance of the party and Chairman Mao above and the support of the collective economy below. Therefore, we must have a willpower, and we must not pass the poverty on to the next generation. Born to this impoverished area, we have to reform it. As long as we follow Chairman Mao's words, learn the revolutionary spirit of the fool moving the mountain,

and emulate the self-revitalization of Ta-chai, with direction, ambition, and energy, there is no poor mountain gully which cannot be changed.

Elevate the People's Ideological Awareness with the Class Struggle

How did the commune members of the Hsia-ting-chia big brigade acquire such a great determination and such a great power to change the features of the impoverished mountain gully? How did we realize that we could not sit and wait for the development of the socialist enterprise, but must rely on ourselves to construct it? Of the many reasons advanced, the principal reason was that the party branch, with the class struggle as the center, adopted all kinds of means to elevate the people's ideological awareness and rely on the people's strength, the people's wisdom, and the people's creation.

Man's mind controls his action. Without revolutionary thinking, there can be no revolutionary action. In order to rely on the people, their ideological awareness must be elevated and their revolution education conducted. A few years ago, we relied on the poor and low-middle peasants and, by means of recollection and comparison, conducted a ceaseless class and class struggle education of the commune members. Meanwhile, we also taught them to be the masters, not the slaves, of nature and build for socialism. In recent years, we vigorously studied Chairman Mao's works and taught them to farm for the revolution and construct for socialism. Through such revolutionary education, the vast commune members further established the revolutionary spirit of fearing no hardship or difficulty when working for the collective, for socialism, and for the revolution. Once the revolutionary thinking took control, the feeling of hopelessness and predestination and the hesitation disappeared. The commune members declared that mountain control and land improvement were for the purpose of eradicating poverty and building up the assets, laying the foundation for socialism, and the welfare of our children. Through such revolutionary education, the commune members realized that, in order to revolutionize, they must follow Chairman Mao's words, and that the extent of their success in farming was measured by the extent to which they followed his instructions.

In educating the commune members in ideology and in organizing them to reform nature, we have always centered around the struggles between the two classes and between the two roads. When we build, the class enemy is not asleep, and the capitalist power has not given up. At all times, they wish to subvert our enterprise and realize capitalist restoration. The class struggle promoted our struggle to reform nature and develop production. In 1956, the first year after cooperativization, we began the experiment to improve the land. We planned to combine seven seven small parcels into a big farm. To do so, we had to excavate and discard the boundary stones left down from

the private ownership system. The well-to-do middle peasants with serious capitalist thinking asked: "If the boundary stones are discarded, what would happen if the cooperative should collapse?" At this juncture, we conducted a socialist education and elevated the people's awareness. The poor and low-middle peasants declared: "So long as the South Mountain does not crumble, the cooperative will not collapse." The people excavated and discarded the boundary stones and started work. After ten days of rush work, the commune members completed a sample of an improved farm.

In 1957, a reservoir was built in the K'ou-tzu village. To build it, the temple of the local deity had to be moved, and the dirt from "the back of the local dragon" had to be obtained for the embankment. Some people objected because it would destroy the geomancy and condemn the village to permanent poverty. At this time, we conducted an education against the feudal superstition and organized the commune members to discuss whether a better life depended on the gods and geomancy or on the collective economy and diligent labor. The truth became more and more apparent as we discussed. Finally, the people came to the conclusion that a reservoir, furnishing irrigation to the terrace farms, was the answer. With their own hands, the people moved the temple and transported the dirt from the "back of the local dragon, " and the reservoir was completed.

The situation in 1957 was excellent. With the land improvement sample and the experience in reservoir building, the foundation was laid for a mass high tide in large scale farmland water conservation capital construction. At that time, the vast masses rejoiced, but the landlords and rich peasants, coordinating with the reckless attack of the urban bourgeois rightist faction, agitated the commune members to withdraw from and dissolve the cooperative, attempting to destroy it. Those well-to-do middle farmers seriously affected with the capitalist idea also took this opportunity to attack the cooperative, wishing to follow the capitalist road. Under this situation, there was no choice but to repel the attack of the class enemies and the capitalist power, for otherwise the collective economy could not be consolidated, nor the struggle to control nature continued. Thus, we deployed a great debate in the entire cooperative. During the debate, the miseries of the old society and the small-farmer economy were recapitulated and the fallacy that the cooperative was not as desirable as independent operation was refuted by vivid facts. The crimes of the rich farmer elements of the Hsiao-ch'en-chia village in associating with party member cadres to destroy the collective economy were exposed. The attack of the class enemies was a bad thing, but, after the class struggle and the debate, the bad was turned into something good. The truth was clarified, the people's class awareness elevated, the enemy attack repelled, and a mass high tide for large scale farmland water conservation capital construction begun, resulting in the great leap forward of 1958.

From 1958 on, we raised high the three red banners, adhered to the socialist direction, and continued to struggle against the class enemies and the capitalist power. In 1959, we summarized the successful experience of 1958, examined the defects in our work, conducted a morals rectification in the party, and struggled against the cadres of the Hsiao-ch'en-chia village who sheltered the rich farmers and conspired with the dishonest merchants. After the morals rectification this time, the awareness of the party members was elevated, the capitalist agents who had infiltrated the party expelled, and the party organization purified. The success of the class struggle this time and the elevation of ideology resulted in the continued leap forward in 1959 on the foundation of 1958.

At this time, feeling that the party was united and the problems no longer serious, we relaxed on our ideological struggle. But, the moment we relaxed, something happened. An evil wind again blew in 1961. Some people said that selling firewood would be better than land improvement. Others abandoned farming to go into business and opened a mutton shop in the hsien seat of Huang hsien. It caused another class struggle. In the fall, relying on the poor and low-middle peasants, we debated on the question of whether socialism was to build an estate, to maintain it, or to destroy it. The commune members declared that it was to create an estate, and that, to do so, they must not go astray, but must control the mountains and improve the land. Chopping down trees and selling firewood would only bring current benefits, and the result would be the destruction of the estate. In addition to repelling the evil wind of selling firewood and going into business, the debate elevated the commune members' socialist awareness and consolidated the socialist construction idea.

In recent years, the struggles between the two classes and between the two roads were never interrupted. Such struggles furnished the motive force of construction and promoted the development of water conservation & production.

The conditions of our big brigade's class struggle have made us realize even more clearly the principle that revolution promotes construction. To construct, we must revolutionize; to revolutionize, we must tackle the class struggle. We must not forget the classes and the class struggle, but must always heighten our vigilance. Just because we are in the process of controlling the water and improving the land, we must not immerse our head in the water or bury it in the dirt and fail to see anything else. The class struggle cannot be relaxed. The moment we relax, the class enemy will attack. As long as we constantly tackle the class struggle and keep the class camp in good order, the commune members will be energetic and the socialist construction will develop.

The farmers are practical in their temperament; they look at the facts and the result. When we activate them to struggle against nature, besides elevating their ideological awareness in the class

struggle, we must also guide them to gradually improve their understanding and reenforce their confidence in the practical struggles to reform nature. As mountain control, water conservation, and land improvement were matters never before undertaken by our forefathers, the farmers would not lightly believe in or accept them.

How to obtain their faith and acceptance? We must break through one point and display samples and facts for them to see and discuss. After seeing and discussing, it will become easy for them to believe and accept. In our struggle to reform nature, we have followed this procedure in all our undertakings.

For example, when we were building our first reservoir in 1957, some people did not believe that we could build a reservoir in the mountain gully to irrigate the land. Old farmer Lu Ch'ing-chung (0712 3237 1813) called it a daydream. While propagandizing to the people, we organized some active elements to start the work and produce a sample for all to see. Since it was the first time for us to build a reservoir, we did not want it to fail, because it would then produce an unfavorable impression. Thus, our party member cadres all went to the site and led the people in the work. After a little over a month, the reservoir was completed and the water let out to irrigate the land. The people saw and discussed it, and were convinced. At this time, Lu Ch'ing-chung declared: "Facts are facts. Even if I don't believe, I have to. My old brain is getting rusty!" Those who did not believe in the reservoir before turned into active elements in reservoir building. With this reservoir as an example, we educated and activated the people, and a large scale water conservation high tide was stirred up.

We have come to the conclusion that we must break through one point, produce a sample for the people to see and discuss, and, once their thinking is enlightened, activate them to undertake the task. This method is like rolling a snow ball. It begins with a handful of active elements who propagandize to the people and produce a sample to educate them; once the people are enlightened, the active elements will lead them in the task. By so doing, the actions of the minority become those of the majority, forming a mass movement to control nature.

When activating the people to deploy the movement to control nature, we must tackle the easy first and the difficult later; we must not embark on the difficult the moment we begin. Success and result will stimulate the morale. After we have made several successes and trained the people, we will then tackle the difficult. When our big brigade improved the land, we began with the land at the foot of the hills and on river shores before the high mountain terrace farms.

