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JPRS: 3436

24 June 1960

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FOREWORD

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JPRS: 3436

CSO: 3566-D

SELECTED ARTICLES ON MACHINE INDUSTRY IN COMMUNIST CHINA IN 1959

[Following is a translation of selected articles from various issues of the Chinese-language periodical Chi-hsieh Kung-yeh Chou-pao (Machine Industry Weekly), Peiping. Date of issue, page and author, if any are given under individual article headings.]

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## 1. GREAT ACHIEVEMENTS IN THE UNIVERSAL AND LIGHT INDUSTRY SECTORS

Suppl. No. 4,  
7 November 1959  
Pages 28-30

Chou Tzu-chien  
Director,  
Third Bureau

The universal machine and light machine industries are two of the components of the machine industry. They, together with other components of the machine industry, jointly carry out the mission of supplying various types of technical installations for socialist construction. The scope of work undertaken by these two components is wide and includes many businesses with numerous products and complex specifications. The universal machine industry consists of several main businesses, which include the manufacture of pumps, ventilators, air compressors, and refrigerating equipment with products of thousands of different specifications. Pumps and ventilators are widely used in various departments in the national economy. They can be found distributing liquids and gas nearly in every factory and mine. Low air compressors are the source of air motive power. High air compressors are the principal equipment used in synthetic chemical and petroleum enterprises. Light refrigerating facilities are widely used in transportation and storage of food-stuffs and also as a source of low temperature reaction in the chemical industry. The use of deep refrigeration in air separation can acquire large quantities of oxygen, nitrogen and other rare gases, and yet, oxygen is a material which is indispensable in strengthening iron and steel refining operations in the modern metallurgical industry and liquid oxygen is a high grade fuel used in the aviation and rocket industries. The light machine industry consists of more than 20 main businesses, which include the making of machines for the paper, sugar, printing and oil refining industries and which are directly involved in the improvement of the people's living standard and cultural life. Consequently, it is evident that the universal and light machine industries are undertaking an extremely delicate mission in the development of our national economy, and, as such represent a lofty challenge.

Before liberation, the universal and light machine industries were practically nonexistent. At that time, certain factories located in a minor number of cities once manufactured small water pumps, ventilators, air compressors, printing machines and paper making machines. However, under the oppression of the imperialists and the Kuomintang, they were constantly in a backward condition. Until the days shortly before liberation, some of these factories suffered great damages and some were entirely non-operational.

Following liberation, these industries, under the leadership of the Chinese Communist Party, had a rapid development. During the three-year rehabilitation period, economic rehabilitation work was vigorously carried out by the party and the government. Among the universal and light manufacturing enterprises, a democratic reform movement was launched to thoroughly eliminate the unreasonable control system left

over from the old society and to establish a new system based on the dependence of the working class. Staff and workers were given a series of education on class and political ideology, which, in the days that followed, created a sense of responsibility and positiveness on the part of the working people. Numerous accomplishments were then made and production was able to become quickly rehabilitated and developed. The output of principal products in 1952, as compared to that of 1949, was increased many times, and also surpassed the highest level in the pre-liberation years. On the development of different types of products, we were already capable of manufacturing such medium type products as the 100-horsepower air compressor and the 1,250-horsepower low lift water pump, and were also beginning to use Soviet technical data for the manufacture of a number of new products with a better structure. Along with the carrying out of rehabilitation work and the increasing of output, the production work in a number of principal plants was also shaping up. These plants gradually became the respective sole manufacturers of pumps, ventilators and air compressors, and within them, organizations for the carrying out of systematic production activities were primarily established, a production responsibility system was enforced, and control experiences were studied and acquired. All these created important factors for the initial development of production and reform of enterprises systematically and according to plan.

During the period of the First Five-Year Plan, the universal and light machine industries were completely organized in accordance with instructions from higher authorities. Based upon the principle of each plant adhering to its own line of production, work for enterprise re-organization and technical reforms was launched. Central government-operated enterprises were divided from local government-operated enterprises, so that they may be able to assume their respective responsibilities. Central government-operated enterprises, by studying the Soviet methods and with the aid of Soviet specialists, quickly improved their technical level and increased the number of different types of products. They gradually transferred certain production activities to local government-operated enterprises which produced similar types of products, and rendered them technical assistance, enabling them also to become rapidly developed. In this way, central government as well as local government-operated enterprises can be completely organized together, allowing each and every one of them to develop its own line of production by studying and mastering various technical operations, increasing the number of different types of products and establishing a normal operational system, setting on a firm basis from repairing and assembling to individual manufacturing.

As a result of the tireless efforts exerted in the period of the First Five-Year Plan, the production work in the universal and light machine industries was in rapid progress. By 1956, they had already overfulfilled their respective quotas assigned in the First Five-Year Plan ahead of schedule. The quantities of output of all the principal products in 1957 exceeded those in 1952 from several to several tens of times. The number of different types of products was also increased,

which greatly accelerated the self-sufficiency rate of equipment supply. Apart from those special and larger products, production of the general items was greatly raised both in quantity and variety, which basically satisfied the needs for the development of the various departments in the national economy. During that period, a number of plants capable of designing their own products in their respective lines of production were developed. These plants, in carrying out their production activities, had a steady organized operational system with a healthy technical background which could satisfy the needs for production in accordance with plan and schedule. They were capable of putting out products according to requirements and could also manufacture certain large and precision products which were urgently needed by the nation. In the days that followed, they gradually became the leading plants and technical pivot within their respective fields of production.

Since 1958, inspired by the central CCP policy of "exerting vigorous efforts and striving for an upper hand in socialist construction by producing more, producing rapidly, producing good quality products and practicing economy," a great leap forward campaign was launched throughout the nation. In responding to the demand for the development of the agricultural industry, the universal and light machine industries supplied enormous quantities of water pumps for irrigation purposes and air compressors and separators for use by the chemical fertilizer industry. In coordinating with the harvest of sugar making materials and straw fiber, they quickly produced sugar and paper manufacturing equipment. In insuring success in the steel refining work carried out by the masses of people, the rapid development of blowers became a battling target for the entire staff and workers of these industries.

The progress made in this new era urgently required the universal and light machine industries to accelerate their speed of development, making further steps toward the increase of the production capability of the old plants and the raising of the technical level of the leading plants so that they may be able to concentrate on the production of larger and more complex products, leaving the work for the production of medium and smaller items to the local government-operated medium and small plants, the result of which will enable these plants to have a rapid expansion of their production capabilities. Under the guidance of the party policy of "advance by both feet," the production capabilities of the universal and light machine industries were rapidly expanded. They, on the one hand, have large plants that are capable of producing 10,000 tons annually, and on the other, possess medium and small plants with a yearly output of from several hundred and several thousand tons, forming a unified and closely coordinated manufacturing system within the country. In 1958, the total output of irrigation water pumps was equivalent to 1,100,000 horsepower, which surpassed the total amount produced throughout the entire period of the First Five-Year Plan; that of ventilators and blowers was more than three times that of 1957; that of paper manufacturing machines, approximately two times, and that of sugar making machines, more than double the amount. On the test manufacture of new products, those completed included large oxygen making

machine with a capacity of 3,350 cubic meters/hour, large nitrogen and hydrogen air compressors with 362 atmospheric pressure and an air exhausting capacity of 7,800 cubic meters/hour, large water pumps with a caliber of 1,200 millimeters, a flowing capacity from 8,500 to 12,500 cubic meters/hour and a 14.3 to 28.5 lift, and large rotary printing presses with an hourly output of 80,000 newspapers. From these developments, it is evident that in 1958 the production and technical level of these two industries had a tremendous leap forward.

In 1959, the universal and light machine industries had a continuous leap forward progress. During that period, the total output of both sugar and paper manufacturing equipment and irrigation water pumps greatly surpassed that of 1958.