There is also another principle in activating the people to reform nature. It is to combine the current and long range interests

of the people. Accordingly, we adopted the policy of improvement, completion, and result in the same year. It enhanced the confidence and the morale of the commune members. One commune member said that, when he saw the result of the improved land, he felt sorry over the land yet untouched.

Success or Failure Depends on the Leadership

Whether the ideological work on the people can be successfully performed and whether their strength, wisdom, and creation can be relied on hinge on the leadership and on whether the party organization can implement the directives of the Party Central and Chairman Mao and bring out their positivity. In all tasks, the people look to the party members, and the party members look to the cadres. Therefore, success or failure hinges on the leadership. If the cadres do not concentrate on creating assets, but wander around everywhere, without settling down to lead the people, the people's morale will not rise, and, even if they start the work, they will not be able to complete it.

To lead properly, the cadres must possess the idea of devoting their entire life to the revolution. In recent years, I realized the importance of impressing this idea in the cadres. In the past, some few cadres in our place did not have such idea. They wanted to be transferred. They had no energy, and could not lead the people. To solve this "transfer idea," we asked the comrades in the party branch committee who had seen combat to talk about how they fought, why they fought, for whom they shed their blood, and how to gain revolutionary victory. Now we were in the process of constructing socialism, which was only the first step in the ten-thousand-li trek toward communism. Therefore, was it right not to prosecute the revolution to the final end? Could we face our deceased patriots? After recollection and comparison and the class education, the cadres realized that non-revolution would result in revisionism, the restoration of capitalism, and the return to the miseries of the old society. Thus, the "transfer idea" was overcome in some of the cadres, and the idea of creating assets established. They looked to the future while they worked, wishing to devote their entire life to the task. They were determined to prosecute the revolution and create assets for the collective and the state. Once their mind was settled, they racked their brains all day long to think of the means to reform nature, and no one wandered around any more.

In addition to the idea of creating assets in the mind of the cadres, a united party branch is also required in order to lead successfully the struggle to reform nature. Unity is strength. If the party branch is not united, it will not be able to lead the people successfully, and it will give the class enemy the opportunity to attack, disrupt the leadership nucleus, usurp the leadership power,

and attempt at a capitalist restoration. During the advanced cooperative period, our party general branch had a sub-branch secretary in Hsiao-ch'en-chia village who overlooked ideological reform and was seduced by the rich peasants and dishonest merchants. He competed with the general branch and undermined its fighting power. What should we do about the disunity in the party? Should we compromise, or should we adhere to the principles and struggle against those damaging the party unity? Seeking unity by compromise would not attain true unity. Only criticism and struggle would lead to unity. Our party general branch committee adopted the method of struggle against this individual, continuing for several years, exposing and criticizing his errors, and educating the party members and the people. Subsequently, as he refused to reform in spite of the repeated education, he was expelled from the party. The unity of the party general branch was strengthened, and its fighting power elevated. I feel that good leadership does not depend on individuals, but on a firm and united leadership group. Only when everyone makes suggestions, thinks of means, decides, and carries out the decision, when everyone joins in the work, performs it to the very end, and produces a sample, will there be fighting power. Neither the ability nor the patience of the several comrades of our party general branch is great, but they rely on the stability and unity of all; therefore, they can lead the commune members of the entire big brigade and reform the impoverished mountain gully with the spirit of the fool moving the mountain.

In activating the commune members to reform nature, we have another leadership experience. It is the enforcement of the democratic centralization system. In mountain control, water conservation, and land improvement, our party general branch pointed out: "The moment we see clearly, we will act, and persist in the task to its final success." To attain this point, we relied entirely on the democratic centralization system. How did we see clearly? We depended on democracy. Whatever we wanted to undertake, we would get the opinions of everyone. By so doing, we could see the task and the people clearly. Through their opinions, we could clarify the natural conditions, the way to handle the task, and the most economical approach. We would also clarify their thinking, commend and encourage the accurate ones, educate and correct the erroneous ones, and help solve the practical problems. Only thus would democracy and the positivity of the commune members be fully developed; only thus would the leadership see the task and the people clearly, start from the practical, centralize, and arrive at an accurate decision. For example, in the spring of 1958, we learned the experience of Li-chia-chai and built more than ten mou of terrace farms. But our work was almost completely ruined by a heavy summer rain storm. The people expressed all kinds of opinions. Hearing them, some cadres became discouraged. The party general branch calmly analyzed the opinions, and found that the

failure was mainly due to our copying the experience of Li-chia-chai without regard of the practical conditions of Hsia-ting-chia. Thereupon, it educated the cadres: "When we have made a mistake and the people can freely criticize us, it is an excellent thing. We are reminded to start from the practical at all times in our undertakings." After the summation this time and more than a year's practice, Hsia-ting-chia found the means to improve the land compatible with the local conditions.

To be able to "persist in a task to its final success," we also require centralization, i. e., the firm implementation of a correct decision. In mountain control, water conservation, and land improvement, man fights nature, and nature also fights man. When the work is substandard or abandoned half way, it becomes wasted the moment a heavy rain falls. Therefore, after seeing the matter clearly and deciding on it, we must centralize to an advanced degree. But we must not reach a hasty decision before we can see clearly. On the other hand, once the decision is made, we must firmly implement it. Those who do not follow the decision must be criticized; they must not be ignored, for it will damage the democratic centralization system and cultivate a bad habit. Only when we see clearly and make up our mind will we be able to lead the people to work arduously and concretely; only then will we become invincible. Chairman Mao declared: "Do not fight an unprepared battle; do not fight a battle of which we have no confidence." ("The Current Situation and Our Tasks," Selected Works of Mao Tse-tung, volume 4, page 1247, People's Publishing House, 1960 edition). He again said: "Prosecute the revolution to the final end." ("Prosecute the Revolution to the Final End," op. cit., volume 4, page 1377). I find his words applicable to our struggle against nature.

Similar to fighting a battle, the success of failure of the struggle against nature depends on whether the cadres can take the lead and charge. They must lead in labor and experiments, and in undergoing the hardships and overcoming the difficulties. When the cadres labor regularly and lead in labor, they will be able to clarify the commune members' thinking, familiarize themselves with the farm work and the tasks, and make good suggestions, and the commune members will be able to obey the leadership and work energetically and successfully. In regard to new projects and new measures, as the people do not have experience in them, some of them may be doubtful. Only when the cadres take the lead in experimenting, produce samples, gain experience, find the means, and speak relevantly, will the people be convinced and the work promoted. In case of hardships and difficulties, it is like close combat in battle. Only when the cadres take the lead and charge will the battle be won. In 1957, when we built our first reservoir, the moment the party general branch issued the mobilization, the party and league members and the active elements

all mustered. They carried rocks and dirt, smoothed the foundation, and built the embankments. Like live dragons and tigers, they worked in great fervor. Sixty-year old communist member Chiang Yen-yu (1203 1693 0645) also rushed to the work area, laboring and shouting slogans at the same time. Under their motivation, the foundation work of the reservoir was completed in less than twenty days. When we were working together in the building of the Ta-ch'en-chia river blocking dam, the ice had not melted, and the water came up to one's waist. In the severe cold, some commune members hesitated. At this time, the big brigade leader took the lead and jumped into the water, and the young shock troop leader, together with a group of young fellows, followed suit. They worked continuously for more than three hours in the waist deep freezing water and completed the job. The commune members declared: "If the cadres can jump into the river, so can the commune members." I find that undergoing great hardships and enduring great labor on the part of the cadres are glorious and obligatory. Whether the commune members can do it or not depend on the leadership of the cadres. What the cadres cannot do, they cannot expect the commune members to do. When the cadres set the example, the commune members will naturally follow suit. The leadership of the cadres is a treasure, a voiceless command, and the people will follow. Difficulties will be overcome and victories won.

Socialism does not simply drop down from heaven or grow out of the earth. If we wish to construct socialism, we must heed Chairman Mao's words, establish our revolutionary willpower, stimulate our revolutionary energy, rally the people, and work to the final end spade by spade and shovel by shovel. We must continue to take Ta-chai as our model, examine our defects, ascertain our inferiorities, and build up Hsia-ting-chia more successfully than ever before.

"We cannot sit and wait for the development of the socialist enterprise." These are the words of the commune members. They also constitute my general understanding.

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A RURAL FILM PROJECTION TEAM

[Following is a translation of an article by Chi Ying (0679 2503) in the Chinese-language periodical, Hung Ch'i (Red Flag), Peiping, No. 1, 1966, pages 37-40]

Since its formation in 1954, the first film projection team of Ho-lung hsien, Kirin, has set its roots deeply in the rural villages and persevered in serving the peasants. In the past ten years, the team members have climbed mountains and crossed rivers hundred of times and covered over 43,000 li, popularizing film projection work in the Te-hua and Lu-kuo people's communes, the most desolate mountain areas of the hsien, and contributing to the expansion of the rural socialist ideological battleground and the activation of the rural cultural life. The team has received awards from the party and the government 27 times and is a red banner unit in film projection work in Kirin.