From January to September, 1959, the total output of pumps for industrial use was 137 per cent of the planned quota for that year and that of pumps for agricultural use was 105 per cent, which effectively accelerated the progress of farm irrigation and aided the masses of farmers in their struggle against drought and flood. The total number of air compressors completed was equivalent to 81 per cent of the annual quota. On the development of new products, those which were test manufactured included the combined nitrogen and hydrogen gas compressor with 320 atmospheric pressure and an air exhaust capacity of 10,000 cubic meters/hour, the centrifugal turbine compressor with 6.4 absolute atmospheric pressure and an air exhaust capacity of 25,000 cubic meters/hour, the high temperature oil pump with a flowing capacity of 286 cubic meters/hour, a lift of 120 meters and a temperature resistance of 400 degrees Centigrade, and the axial flow ventilator used in mine shaft with a complete efficiency of more than 80 per cent and capable of air reversal from 06 - 2 to 2,400 under emergency circumstances.

As a result of exerting our ceaseless efforts in studying Soviet techniques, strengthening the test manufacturing work of new products and pursuing scientific research and studies during the past ten years, we have already been able to master the designing work of principal products in certain special fields of production. On ventilators, air compressors, pumps and ammonia compressors, we have been in the past and are presently designing a series of such types of products suitable for use in our country. The performance capability and efficiency of a number of new products have reached the international level.

The course through which the universal and light machine industries took during the past ten years was a magnificent one. The achievements made were tremendous. During this period, we deeply realized that only by resolutely carrying out the party's main principle, plans and policies, by liberating our ideas and by depending upon the masses of people could our production work be rapidly developed. During the period of rehabilitation, we conscientiously followed the party's instructions of carrying out a democratic reform, establishing a new business control system and depending upon the working class which, despite extremely difficult circumstances, enabled our production operations to be rapidly rehabilitated and developed. The output of numerous products exceeded the maximum level in history. In 1956, again

by following the party's policy of "opposing rightist and conservative thinkings, and striving for producing more, producing rapidly, producing good quality products and practicing economy in carrying out socialist construction," the positiveness and creativeness of the masses became unprecedentedly high and the production potentiality was further manifested, which resulted in overfulfilling the First Five-Year Plan ahead of schedule. In the beginning of 1958, Chairman MAO brought out the principle of "exerting vigorous efforts and striving for an upper hand in socialist construction by producing more, producing rapidly, producing good quality products and practicing economy." Under an all-out leap forward movement, the production capabilities of the universal and light machine industries were greatly developed, which resulted in multiple increase of output with numerous types of new products of a higher technical level being test manufactured.

The practical experiences gained in the past ten years proved that according to the characteristics of the universal and light machine industries, it is not necessary to build new plants urgently but adopt the principle of reorganizing old plants by fully developing their potentialities, cultivating them into becoming the technical pivot of their respective lines of production and utilizing the leading plants to guide the medium and small plants in their production work, which, it is believed, agrees with the principle of producing more, producing rapidly, producing good quality products and practicing economy, enabling production to become rapidly developed, saving a considerable amount of investments for the nation and producing more mechanical facilities. Since 1958, this policy has still been maintained despite the fact that more and more larger products have been in demand. Facts proved that this principle has been appropriate and can rapidly satisfy the needs of the nation.

The fact that the universal and light machine industries were able to make rapid progress during the past ten years is inseparable from the assistance rendered by the brotherly nations, especially by Soviet Russia. During the past ten years, Soviet Russia not only supplied us whole sets of blueprints and other technical data, but also dispatched a large number of technicians to our country to teach us their latest technical achievements and help us in cultivating a number of technical personnel. Without the Soviet technical assistance and without learning and mastering the Soviet technical achievements from the beginning, the universal and light machine industries could not have made such rapid progress.