The two communes in their work area have a total of 39 natural villages, scattered in a distance of 100 li of deep mountains and dense forests. The communication is inconvenient, and most of the villages are connected by uneven and dangerous mountain paths. The residents have to climb mountains and cross rivers any time they wish to travel beyond their own village. How to open up a projection route in such an area was an arduous task. Chairman Mao's works furnished the team members with a tremendous spiritual force and made them fearless of the task. With Comrade Chang Szu-te, commended in Chairman Mao's article entitled "Serving the People," as the model, and the spirit of "the Fool Moving the Mountain," they were determined to endure the great hardships labor and deliver film projection to the deep mountains and dense forests, to the door of the mountain area peasants. To show the films, they travelled in knee deep snow in the winter and torrential rain in the summer, climbed mountains and crossed waters, cut through brambles and thorns, and advanced

against the difficulties. They had to climb dozens of mountains and cross dozens of rivers and spend a month to travel on foot over 400 li for each show. In some spots, they not only had to help pull the carts, but also carry the equipment on their back. In the spring of 1961, for example, the ox cart carrying the equipment was mired in the melting mud below a great mountain. At this time, they would rather undergo the hardship in order to enable the peasants to see the show, and immediately carried the equipment and luggage on their own back to climb the mountain. With a load of seventy or eighty catties per person, they trudged through the mud. Though frozen and exhausted, they were filled with happiness in their heart, singing revolutionary songs while they climbed. Some peasants were so impressed that they called the team members "tough guys made of iron." They were praised as the "ever prompt" film projection team - prompt regardless of the hour, the distance, or the weather.

After several years of courageous struggle, the team opened up 33 film projection stations, and 98% of the peasants in their work area could attend shows within 5 li. Yet they were not satisfied. One time, when discussing serving the people with "perfection" and "thoroughness" while studying Chairman Mao's works, they made a survey of their work village by village and discovered that the little village of Hu-ch'u, with a population of 44 persons in nine households, was not provided with shows. They came to the conclusion that their task was only basically completed. To change the "basic" to "perfect and thorough completion" and provide shows to the people of all the villages in the area served by them, they decided to eliminate the blank spot in their work and bring movie films to the Hu-ch'u village. After surveying the path leading to the village, they put their equipment on their back and started out. The path was most difficult. In addition to the dangerous path, they had to climb five great mountains, and squeeze through crevices in many spots. After climbing three of the mountains, they were absolutely exhausted. When resting, they chatted about Chairman Mao's works. Some said: "Chairman Mao instructs us to possess the class viewpoint. To bring movie films to our class brothers of Hu-ch'u village, we will undergo anything." Others said: "No mountain is higher than the Ta-hsueh Mountain and no river deeper than the Ta-tu River. We will follow the footprints of our revolutionary forebears and advance." Thus, in one breath, they climbed the remaining two great mountains and reached the little Hu-ch'u village. Catching sight of them, the peasants, wild with joy, rushed to the village gate to welcome them. When they saw the great leader Chairman Mao on the screen, they were so excited that they jumped and shouted. They said: "Even in Peiping, Chairman Mao knows what we want. We will produce successfully and construct the frontier, in order to merit the concern of the party and Chairman Mao."

How to reduce the aimlessness of film projection work, attain planned showing, increase the number of mobile shows, and display more films to the peasants constitute a problem constantly studied by them. Beginning in 1958, they investigated and studied the basic conditions of their work area and comprehensively clarified the natural and economic conditions of the villages and the distances between them. Based on the information, they formulated a popularization film showing plan, rationally determining the place, route, time, schedule, and price. According to experience, planned showing is an important measure to popularize film shows.

Mixed minority nationalities live in this mountain area, and 90% of them are Koreans who cannot understand Chinese. To enable them to understand the movies, the team thought of many ways. In the past ten years, they made dozens of studies and experiments. At the beginning, they mainly distributed or posted printed or written explanations. Subsequently, they adopted the method of commenting in Korean during the show. After 1956, they dubbed in the sound. This required accuracy and skill in order to coordinate with the oral movements of the actors on the screen and express their thinking and emotions. To complete the task, many of the team members rose early and retired late, occupied their mind with the ways and means even when eating or walking, and regularly solicited the opinions of the people. After a long period of diligent study and practice, they finally mastered the skill and could express the different roles in the show effectively. The leadership commended them, and the people encouraged them. The people found the shows as good as translations.

But the team members were not satisfied with their achievement. They continued to exert their effort, advanced while successful, and tried to dub in the sound by the magnetic coating (t'u-tz'u 3205 4318) recording method by installing a certain device. With the aid of the hsien movie film management station and units concerned, they studied and experimented. As their cultural standard was low and their technical knowledge and experience not advanced, they encountered many difficulties when experimenting on the "16 mm magnetic coating device." They knew that it required magnetic powder, but they had never seen the magnetic powder. To overcome this difficulty, they made it according to the native method based on the little material they had. Twice they failed when recording because the sound was not satisfactory. But they were not discouraged. Learning the lessons of experience, they repeatedly experimented. To break through a technical difficulty, team leader and communist party member Li Hsing-shih (2621 5281 4258) studied day and night, at times going without sleep for several nights. After a long and arduous struggle, they finally succeeded. The device was a significant technical innovation and a flying leap in sound recording for movie films. This new tool reduced the preparation time for sound recording and the labor intensity of the commentators and greatly improved the quality of the result.

Long time ago, they also studied how to enable the audience attending the same show to hear the explanation in two different minority languages according to their choice. After their success in the "16 mm magnetic coating recording device," they further improved on the dual-language sound recording and perfected it even more. Thus, they solved the problem of enabling audience of different nationalities to understand the show and greatly elevated the effect of film propaganda education.

How to enable all the peasants to be able to afford the movies was also a concern of the team. The team members brought forth the revolutionary spirit of self-revitalization, ambition, arduous struggle, and thrifty and industrious national construction, took good care of the equipment and silms, and saved on the expenses, in order to lower the cost and reduce the burden on the peasants. Their care of the equipment and films were commended many times by the hsien, autonomous chou, and province. They handled their equipment and films like the way the warriors handled their weapons in the battlefield, examining and repairing regularly. When it was not convenient to move the equipment after a show, they would keep guard all night over it. When travelling on uneven mountain paths, they would put their own luggage underneath it in the ox cart to cushion it against the shock and vibration. Communist party member Li Min-chu (2621 3787 3178) always followed immediately behind the ox cart and would carry the heavy equipment on his back whenever he came to any stretch of the path which was too rocky or steep. Team leader Li Hsing-shih regarded the equipment as his heart's treasure. He would dismantle and clean it part by part whenever he had time, wiping off the least speck of dirt. Some people commented that the equipment was so shiny that it could serve as a mirror. One time when they went to the Fu-tung big brigade, the path was steep and slippery, and the ox stumbled. The cart was on the point of tumbling down the cliff, dragging the ox with it. At this crucial moment, Li Hsing-shih, without any hesitation, blocked the wheel with his thigh. Though he was injured, he averted an accident. He said afterward: "I must protect the equipment and films even at the cost of my life, for they are the 'weapons' of our movie work." Due to such meticulous care in the past ten years, the equipment was never damaged due to carelessness. Though the motor had been in use for ten years and operated for more than 8,600 hours, it was still in good condition.

They would always calculate carefully for each penny spent. They had never sent their equipment to the plant for repairs, but undertook the large and small repairs by themselves. They also set up a thrift box, which was called the "treasure chest" by the people. It was filled with nails, screws, old parts, and used tools. These were the things picked up and saved by them. Besides using them to repair the equipment, they would often fix the sewing machines, radios, and loudspeakers for the poor and low-middle peasants without

charge. One time, when a phonograph needle dropped on the floor and disappeared, Li Hsing-shih spent a long time to find it. Some one remarked that the needle cost so little that it was not worth the trouble of looking for it, but Li Hsing-shih said: "Even one-tenth of a penny is the property of the people, and we must not lose it." Formerly the gasoline consumption norm per show was two yuan. Through their effort, it was reduced to under two yuan.

In the past ten years, as they continuously lowered the cost, the price per show was reduced four times. It was 40% lower in 1965 than 1954, and the peasants could attend shows at a very small cost.

The comrades of the team accurately realized that rural film showing constituted a part of the party's socialist education of the peasants. Therefore, they consciously linked their own work with the class struggle, production struggle, and scientific experimentation, the three great revolutionary movements, and with the party's central tasks of the different periods, thus fully developing the effect of movies in uniting and educating the people and attacking and eliminating the enemy. They showed films in close coordination with the party rural tasks. For example, during the rural socialist education period, they showed "White Hair Girl," "Locust Tree Village," "Seizing the Seal," and "Li Shuang-shuang;" during the water conservation construction, they showed "the Young Men of Our Village;" during the frontier militia training period, they showed "Land Mine Battle" and "Railway Guerrilla." They also painted and made magic lantern slides to propagandize and encourage, and to commend the good men and good deeds. In addition, by various means, they helped the people deploy spare time cultural activities. They took time out to help the peasants study Chairman Mao's works, sold revolutionary publications, assisted the spare time theatrical group to give performances, taught revolutionary songs, told revolutionary stories, wrote blackboard bulletins and slogans, and served as extra-curricular advisors to the young vanguard teams. Wherever they went, one would hear singing. Therefore, the people called them the "treasures" of the mountains.

That the team could bring politics out in their work and turn toward production was the result of their long perseverance in the study of Chairman Mao's works, their integration with the worker-farmer-soldier masses, and their ideological revolutionization. They considered the Selected Works of Mao Tse-tung a treasure, carrying and studying it at all times. They repeatedly studied Chairman Mao's "Talk at the Yenan Literary Round Table," "Serving the People," "in Memory of Bettume," and "the Fool Moving the Mountain," guided their own work with Chairman Mao's ideology, relied on the people, ate and lived with the peasants, and persisted in associating with the poor and low-middle peasants. They regularly participated in the collective productive labor, helped the people with their chores, and did many good deeds for them. The people wrote many letters of praise. In recent years, they also utilized their rest period to visit the

poor and the suffering and listen to the people's family and village histories. In the self-education of remembering the bitter and realizing the sweet, they cultivated their friendship with the workers and farmers, elevated their own class awareness, and established the proletarian world philosophy. They were determined to show movie films for the peasants with their whole heart for their entire life.

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DELIVER THE BOOKS TO THE HANDS OF THE PEASANTS

[Following is a translation of an article by Ts'ui Yueh-hsien (1508 2588 0103) in the Chinese-language periodical, Hung Ch'i (Red Flag), Peiping, No. 1, 1965, pages 41-44]

I have been doing publication distribution work for seven years. My little bit of accomplishment in the seven years has all been the result of listening to Chairman Mao's words and studying his books. It is the Mao Tse-tung ideology which has enabled me to realize the principle of serving the people with my whole being. I am more and more devoted to my work, and I am determined to serve the rural readers at my post for the rest of my life.

When I first started doing this work, I was a rather ignorant 17-year old girl. That was in August of 1958. At that time, with the development of the socialist construction, the Sun-chiang retail department of the Hsin-hua Bookstores was established in Sung-chiang-t'un, at the foot of the Ch'ang-pai Mountain in An-t'u hsien, Kirin. According to the need of the work, the party organization transferred me from the agricultural front to the said retail department as a sales person.

The conditions of the newly established little book store were rather inferior, and I was the only one to take care of the inside and outside. I was quite pleased upon first arrival, but lost interest as time passed. I had to take care of the publications, the money, and the accounts. Being inexperienced, I was busy all day long. I began to doubt the future of my work, and wished to return to farming at home. Farming would be much easier on the mind even if it involved handling mud and water. I gradually became restless. At this time, the party branch was just organizing the study of Chairman Mao's works. The party branch comrade advised me to join the study in order to settle my mind. Thereafter, with the aid of the party organization, I began to study Chairman Mao's works.

While studying, I pondered, and I examined myself. I came from a poor peasant family. My parents suffered half their life in the old society, and my younger brother was frozen to death. Therefore, I felt that Chairman Mao's words were aimed at me. After repeated study, I gradually understood that the value of a person did not depend on what his job was, but on whether he served the people with his whole being. That a person was noble was mainly because of his self-less ideological quality. Meanwhile, I dwelt on my personal gain or loss and felt restless in my job. Comparing myself with the others, I found myself far inferior, and was deeply embarrassed. Had it not been for the guidance of the communist party and Chairman Mao, and had it not been for the bloody sacrifice of our revolutionary forbears, would a girl of a poor peasant family like me have the happy life of today? Would I have work to do? If I did not settle down to work, would it not be forgetting my origin? Thus, I made up my mind to listen to Chairman Mao's words, learn from our revolutionary forbears, become an individual useful to the people, and offer my youth to the people of the mountain area. When my thinking was rectified, I became devoted to my work.

My place of work is located in a distant mountain area. In a distance of 100 li, there is only this little bookstore. Most of the villages are far away from the store, and the communication is not convenient. It is not easy for the peasants to come and buy books. I tried to find a way to save them time, enabling them to buy the books needed by them without taking time off from production. If, instead of waiting for them to come to the store, I carried the books to the villages, would it not facilitate the people? I recalled that the party branch comrade mentioned to me that I could not wait for the readers at the counter, but must deliver the books to the hands of the peasants. I did not pay much attention to his suggestion at the time. But , after studying Chairman Mao's books, I felt that it was the right way. I made the suggestion to the party branch. The party branch comrade reminded me of the difficulties and of the necessity to possess a revolutionary spirit. As I had already made up my mind, I answered him with Chairman Mao's words: "Work is struggle. The more difficult the prospect, the more I wish to go." With the encouragement of the party organization, I carried the publications and New Year posters to the villages. I covered several villages, and, everywhere I went, I was warmly welcomed by the villagers. They were happy to be able to buy the New Year posters without taking time off from production. Hearing their comments, I felt a warmth in the depth of my heart. Thereafter, I regularly took the books to sell in the villages. I began with those in the vicinity, but gradually expanded to distant mountain areas.

Selling books in distant mountain areas involved more difficulties, e. g., the longer distances and the bad roads. One time I went to a distant commune. By the time I finished selling books, it

was almost dark. As I was in a hurry to go to other communes the next day, I decided to return to the bookstore in the dark. It was in mid-winter. The snow in the forest was thick and the road slippery. The wind felt like a knife on my face. And it was pitch dark. Therefore, it was difficult walking. When I returned to the bookstore, my feet were blistered and my hands frozen. My mother was so worried that she wanted me to rest up for a few days at home. But, remembering Chairman Mao's teaching, I could not lie still. With my wounds dressed by my mother and my father's cotton padded boots on my feet, I set out again. I travelled around for seven days continuously and delivered over 400 volumes of publications to the people.

By May of 1964, except for some outlying small villages, I had visited most of the villages of the four communes served by me. The Nai-t'ou River big brigade of Er-tao-pai-ho commune, located at the foot of the Ch'ang-pai Mountain, was entirely surrounded by forests. To eliminate this blank spot, I planned to carry books there. Some one warned me against it as the population there was sparse and the area was filled with wild beasts. Since I had never been to such an isolated area before, I was undecided. But, imagining the eagerness of the villagers for books, my courage rose, and I felt that I had to overcome the difficulties. The road to Nai-t'ou Mountain was truly difficult. Not only I had to dodge around trees, but the grass roots were like mud puddles. The least bit of carelessness would cause me to fall into the stagnant muddy water. When I fell or became tired, I thought of the greater difficulties undergone by the Red Army in its long trek. Compared with it, the little bit of hardship encountered by me when delivering books to the peasants was nothing. I delivered books to the peasants in order to encourage them in production so that our country would become more powerful. There was no reason on earth for me not to do my job. After one day's "forced march," I finally arrived at Nai-t'ou Mountain. The local cadres and people welcomed me warmly and compared me with a "timely rain."

In recent years, I have visited almost all the 120 production brigades in the area served by me. I have travelled over 15,000 li on foot and distributed over 300,000 volumes (posters) of publications, textbooks, and New Year posters.

To deliver and sell books was for the convenience of the peasants, but also posed a new problem. At the beginning, the peasants complained that, after travelling a long way to the store to buy books, they were disappointed to find the door closed. I found that they were right. It was a conflict between mobile book selling and counter business, and it mainly rested with the time scheduling. Thus, I gave attention to readers coming to the store and discovered that between nine o'clock in the morning and three o'clock in the afternoon was the time when most of them would come. Thereby I scheduled my mobile selling after four o'clock in the afternoon or on my holidays. I would rather work harder and rest less in order to take

care of both the counter business and mobile selling. When I had to travel to distant villages, I would entrust the books most needed by the readers to organs or units nearby and ask them to sell them for me. I would also post a note on the door of the store, announcing my absence and requesting the readers to buy the books at a certain place. By so doing, the conflict between mobile selling and counter business was solved.

Delivering books to the door was a good way to facilitate the people, but what books to deliver was a problem. At the beginning, I did not know what to select. As a result, sometimes I sold only a few books after climbing mountains and visiting several production brigades. First I thought that the peasants did not have the habit of buying books, but later discovered that what I brought did not fit their desire. What kind of books would fit their desire? Chairman Mao said that, if we wished to clarify the conditions, the only means was by social survey. Thus, by various means, I tried to clarify the need of the people. At the retail store, I asked for information from the commune cadres who frequented the production brigades; when I travelled, I solicited the opinions of the people. I also established contact with some peasant readers by correspondence. I would notify them upon receipt of new books, and they would write me on what they needed. A reader informed me that many people in his village wished to study Chairman Mao's works but did not have the books. Based on this opinion, I surveyed several production brigades and found that many commune members had a similar desire. Thereafter, I always carried more of Chairman Mao's single-article pamphlets with me when visiting the villages, and the people were satisfied.