Indeed, the achievements made in the past ten years were great and the progress was rapid. But, as compared to the long range plan, these were merely a favorable beginning. In the course of our work, certain deficiencies still exist. In developing different types of new products, for example, a long range plan is still needed. Some of the products have already been satisfactorily produced in series, but they have not been widely extended throughout the nation. On arrangements for industrial production and the sharing of responsibilities among enterprises which have their respective lines of production, some of

those principal enterprises are still short of an overall and complete plan. Consequently, some of the products are over produced while others are inadequate. It is demanded that these deficiencies be rapidly eliminated.

From now on, our socialist construction work is still designed to be developed at a high speed. The amount of products of the universal and light machine industries needed by various departments will become much greater and the technical level will be much higher. Therefore, in the near future, these industries must bring about a new stage of leap forward development both on their production and technical level. At the same time while old plants are being expanded, a number of new plants should be established. In regard to the development of medium and small plants, the policy of obtaining raw materials and disposing the products locally should be maintained, so that the production system in the universal and light machine industries throughout the country can gradually become perfect. Under the nation's overall guiding principle, each field of production should be gradually consolidated to become the work of only two to three or four to five leading plants, which will serve as the technical pivot of that field of production in their respective localities. On the development of principal products and on the work of scientific research, appropriate distribution of responsibilities should be made among the leading plants so that the technical level can become more rapidly raised. On the development of new products, efforts should be made to create those of the latest and high parametric types and those which are suitable to the conditions existing in our country. Scientific establishments must be rapidly constructed, and research and designing capabilities must be strengthened. A further step should be taken to have the technical potentials of each field of production organized with a systematic development of the scientific research work which is presently urgently needed and a rapid mapping out of plans for the production of more complete series of products. Efforts should be made to continue learning the technical achievements of Soviet Russia and other brotherly nations and to strengthen the technical cooperation among the brotherly nations, and at the same time, to pay special attention to the advanced technical experiences of other nations so that in not too long a period, the principal products of the universal and light machine industries can reach the international technical level.

It is believed that under the leadership of the party, the entire staff and workers of the universal and light machine industries, together with those of the other machine industries, will definitely be able to continue a forever proportional leap forward development and to assume the glorious mission of supplying excellent quality technical facilities to various departments in the national economy in the course of the socialist construction.

## 2. INSTRUMENTS AND METERS

No. 42

17 October 1959

Page 7

Unsigned article

Prior to liberation, our nation practically had never produced any scientific instruments and meters. Following liberation, as a result of the concern voiced by the party and the government, this field of industry was gradually established and its technical level has since been greatly raised. In the great leap forward year of 1958, especially, it attained an extremely rapid progress. Despite being under a materially disadvantageous condition, numerous important products were produced.

On thermological instruments, complete sets of automatic electronic regulating instruments for use by large and modern power stations were produced. Each set of these instruments is made up of 27 different types of equipment, which include a flowing capacity transformer with a maximum dielectric working pressure of 165 kilograms/square millimeter, a three-stroke electronic regulator with a minimum scope of ineffectiveness of 6 millivolts, a power harmonic oscillating stabilizer, a micrometer, an adjuster and a remote controller. These electronic regulating instruments which can be used to serve as various different types of automatic control systems are important automatic control equipment for modern thermoelectric power stations and can also be regarded as the nerve of such type of power stations. Other items produced in this field include pressure gauges of 10,000 kilograms/square millimeter, small type two-phase instruments for use on 160-millimeter wide recording paper, 2,000-degree centigrade radiation pyrometers, infra red ray apparatuses for gas analysis, and radio isotope liquid meters.