After several years on my job, I gradually understood that rural publication distribution must mainly serve the rural class struggle, production struggle, and scientific experimentation, the three great revolutionary movements. As Chairman Mao once said, cultural work must be coordinated with the revolutionary tasks of specific periods assigned by the party. Therefore, in my visits to the mountains and villages, I always tried to coordinate with the party's central tasks. In the winter of 1963, in conjunction with the rural socialist education movement, when I heard about the cadre meetings in process in some of the communes, I carried sixty to seventy catties of books to those communes to sell.

With the study of Chairman Mao's works, my understanding ceaselessly improved. As a revolutionary publication distribution worker, I not only have to deliver the books to the hands of the peasants, but must also help them understand the contents. In other words, I must serve as a propagandist as well as a sales person. In the past several years, I distributed thousands and tens of thousands of Chairman Mao's works, and deeply realized the eagerness of the people to study. One old peasant told me: "Chairman Mao wrote the the books for us. I am illiterate, but I would like to buy a copy

anyway, so that my child can read it to me." To satisfy the eager desire of the people, I often utilized the opportunity of mobile selling to help them study Chairman Mao's works, and assisted 14 production brigades to set up 18 small study teams, participated by more than 300 persons.

One time when I went to the Yang-mu production brigade to sell books, I saw many young people chatting together after work, and one of them asked me whether I had any old novels. I felt that they should be organized to study Chairman Mao's works, for otherwise they would be drawn away by the old novels spreading feudalism and capitalism. The league branch secretary was pleased with my idea, and immediately formed a small study team the next day to study Chairman Mao's works. After their study, the young people of the production brigade changed greatly. The young man who asked me for old novels later became the person in charge of the receipts and expanditures of the production brigade. There was also another young man who came from a poor peasant family in the Yang-mu brigade. But, as a result of the influence of the non-proletarian ideology, he did not like to work and his thinking was backward. I felt that I had the duty to help him. Thus, I made friends with him and helped him study Chairman Mao's works. Later on, he also changed, and even joined the communist youth league. He wrote me: "You helped me study Mao Tse-tung's ideology. I will listen to Chairman Mao's words, study hard, work properly, and contribute to the construction of our beautiful country."

I also made use of all opportunities to do propaganda work. For example, in the spring of 1965, in conjunction with the socialist education movement, when class education publications concerning bitterness recollection and sweetness realization were distributed, I lectured to the people on the poster entitled "the Plantation of the Criminal Landlord" while making my rounds of the villages to sell books. I lectured 31 times in 23 days, and over 3,800 persons heard me. Whenever I came to the impoverished life of the peasants under the landlords' cruel exploitation and oppression, I naturally associated it with my family history. Therefore, I wept while lecturing, and the people also wept while listening to me, thus inciting the class emotion of the people in their hatred for the class enemy. An old poor peasant of the Hsin-hua big brigade brought his son with him to hear me. Afterward he told his son: "You must remember the class hatred and serve as a revolutionary successor."

I came in contact with many young children among my readers. After studying Chairman Mao's works, I understood the importance of cultivating and educating the younger generation in the prosecution of the revolution. When they came to the bookstore, I introduced good books to them, helped them with their selections, told them the stories of model figures in Chairman Mao's works, and turned the bookstore into a political-ideological education battleground for

them. For this reason, the schools asked me to serve as an extracurricular advisor to the young vanguard team.

The main objective of the distribution of our retail department is the vast peasantry, while we also serve the forestry enterprise and frontier units. In addition to delivering the publications to such forestry enterprise and frontier units regularly, I also did my best to satisfy their need. In the summer of 1963, a physician of a certain forestry protection unit came to the store to buy the "Rural Physician's Manual." It happened that the book was sold out. Had this occurred at the time when I first started work in the store, I would have simply said "not in stock" and forgotten it. But, after studying Chairman Mao's works, I took a different attitude. Seeing his disappointment, I was extremely sympathetic. After noting down his place of work and name, I immediately contacted the superior level bookstore, which finally sent a copy to me. When I personally delivered it to the physician, he was surprised because he did not think that he would get it so soon. Another time a frontier soldier comrade came to buy volume 4 of the Selected Works of Mao Tse-tung. The Chinese edition was sold out, and the superior level bookstore did not have any either. He could not read the Korean edition. To help him obtain this book, I utilized my morning and evening rest periods to visit more than 20 Korean readers, hoping that they might have a Chinese edition of the book which could be traded for a Korean edition. The moment I stepped into their house, I would look at their bookshelves. They teased me for being a guest from the bookstore. After more than ten days, I finally obtained a Chinese edition of the book by trade. Upon its receipt, the soldier comrade wrote me: "I will diligently study Chairman Mao's works and devote myself to the defense of the father country." In the past, I would have thought it none of my "business" in the case of the physician and the soldier. But now I feel that, as an orderly of the people, the more I mind such "business," the better it is.

Though I have done some work in the past seven years, I am still far below the standard of the party. I am determined to study Chairman Mao's works harder hereafter, so that I can become a cultural warrior and a red publication distributor in deed as well as in name, and turn the small mountain bookstore into a battleground to propagandize Mao Tse-tung's ideology and serve the mountain area peasants more effectively.

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COURSE OF MANKIND'S UNDERSTANDING OF CHEMICAL ELEMENTS

/Following is a translation of an article by Liu Chi-ch'i (0491 7139 0796) in the Chinese-language periodical Hung Ch'i (Red Flag), Peiping, No. 1, 1 January 1966, pages 45-53./

What are the myriad physical things in the world constructed of? This question has attracted man's attention from the earliest times. We now know that the countless numbers of things which we contact everyday are made up of a limited number of chemical elements, about 100 in total count. From the point of view of view of chemical composition, these things may be divided into two major categories: one type is of a single nature, that is things made up of one element; for example, this includes lead, copper, etc. The other type is the chemical compound, that is, the things made up of two or more elements; for example, this includes water, table salt, chemical fertilizer, etc. Chemical elements are the most simple matter in the study of chemistry. For example, water can be divided into the two elements of hydrogen and oxygen; table salt can be divided into chlorine and sodium; and the ammonium sulfate in chemical fertilizers can be split into the four elements of sulphur, oxygen, nitrogen, and hydrogen. However, hydrogen, oxygen, chlorine, sodium, nitrogen, and sulphur cannot be divided into any simpler parts by chemical methods, so they are chemical elements.

In reaching today's level of understanding, man's knowledge of chemical elements underwent a long, slow process which accompanied the development of production and science. During this process, mankind's understanding of chemical elements constantly developed and deepened.

Chemical Elements Are the Various Essences Which Make Up Physical Bodies

Before the formation of modern concepts on chemical elements, man's understanding of elements may be said to have been in its initial stage. The duration of this stage was very long, including all of antiquity and prehistory.

There is a close connection between chemistry and mankind's

needs in life, and thus it is one of the most ancient of sciences. From the time mankind left the animal world and entered into material production activities, he constantly changed the physical things in the world of nature so as to make them accord with his living needs. Man not only needed to change the quantity, shape, and position of physical bodies, but he also needed to change their essence. Fire was the chemical method which man first discovered and mastered by which he could change the basic nature of things. The use of fire not only enabled man to have cooked food, but there also gradually developed the chemical techniques for firing pottery and for refining metals. After the development of agriculture, in the phenomenom of the mildewing of grain, man discovered and mastered the chemical technique of fermentation. The flourishing of the practice of drinking wine in the Shang Dynasty shows that, even 3,000 years ago, people could use the chemical process of fermentation to make alcoholic drink. In the course of this production practice of changing the basic natures of things, man gradually accumulated a large store of chemical knowledge, and thus chemistry was gradually born.

In the practice of production and living, man in ancient times repeatedly observed the changes in the essences of physical things, and gradually developed a theory. He held that these essences were the basic natures of all physical things, that these basic essences would combine differently to form the different things. The thing which had only one basic essence was the element. For example, ancient China had the theory of "five elements", metal, wood, water, fire, and soil; ancient Greece had the theory of four elements, soil, water, air, and fire.

These chemical viewpoints of antiquity provided the theoretical foundation for the original form of chemistry -- alchemy (which includes the art of making gold). The ancient views on the elements held that all physical things were composed of its various essences, and thus if one could find a way to change the essence of a thing, it could be changed into a different thing. The alchemists of ancient China held that "the longer one heated the elixir of gold, the more subtly it was transformed; gold could not be destroyed by 100 refinings in fire, nor decayed by burying it in the earth. If this was consumed two times, a person's body would be transformed, and thus immortality would be conferred." (Ko-hung: "Pao-p'u tzu" chapter, volume on elixir of gold.) This was dreaming about transferring the indestructibleness of the elixir of gold (the sublimation of sulphur into mercury) and gold into the human body, so that, similar to these two things, man also would never decay. The alchemists held that if the qualities of gold could be added to base metals (the yellow color of gold, the smoothness, etc.), then they could be changed into valuable gold. The arts of alchemy of ancient China were born in the second century B.C. (Western Han), and later transmitted to western Europe via the Arabs. Since the activities of the alchemists were in accord with the desires of the rulers who sought long life or who were infinitely greedy, they were respected and supported by the rulers whether in the East or the West.