On optical instruments, a type of modern universal microscope was produced. This instrument, which is capable of measuring as little as one micron, is a basic instrument for precision measurement. It can be used for measuring length, angle, screw thread, thread pitch and various types of geometrical formations. As compared to the similar type of international products, it has more measuring devices, which are the projection comparison measurement and double image observation, and is convenient to be operated. A large electromagnetic type electronic microscope, which has an electronic optical enlargement of 100,000 times, an optical enlargement of five times and a total enlargement of 500,000 times with a distinguishability of 25 A, was also produced. This instrument, which took a period of nine months to complete, is presently the largest electronic microscope in our country. It is capable of being used for analyzing the substances contained in alloy, chemical molecules and particles, filtered bacteria and medically treated bacteria cells, and also in studying physical metallurgy, geology and mineralogy. In addition to the above, those items produced include altazimuth instruments with an error of mean square of  $M = \pm 4.7''$ , surveying cameras with a relative aperture of 1:0.8 and a field of vision of 40 degrees, quartz spectrometers and optical comparing instruments.

On electrical instruments and meters, there are the grade 0.1 electric meters with a broadening frequency scope of 60 to 500 hertz and a damping time of not more than 4 seconds which can be used for testing precision electrical surveying instruments and as standard ruling meters, and eight-wire electromagnetic oscillographs which is a complicated modern instrument and which can be used for simultaneously recording and observing eight different stages in an electric circuit. Other items in this line of production include watt-hour meters, impedance bridges with an accuracy of 0.5 per cent, and X-Y axis function recording instruments.

On laboratory instruments, those produced include high precision analytical balances with a sensitivity of one-millionth of a gram and a capacity of 5 grams, and vacuum balances with a sensitivity of 1/10,000 gram. The former type of balances, which were designed by Chinese workers, are an important tool for use in complex scientific and technical studies.

On radio surveying instruments, electronic calculators, meteorological surveying instruments, materials testing instruments, medical instruments, navigation instruments, hydrographic instruments and construction engineering instruments, numerous new and important products were produced. All these show that our newly developed scientific instruments and meters industry, under the magnificence of the party's socialist construction policy, is heading toward a flying leap forward progress.

### 3. WHIRLWIND TYPE 25 HELICOPTER

No. 42,  
17 October 1959  
Page 7

Unsigned article

The Whirlwind Type 25 helicopter, which was first manufactured in Communist China in the great leap forward year of 1958, is now being produced in large number.

The helicopter, as compared with the average aircraft, has the following characteristics:

First, its operation does not involve the construction of an airfield. It is capable of taking off from and landing on a 50-square-meter level ground, such as a lawn, ranch, river bed, forest ground, mountain slope, highway, ball park, the deck of a ship, downtown park, or even the roof of a building.

Secondly, it can be stationary and quietly floating in the air. According to necessity, it can fly backward or sidewise, or its body can circle around the vertical shaft clockwise or anti-clockwise. Its flying speed is from zero to several hundred kilometers.

The "Whirlwind 25" is a multi-purpose helicopter made from domestically manufactured materials. When being used in transportation, its cargo loading space is 16 cubic meters. It can carry a load of not more than 1,500 kilograms and is not necessary to land while carrying out loading or unloading operations. When being detailed for rescue work, it can accommodate eight patients and a medic. When being employed for agricultural purposes, it is equipped with a whole set of agricultural facilities, capable of spraying powered or liquid drugs, or insecticide in mountain valleys without being restricted to the flying altitude or speed. When being used for fighting against a forest fire, it is equipped with special facilities, capable of effectively putting off fire disasters. It can also be used for passenger transportation, with a seating capacity of eleven and, at the same time, a cargo loading capacity of more than 100 kilograms. When being employed for rescue work at sea or for the observation of fish gatherings, it can be regarded as a strong and active "tern." While in the air, it can be used for hoisting work, with a hoisting capacity of 1,300 kilograms. It is also suitable of being used for carrying mail, and for aerial photographing and prospecting purposes. When being used for paratroop jumping, it is equipped with a paratroop jumping cabin, with eleven removable seats for the paratroopers, and, if necessary, four more seats can be added. The cabin is equipped with a complete of jumping facilities and command signals. Consequently, its manufacture and production in large numbers have created important factors to our national defense, transportation and economic construction.