The basis for the alchemists was an illusion which was not in accord with the laws of objective reality, and of course they were not successful. However, in the course of their many probing attempts to transform the essences of physical things, they became acquainted with many chemical elements and their conditions for forming compounds; they accumulated much chemical knowledge, created some methods for chemical operations, and thus made a certain contribution towards the development of chemistry.

The metals and medicinal things which the alchemists used were primarily compounds such as mercury, lead, and arsenic. The things which could be melted down in them were strongly poisonous, and thus they not only did not achieve the goal of long life, but they also inavoidably brought about the tragedy of poisoning. Thereupon, the alchemists were gradually rejected by the people. From about the time of the 12th century A.D. (the Southern Sung), the chemistry of the alchemists gradually yielded to the chemistry of the "study of materia medica." Among the writings on materia medica left over from the past, there are many important data concerning the history of chemistry. In the West, the position of the alchemists in chemistry starting in the 15th century was also gradually taken over by the chemistry of medicine.

Practice comes first. Man does not proceed to practice after he has knowledge, but rather it is only after he has acquired practical experience for a long time that he is able to formulate theories and to arrive at correct understanding. Before man had come to understand the law of the transformation of energy, he had been constantly applying this law in everyday life. Similarly, throughout all of antiquity, despite the fact that man had formed no scientific theory on elements, he was actually in the course of production practice discovering and rationally using many chemical elements. Before the start of the Christian era, those which had been discovered and were being used included gold, silver, copper, iron, tin, lead, carbon, mercury, sulphur, nine elements in all; after the start of the Christian era, they also discovered such elements as arsenic, bismuth, phosphorus, and so forth.

Since the level of the development of production in ancient China was rather high, China's discovery of many chemical elements preceeded that of other countries. For example, the manufacture of the famous Hsuan-teh furnace (the hsiang - 7449 - furnace) during the reign of the Hsuan-teh emperer (the second decade of the 15th century) proves that China at that time was able to produce the metal zinc; this was 300 or 400 years before the West.

Chemical Elements Constitute the Simplest Matter Which Makes up Physical Bodies

The rise of capitalism and the needs of developing production pushed the development of the natural sciences. Chemistry, in the course of serving the chemical industry for such things as refining metals, making medicines, in dyeing materials, in making acids, and so forth, accumulated large amounts of data, gradually discarded old concepts,

and developed scientific theories on chemical elements.

By the 17th century, people had come to understand, from the failures of the alchemists, that the ancient viewpoint on matter and elements was erroneous. Physical things were not composed of essences, but on the contrary, the physical thing itself contained various sorts of essences. Elements could not be viewed as essences; elements were the most simple form of matter which possessed a certain basic essence. For example, no matter what methods were used, gold could not be split into even more simple components; thus it is an element. Gold possesses its own properties, and these properties cannot be altered at will. This is the basic reason why the alchemists were not successful in their attempts to transform base metals into gold.

Acknowledging that chemical elements are the simplest form of matter which possess a certain essence is undoubtedly basically correct. At the level of technology at that time however, it could not be determined which were compounds and which were elements in the matter which was known. Consequently, no true scientific theory on chemical elements had yet been formed. Thus it happened unavoidably that chemistry was controlled for 100 years by the theory of combustion materials (jan-su -- 3595 4790) created by Ssu-t'ai-erh and Po-tz'u.

At that time people didn't understand how the various properties of physical bodies were formed, and thus they imagined many microscopic materials to explain them. For example, the weight of a body was due to its heavy material; the magneticism of a body was due to its having a magnetic material; for a body to give off heat was due to its having a heat material in it, and so on. This theory in chemistry was also used at that time to explain the phenomenom of the combustion of things. The theory held that a certain body is combustible because it possesses a combustion material; the combustion material is one of the elements which make up combustible things. In the course of combustion, the combustion material flies out from the body, and what is left over is ashes or dregs.

According to the combustion material theory, many combustible metal elements were believed to be compounds which contained a combustion material. Thus the oxydized form of the metal which was formed after combustion was taken to be the element. This is a theory which stood the facts on their head, but this was able to provide a unanimous, non-contradictory explanation for all questions facing chemistry at that time. For example, the explanation given by this theory for the process of refining ores into metals was rather simple and natural: Metals were composed of ores (or the dregs formed after the burning of the metals) and combustion material. Consequently, if they were burned together with a thing such as coal which possessed rich combustion material, then the combustion material in the coal would leap out and combine with the ore to form the metal.

This combustion material theory even helped chemistry to complete an important discovery. In the distilling of tartar, some persons wanted to get rid of the impurities in the liquid, thinking that these might be formed from the combustion material emitted from the tartar.

Thus they posited that use of wood ash, which was unusually eager for the combustion material, could absorb these things. The results of the experiments were that they really did make an extremely good tartar crystal. In this way, they both solved the question of the distilling of tartar, and also discovered the property of porous wood ash in absorbing impurities. This provided a basis for the technique of guarding against poisoning.

This sort of discovery almost seemed to prove the correctness of the combustion material theory all the more. Only after the middle of the 18th century when chemistry undertook experiments of fixed quantities was this theory overthrown step by step.

Before chemistry started to use the experimental method of fixed quantities, it was very hard to overturn the combustion material theory. For example, chemists had long ago discovered that when metals were burned, their weight was not reduced because of losing the combustion material; on the contrary it increased, and this quite obviously was in contradiction with the theory of combustion material. However at that time some persons argued that this was because the combustion material lost its weight, and so the metal after losing the combustion material wouuld acquire weight. Now, chemists burn metals in tightly sealed containers, and the weight of the container does not change before and after the burning. After it is opened, air goes in and the weight increases, and the weight of the increase is equal to the weight of that which is added to the metal. This proves that the weight added to the metal comes from the air, and is not created after the loss of the combustion material.

After chemists started using the method of fixed quantity experiments, in research on alkaline materials, they discovered many facts which were completely opposite to the explanation given by the combustion theory.

At that time people divided alkalis into the two types of the moderate (wen-ho -- 3306 0735) and the caustic. According to the combustion material theory, it was held that the caustic alkali contained combustion material, and that it would become moderate alkali after losing the combustion material. Thus the mild (moderate) alkali was a more simple basic material than the caustic alkali. Some chemists put caustic lime into an instrument for collecting gases, hoping to collect the combustion material. However, after the caustic nature was lost, they had not collected any combustion material, but at the same time the weight of the lime had increased, and the volume of the air had strikingly decreased. This showed on the one hand that the reason why the caustic lime lost its caustic aspect was not due to losing a combustion material, but was rather due to absorbing some air. On the other hand this showed that mild alkalis were not simpler than caustic alkalis, but that they contained more air.

Chemists did a series of experiments and proved that all mild alkalis emitted gases when they are heated; their weight is reduced and they become caustic alkalis. And the weight of the gas given off is just equal to the reduction in weight of the mild alkali. It was

also discovered that there was no difference between this gas and the gas which people breathe; there was also no difference between this gas and that formed when certain combustible things are burned. The chemists at that time, based on the idea that this gas was fixed in the alkali material, called it "fixed air." This actually is carbonic acid gas.

After this, chemists focused on doing research on gases, and consecutively discovered hydrogen, oxygen, and nitrogen, these three important gaseous elements. The discovery of oxygen elucidated the basic nature of the phenomenom of combustion, and revealed many truths concerning chemical phenomena. It turned out that combustion was the violent oxygenization of physical things. Oxygen combined with metals when they were burned, and thus their weight increased. When things containing carbon burned, carbonic acid gas was formed; when ores (metal oxydides) were burned together with carbon, the carbon combined with the oxygen in the ores to form carbonic acid gas, so that the ores turned into their original metals. This is the essence of the process of refining metals. The mild alkali was a carbonate of alkali metals, and when it was heated, it would emit carbonic acid gas and become a caustic alkali. When caustic alkali was placed in the air, it would combine with the carbonic acid gas to form a carbonate, thus losing its caustic nature and becoming a mild alkali. In this way, there was no longer any raison d'etre for combustion material in chemical changes, and the combustion material theory was thoroughly refuted.

At the end of the 18th century the law of definite proportions was discovered; that is, the fact that the components making up a compound are fixed and unchanging. At the start of the 19th century the law of multiple proportions was discovered; that is, if in different compounds formed by the same two elements the weight of one element is fixed, then the weight of the other element in this must form a simple whole proportion. In order to understand the reason for the formation of these two laws, the atom-molecule theory was born. According to this theory, every piece of matter is composed of molecules, and the molecules for the same matter are composed of atoms of the same number and same type. Thus its components are fixed and unchanging. Molecules are always made up of whole atoms, and thus the various components which make up matter always constitute a whole proportion. After the establishment of the atom-molecule theory, symbols for chemical elements and molecular formulas were invented, and this lucidly and scientifically explained the course of chemical reactions.

By this time, mankind had formulated this sort of theory: Chemical elements are the simplest form of matter which cannot be divided further. Its minimal units are atoms, and the definite combining of atoms of different elements makes up the minimal units of matter -- molecules. Accordingly we can say that it was only at the start of the 19th century, when the atomic theory was born, that a scientific theory for chemical elements was formed initially.