4. REPORT BY AGRICULTURAL MACHINERY MINISTER CH'EN CHENG-  
JEN AT ADVANCED EXPERIENCES EXCHANGE CONFERENCE

No. 45

7 November 1959

Page 2 (excerpts)

The CCP Central Committee and Chairman have constantly expressed deep concern about our agricultural developments. They repeatedly instructed our industrial workers to give special attention to the progress of the agricultural industry, emphasizing the extreme importance of the industry in our national economy. During the past several years, although our industrial foundation was still weak, a number of modern implements and a tremendous amount of semi-mechanized and improved tools were made for our farms. Up to 1959, a total of 55,000 standard tractors, 100,000 machine-drawn implements, 4,500 harvesters, 7,500 grain husking mills and 13,000 trucks were produced. Irrigation facilities with a total of 2,800,000 horsepower and small power stations that have a total generating capacity of 250,000 kilowatts were also built. These facilities, as compared to the enormous demand of our agricultural industry, are indeed not adequate, but the users of various localities have already experienced their performance superiority. According to inquiries made in Hei-lung-chiang Province in 1958, the total per capita yield of food per year was 8,000 catties when the conventional type of tools were used. The amount was raised to 14,000 catties when modern animal-drawn implements were applied, but when mechanical facilities were employed, the figure reached as high as 22,000 catties. In one of the experimenting stations of the Sinkiang Construction Army Corps, the labor production rate was generally raised by one to five times after mechanical facilities were initially introduced. The number of man-hours needed for the production of 100 kilograms of ginned cotton, for example, dropped from 295 to 37; for a similar quantity of wheat, from 30 to 5, and for the same amount of corn, from 25 to a little above 5.

## 5. ELECTRICAL MACHINERY INDUSTRY ACHIEVED DOUBLE-VICTORY IN PRODUCTION AND BASIC CONSTRUCTION

Unsigned article

No. 46,  
14 November 1959  
Page 1

Up to the end of October 1959, the total amount of power station equipment produced by the electrical machinery industry reached a capacity of 1,757,000 kilowatts, which was 97.6 per cent of the year's overall plan. The total number of basic construction projects completed was equivalent to 94.5 per cent of the year's total investment plan, of which, 86.8 per cent were completed by agencies directly subordinate to the Eighth Bureau.

On the eve of the National Day, the output of power station equipment already reached the 1962 target, three years and three months ahead of schedule. Of the 33 different types of electrical products, the year's respective quotas of 28, including mutual inductors, mercury rectifiers, electrical condensers, arc furnaces, arc welders, mobile batteries, electroscopes and electrocarbon products, were completed three months ahead of schedule. In October, electricity generating equipment with a total generating capacity of 303,000 kilowatts were produced, which, compared to September, was the highest productive month of the year and represented an increase of 1.7 per cent. The output of complete sets of electrical machinery in October was also quite satisfactory. Large generators produced have a total generating capacity of 146,000 kilowatts, which, compared to those produced in September, was an increase of 22 per cent; the total output of high tension electromagnets was 5,742 tons, which was 33.3 per cent over that of September.

The basic construction work in the electrical machinery industry was carried out in an excellent manner. The October plan, in this respect, was overfulfilled by five per cent. The work completed in this one month is equivalent to 13.8 per cent of the year's overall plan.

In October, numerous plants completed their respective production and basic construction plans of the year ahead of schedule. The Harbin Electrical Machinery Plant produced power station equipment and large generators with a total generating capacity of 210,000 and 44,200 kilowatts, respectively. The Shanghai Electrical Machinery Plant, in addition to fulfilling its plan, also test manufactured a 25,000-kilowatt water cooled steam turbo-generator.

6. TWENTY-THREE SETS OF LARGE AND MEDIUM STEEL  
ROLLING MILLS COMPLETED IN TEN MONTHS

No. 46,  
14 November 1959  
Page 5

Wang Tung

In the midst of the great leap forward development, the masses of workers in the heavy machine manufacturing industry won another great victory. Up to the end of October, they produced a total of 23 sets of large and medium steel rolling mills.

In the course of the manufacture, the workers exerted their vigorous efforts. Without the aid of hoisting equipment and large machine laths, the Shanghai Construction Machine Works was able to produce two sets of No. 650 medium rolling mills by means of the "bit by bit" method. For the purpose of manufacturing the same type of mills, old workers of the Hu-tung Shipyard designed and manufactured a 6-meter wide and 10-meter long simple planer, overcoming the difficulties of machining the mill's support and the external part of the reducing machine. The T'ai-yuan Mining Machinery Plant suggested a competition be carried out among the nation's rolling mill manufacturers so that their respective missions may be completed by the end of November ahead of schedule. The subject for the suggested competition was to complete two sets of No. 2300 medium plate rolling mills together with auxiliary machines within a period of three months.

In order to fulfill the mission of producing complete sets of rolling mills at the earliest possible time, each and every plant fully created a spirit of cooperation. In Shanghai, production of rolling mills is carried out basically by 62 different plants and completed through the organized cooperation of the entire city. Both the T'ai-yuan and the Mukden Heavy Machinery Plant have completed their respective cooperative missions by producing castings and forged parts and by machining larger items on or ahead of schedule. The Lo-yang Mining Machinery Plant dispatched workers to aid the Wu-ch'ang Shipyard in the machining of gears of the No. 1200 thin plate rolling mills. Besides, ample assistance was rendered by workers of the metallurgical industry in this field of production.

At present, the masses of workers are being engaged in an inter-plant competition. They have expressed their determination of completing their production of whole sets of rolling mills 20 days to one month ahead of schedule.

## 7. ELECTRICITY GENERATING EQUIPMENT

No. 47  
21 November 1959  
Page 1 (excerpts)

Unsigned article

The electricity generating equipment industry has made great accomplishments. Up to 17 November 1959, it has produced an amount of equipment with a total generating capacity of 1,807,760 kilowatts, completing the year's national plan 45 days ahead of schedule. This figure, compared with the 800,000 kilowatts produced in the great leap forward year of 1958, is an increase of 125 per cent. Other electrical products which have overfulfilled their respective national quotas ahead of schedule include transformers, wires and cables, high tension circuit breakers for AC generators, high tension isolating switches, mutual inductors, mercury rectifiers, electrical condensers, high tension fuses and electromagnetic instruments.

The medium and small electricity generating equipment manufacturing plants built in the period of the great leap forward development have now become an important source of power in this field of production. In the first nine months of 1959, the medium and small plants throughout the nation, together with a number of machinery plants, produced a total amount of equipment that has a generating capacity of 437,000 kilowatts, overfulfilling the national plan by 14 per cent. In the period of our First Five-year Plan, the principal localities for the manufacture of electricity generating equipment were Shanghai and Harbin. Now there are 15 provinces, cities and autonomous regions that are capable of producing small quantities of such equipment, which has, indeed, created an important aspect for the continuous great leap forward development in 1960 and for the electrification of the agricultural industry.

## 8. BALL BEARING PRODUCTION

No. 47,  
21 November 1959  
Page 1 (excerpts)

Unsigned article

On 12 November 1959, the Sixth Bureau of our Ministry, on behalf of all the workers of the ball bearing industry, reported to the Ministry authorities that up to 10 November 1959, the total amount of ball bearings produced was 101.8 per cent of the year's prescribed quota, and that the national plan for that year was therefore completed 50 days ahead of schedule. The total amount of ball bearings produced in this period was 20 per cent over that of 1958. The Ministry has already sent a cable of congratulations.