Discovery of the Periodic Law of Chemical Elements

The establishment of the atom-molecule theory deepened to a

great degree man's understanding of chemical elements. According to this theory, the countless things in the natural world were composed of the atoms of a limited number of elements. However, how many elements were there? This question threw a new stumbling-block in the path of the chemists.

With the development of industry, new chemical elements appeared like grass after a spring rain. At the beginning of the 19th century, 28 elements were known, and 27 more were discovered during the first five decades of the century, which was about equivalent to the total number previously known. It seemed that there would be no limit to the discovery of new elements.

At the same time, the discovery of new chemical elements was a completely accidental product. When K'u-erh-t'e-wa was doing research on kelp, because he was not careful and added too much sulphuric acid, there suddenly appeared in the beaker a purple vapor, which when it coagulated formed a black crystal of metallic luster. Thus by accident iodine was discovered. When Pa-la was experimenting with lye, after putting in chlorine gas he suddenly saw that the lye had turned brown, and thus bromine was isolated.

What helped the chemists to get away from this difficulty was Men-chieh-lieh-fu's discovery at the end of the 1860's of the periodic law of chemical elements. This law was discovered on the basis of the understanding of two most important and closely related features of chemical elements -- atomic weight and valence.

At the time of the establishment of the atomic theory, the most basic distinction men knew of in the atoms of elements lie in their different weights. The atomic weight was the relative weight of the atoms of the various elements. In order to determine atomic weight, it was necessary to know how many atoms of what kind were in a molecule. For example, in the composition of water, the weight ratio between hydrogen and oxygen is 1:8. If a water molecule contains one atom each of hydrogen and oxygen, then the relative weight of the two is 1 and 8. If a water molecule contains two hydrogen atoms and one oxygen atom, then the relative weight of the two is 1 and 16. At that time, the molecular structure could only be clearly understood for a few gases for which the method of volume measurement was carried out. The molecular structure of the majority of others could only be guessed at.

After this, 50 years went by, and then atomic valence was discovered. Valence is the capacity of one atom of an element to be able to combine with a definite number of other atoms in a strict way. For example, since chlorine and sodium, and so forth, can combine once with a hydrogen, this is called a one valence element; since oxygen and zinc can combine twice with a one valence element, they are called two valence elements. And so on. With the valence of the element known, it is rather easy to arrive at the composition of the compound, that is, how many atoms of what kind does a molecule have.

At the end of the 1860's, the Russian chemist, Menchieh-lieh-fu,

undertook a lengthy, penetrating investigation of the atomic weights and valences of the 63 known elements, and of their physical and chemical properties. He discovered that these elements were definitely not a pile of confused things, but were mutually related by a certain law. According to the size order of the atomic weights, he arranged the various elements and could see that there was periodic repetition in the atomic valences and chemical essences. For example, on the periodic table set up by Men-chieh-lieh-fu, the nature of the seven elements, lithium, beryllium, boron, carbon, nitrogen, oxygen, and flourine, in the first column, change from metallic to non-metallic. Lithium is the strongest, most active metal; beryllium is a not too active metal; the metallic nature of boron is very weak; carbon is a transitional element between the metals and the non-metals; nitrogen is an inactive non-metal, while oxygen is a very active non-metal, and flourine is the most active non-metal. The seven elements in the second column, sodium, aluminum, magnesium, silicon, phosphorus, sulphur, and chlorine, virtually duplicate the natures of the seven elements of the first column. The various elements of the same row on the periodic table constitute a family; their valences are the same, their atomic weights get progressively larger, and their chemical properties get progressively stronger or weaker. For example in the first family, when lithium and water combine, it is very quiet, but sodium combines very violently, and fire will flash out when potassium and water combine.

The law concerning the periodic changes of the chemical properties of elements, which occurs based on the sequence of the increase of atomic weights, is the periodic law of elements. This law enabled men for the first time to be able to make scientific predictions in recognizing chemical elements.

The discovery of the periodic law enabled people to judge the correctness of the atomic weights determined by the chemists. Beryllium was originally considered to have a valence of three; based on an analysis of beryllium chloride, we know that the amount of beryllium which will combine with 35.5 grams of chlorine is 4.7 grams. Thus we know that its atomic weight is three times 4.7, that is, 14.1. When Men-chieh-lieh-fu was arranging his periodic table, he started to put beryllium between nitrogen and oxygen, but he discovered that all the properties of beryllium were different from boron and aluminum which had a valence of three; it was rather very similar to the metals, magnesium, calcium, and barium, which have a valence of two. At the same time, between lithium with a valence of one and boron with a valence of three a position was vacant. Thus he calculated that the atomic weight of beryllium should be twice that of 4.7, that is, 9.4. He boldly changed the atomic weight of beryllium which everyone had agreed on, and placed it between lithium and boron. He also revised the atomic weights of some other elements, so that they would meet the demands of the periodic table. Later these revisions were all confirmed.

The periodic law also overcame the blindness in discovering unkown elements. The periodic table was like a musterrole; the empty positions were for elements which had not yet reported in (been discovered).

Consequently, the types of elements were not without limit. Based on the empty positions on the periodic chart, people could predict how many elements had not yet been discovered. Men-chieh-lieh-fu predicted the existed of three elements, that is, in the empty space after calsium with an atomic weight of 40 and before titanium with a weight of 50, there should be a "boron-like" element with an atomic weight near 45; in the empty space under aluminum there should be an "aluminum-like" element with a weight of about 68; in the empty space under silicon there should be a "silicon-like" element with an atomic weight of about 72. He also predicted the properties of these three new elements and their compounds, and even found a method for finding them. He believed that the "aluminum-like" one should have a rather large volatility, and thus it could be discovered by spectrum analysis; the "boron-like" one would not be volatile, and thus would be hard to discover with a spectrum analysis. As a result, in 1875 the French chemist Pa-po-teh-lang used a spectrum analysis to discover the element which fulfilled the prediction about the "aluminum-like" one; in 1880, the Swedish chemist, Ni-erh-sung discovered scandium, and bore out the prediction about the "boron-like" element; in 1885, the German chemist Wen-k'o-le discovered germanium, and confirmed the prediction about the "silicon-like" element. What was even more astonishing was that when the discoverer of the "aluminum-like" element announced his research results, he received a letter from Men-chieh-lieh-fu pointing out that he was in error its specific gravity. It shouldn't be 4.7, but rather 5.9 to 6.0. On re-running the experiment, Men-chieh-lieh-fu was proven correct.

On the periodic table, from hydrogen to lithium, from flourine to sodium, and from chlorine to potassium, the change followed went from the strong and active non-metals to the strong and active metals. Based on the essential feature, Men-chieh-lieh-fu in 1870 noticed an excessively sudden leap, and he guessed that a family of unknown elements with special properties might exist in this. As a result, in 1894, La-mei-se again discovered argon placed between chlorine and potassium; in 1895 he again discovered helium between hydrogen and lithium; in 1898 La-mei-se and T'e-la-fu-ssu together discovered krypton between bromine and rubidium, necn between flourine and sodium, xenon between iodine and cesium. These five elements formed a new family on the periodic table, that is, the family of inert gases; thus the periodic table was even more complete in form.

The above facts fully demonstrated the theoretical power of the periodic law.

The discovery of the periodic law was a tremendous leap in man's understanding of chemical elements. Beside it, almost all the previous achievements in the understanding of chemical elements pale and lose color. However, this was definitely not the ultimate point in man's understanding of chemical elements. On the contrary, this was just the starting point for the scientific understanding of elements, because at that time there was a complete lack of understanding of the basic nature of the elements and the reason for the formation of the periodic law.

Deepening Knowledge to Include the Interior of the Atom

The various elements on the periodic table were originally arranged according to the sequence of increasing atomic weights, and based on this point, Men-chieh-lieh-fu even revised the atomic weights of some elements. He left a few places where the sequence was obviously upsidedown. For example, the sequence number of cobalt, with an atomic weight of 58.94, was 27, the sequence number of nickel, with an atomic weight of 58.69, was 28; similarly, the sequence number for tellurium, with an atomic weight of 127.61, was 52, and the sequence number for iodine, with an atomic weight of 126.91, was 53. After argon, with an atomic weight of 39.944, was discovered, it should have been element No. 18 according to its nature, but potassium with an atomic weight of 39.100 was No. 19. There was no way to explain these things. These problems hinted to people: The most basic thing which expressed the nature of the elements was the atomic number; the atomic weight was secondary. In order to understand this principle, man's knowledge had to extend into the interior of the atom.

By 1913, people had gradually come to realize that the atom was not a simple thing, but rather had a structure to it. The atom was composed of the nucleus at the core and the electrons surrounding it. The atomic nucleus was positively charged, and the electrons negatively; the electrical amount of both was equal, and their natures were in opposition. The greater was the charge of the nucleus, the greater the number of electrons around it. The electrons revolved about the nucleus in a certain track and at an extremely high rate of speed. For atoms with many electrons, the track was divided into several layers, and there was a limit to the number of electrons (or electron tracks) which each layer could accommodate. If the limit was exceeded, the electron would go into a layer farther out. For example, the innermost layer could only have two electrons, the second layer could have eight, and the third layer could have 18, and so forth.

Now, the periodic law of elements could be given a new explanation which would be a step deeper.

The nuclear charge of the various elements was equal to their atomic numbers on the periodic table. This meant that it was correct for the arrangement of cobalt, tellurium, and argon to violate the increasing sequence of the atomic weights.

Chemical changes and the electrons in the deep parts of the atom did not make much difference, for it was only the position and movement of the electrons in the outermost layer which changed. Consequently, the number and circumstances of the electrons of the outermost layer determined the chemical nature of the atom. Hydrogen had only one electron, and thus it had a valence of one. Helium had two electrons; since its electron layer was extremely stable, it was difficult even to get away one electron, and so it is an inert gas. Lithium has three electrons; the inside layer has two electrons like helium, and the outside layer has one, so it is an element with a valence of one. Since the electron in the outside layer is rather

distant from the nucleus, it easily slips outside the attraction of the nucleus, and thus is formed the metal nature and activeness in chemistry of lithium. Beryllium has four electrons with two in the outside layer, so it has a valence of two. But these two outside electrons are somewhat more strongly attracted by the nucleus than is the case for lithium, so the metal nature and chemical activeness of beryllium is less than for lithium. Boron, carbon, nitrogen, oxygen, flourine, neon, etc. respectively add an electron in the second layer, and thus their valences are respectively three, four, five, six, and seven. The second layer of neon has eight electrons in it, and this is an extremely stable layer; thus along with helium it is an inert gas. Sodium which comes after neon has 11 electrons, and the outside third layer has only one electron. Hence it has a valence of one. Since the outermost electron is quite distant from the core, it has an even stronger metal nature and chemical activeness than does lithium. The rest are similar to this situation. The electrons in the outermost layer always increase from one to eight; this constitutes the periodic repetition of the chemical nature of the elements.

After the structure of the atom was explained, the arrangement of the periodic table was revised. In the past, new rare earth elements were constantly discovered, and of those discovered it was often judged that they were not of a single nature, but were mixtures of other earth elements. This posed the question: How many rare earth elements were there? What position should they occupy on the periodic table? Now the question was resolved. Based on the principle that the electrical charge of the nucleus was equal to the atomic number, from lanthanum to lutecium there could only be 15 elements. Based on research on the structure of the atom, although the atomic numbers of these 15 elements were different, the electrons which they added were not added on to the outermost layer, but were added on to the incomplete inner layers, so that their valences and chemical natures were almost completely similar; they should all be put into the position of the third family. This insured that the arrangements of the elements on the periodic table were in an even more strict form.

This being the case, the periodic law of the elements should be explained anew. In the past it was said that the periodic law was a law governing the periodic changes of the chemical natures of elements caused by the increase of atomic weights. Now it should be said that the periodic law is a law governing the periodic changes of the chemical natures of elements which follow from the increase of the electrical charge of the atomic nucleus.

Transforming the Nucleus, Creating New Elements

The understanding of the structure of the atom brought an even more complete elucidation of the periodic law of elements. However, some questions still had not been cleared up. The weight of the atom was almost all concentrated in the nucleus, and an increase in the atomic weight suggested that the nucleus would increase, and thus the

nuclear charge should proportionately increase. The nuclear charge of the No. 1 element, hydrogen, is 1, and its atomic weight is basically 1; the nuclear charge of the No. 2 element, helium, is 2, which is twice that of hydrogen; but its atomic weight is 4, which is four times that for hydrogen. This was hard to understand. In 1913, isotopes were discovered, and it was found out that the atoms for the same element were not necessarily the same completely. For example, the element potassium possesses three different atoms with atomic weights of 39, 40, and 41. The nuclear charge of these three atoms is the same, meaning that there chemical nature is the same, and so they all occupy slot No. 19 on the periodic table; they are all isotopes of potassium. What causes this? It would seem that man's understanding must reach to within the nucleus.

At the end of the 19th century, Madame Curie's discovery of the radioactive nature of the 88th element, radium, enabled people to understand that the atomic nucleus also had a complex structure to it. After the discover of neutrons in 1930, the Soviet scientist, I-wan-nien-k'o, established a theory about the structure of the nucleus in 1932 which explained the above problem.

This theory points out that all atoms of elements are composed of neutrons and protons in their nuclei; the protons carry a positive charge and the number of protons is equal to the atomic number; the weight of the neutrons is about equal to that of the protons, but they are not charged. The total number of protons and neutrons equals the atomic weight. The hydrogen nucleus has only one proton, so its atomic number is 1, and its atomic weight is also basically one. The helium nucleus is composed of two protons and two neutrons, so its atomic number is 2, while its weight is four.

The theory of nuclear structure also explained the mystery of the isotope. The number of protons in an isotope atom is the same, and thus its atomic number and chemical nature are the same; but the number of neutrons is different, so its atomic weight is different. For example, in the atomic nuclei of the three isotopes of potassium there are 19 protons, but potassium 39 has 20 neutrons, potassium 40 has 21 neutrons, and potassium 41 has 22 neutrons. The difference in the atomic weights of isotopes can be explained by the different number of neutrons.

However, with the old contradiction solved, new ones are prone to appear. Thus there appeared the new doubt: Since the difference in the number of neutrons caused isotopes, why is there a certain limit to the number of isotopes? For example, why cannot potassium have isotopes with 23 or more neutrons? The solution to these questions would further deepen man's knowledge of chemical elements.

Research on radioactive elements finally enabled people to understand that the atomic nucleus was like a building built out of protons and neutrons; an unsuitable increase or reduction in the number of neutrons might weaken the firmness of the building. In stable atomic nuclei there is a certain ratio between the neutrons and the protons. In the lighter atomic nuclei the number of neutrons and

protons is about equal. When the atomic number is rather high, the number of neutrons gradually comes to exceed the number of protons. In the nuclei with atomic numbers of 84 or more, nuclei with an excess of either netrons or protons, the nucleus becomes unstable. The unstable nuclei may of themselves fall apart (decay), emit the extra protons and neutrons, and this creates radiation; the nucleus is changed into that of another element. If the newly formed atomic nucleus is still unstable, it will continue to fall apart until a stable nucleus is formed. This is the reason why there cannot be isotopes with just any atomic weight.

The characteristic of self-decay of atomic nuclei is called radioactivity. The phenomenon of decay in radioactive elements means that elements can change, that various elements may mutually evolve, that one element may become another element. For example, when the radioactive element uranium decays, it becomes in turn the radioactive elements thorium, protoactinium, radium, etc.; finally it becomes a stable isotope of lead.

In 1934 it was discovered that bombarding the nucleus with the alpha particle (that is, the helium nucleus) could produce radioactive elements. Later it was also discovered that using protons, the deuterium nucleus, neutrons, and the gamma ray for bombardment could also produce radioactive elements. The discovery of these artificial radioactive elements also pushed man's understanding to a new stage: Not only could elements change of themselves, but man-made means could also cause them to change; man could create elements which did not exist in nature. For example, bombarding element No. 92, uranium 238, with a neutron would cause its nucleus to absorb a neutron; the atomic weight would increase by one, and it would become the unstable uranium 239. Uranium 239 would expel one electron, which would cause a neutron in the nucleus to change into a proton, and the positive charge in the nucleus would increase by one, that is, the atomic number would increase by one. This would become a new element which did not exist in nature, element No. 93, neptunium 239. The nucleus of neptunium 239 is unstable, and after expelling one electron, the charge of the nucleus (the atomic number) would increase by one, and this would become another new element which did not exist in nature, element No. 94, plutonium 239. Now, the number of man-made radioactive isotopes has reached almost 1,000. By 1957, man-made means had been used to create the elements with atomic numbers from 93 to 102, which do not exist in nature.

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At first it was held that elements were the few basic essences making up physical bodies; later it was held that elements were the smallest, indivisible parts of matter making up physical things; still later it was recognized that the law governing chemical elements -- the periodic law -- could rectify some errors concerning elements, and could predict the existence of some undiscovered elements. Next it was understood that elements are not the minimal units of matter in the

world, for it was only in the sphere of chemical change that they were the smallest, indivisible things. The atoms of elements have structures and are divisible, and this knowledge further elucidated the periodic law. Later it came to be known that the atomic nucleus has a structure and is divisible. Next it became known that elements could change, that man could cause them to change, that man could create elements not existing in nature. In sum, this was the lengthy, ever deepening process by which man came to understand chemical elements.

Of course, man's understanding of chemical elements is not yet complete. Research in chemistry on the structure of molecules and research in physics on nuclear particles are constantly developing, and this will bring new understanding of chemical elements. The objective world is limitless, and in the activities of social practice the course of man's understanding of the world is also limitless. Consequently, the process of man's understanding of chemical elements will never be concluded.

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