## 9. COMMUNIST CHINA'S MACHINE INDUSTRY

No. 51  
19 December 1959  
Page 2 (excerpts)

Liu Ting

Under the magnificence of the main party line, the machine industry, which had its great leap forward development in 1958, is now heading for another great leap forward development. At present, the industry has become one of the strongest components in the entire national economy, comprising several tens of different types of modern and advanced level manufacturing businesses with several hundred large and medium enterprises serving as the backbone, forming a machine industry network within the nation. It has been transformed from the past stage of repairing and assembling into the present individual manufacturing, from copying into individual designing and from individual designing and manufacturing general types of products into individual designing and manufacturing important and complex types of products. The scientific techniques of the industry are quickly approaching the advanced international standard. This year, the industry's production plan is definitely scheduled to become overfulfilled. Our mechanical facilities are presently over 80 per cent self-sufficient. The output of such other important products as metallurgical and power station equipment, metal cutting lathes and engines has reached the originally planned 1962 target. These unprecedented flying leap developments of the machine industry have brought about a great victory to the party's leadership, to its socialist construction policy and to the policy of depending upon the masses of people.

The advance of the technical reform and revolution toward a longer and wider course has not been without good reasons. First, it is basically due to the correct and eminent leadership of the party, to the accurate guidance of the main party policy, to the high consciousness, positiveness and creativeness of the masses of people and to the experiences gained in the technical reform and revolution during the past couple of years. Secondly, in the technical field, we have accumulated a tremendous amount of experiences, which are enormous and useful assets. We have also acquired numerous Soviet and other nations' advanced techniques. In the days to come, we shall be able to receive aid from Soviet Russia and other brotherly nations. On the basis of these foundations, the development of the industry will become much easier. Thirdly, our nation is one which possesses a vast area of land with rich material resources and an enormous population. If only work is carried out with diligence and skill, the availability of materials will become more and more increased. Finally, in our machine industry, there are four million staff and workers and numerous scientific research organizations and schools. If only these advantages are fully utilized, we shall be able to have more accomplishments in our technical reform and revolution, heading from an already acquired victory toward a new victory.

During the past several years, we have acquired numerous developments and creations in manufacturing operations. Some of them have reached the advanced international level. The All-China Representatives Conference, which was held not long ago, was a major inspection of these developments and creations. From now on, in regard to what courses to be taken in extending new operations and reformed tools and equipment, the following opinions are brought up as references:

On casting work, those methods which can be extended are nodular iron casting, powder metallurgy, pressure casting (including pressure casting and founding), sodium metasilicate molding, hydraulic sand purifying, sand casting and mold casting. Nodular iron casting was adopted after liberation. During the past several years, it has been developed to such an extent that numerous different types of important parts or even iron rolling equipment were produced by means of this method. The 80 horsepower crankshafts of the Tientsin Engine Plant were made from nodular cast iron and have excellent performance capability. Punches and dies made of this type of cast iron are more satisfactory than those made of alloy steel. In powder metallurgy, the raw materials used are cheap. Oxidized waste from iron and steels plants can be used, which means converting waste materials into useful materials and increasing production as well as practicing economy. Numerous parts including oil bearings and magnetic porcelain have been produced by means of this method. In Shanghai, steam turbine blades have also been produced by the same method. Sand casting was one of the ancient operations in our country. After being improved, it is now also being used for casting steel. Each mold can be used repeatedly for a maximum number of over 40 times. Other new types of operations like pressure casting, sodium metasilicate molding, hydraulic sand purifying and mold casting, have also been well developed; however, in the future, a more extensive and wider utilization is necessary.

On forging work, our slogan is "cast steel, forge welding, drop forging and drop hammer with no anvil." Forge welding has been employed in our country during the past five or six years and is now extremely popular. It is not only used for manufacturing the general types of tools and patterns or for welding parts, but is also used for producing the large forge drop of a 10-ton drop hammer. In this way, the problem of solely relying on the import of large forge drops in the past has now been settled. Besides, the body of the drops is now made of cast steel instead of forged steel and the surface is welded with alloy steel, which make it more solid both externally and internally and more durable, and economize materials and labor. Within the next two or three years, drop forging will be extensively employed, allowing 30 to 40 per cent of the entire forged parts to be produced by means of this method and substituting pattern forging for free forging. Generally speaking, in a plant where more than 200 forged parts are produced annually, it is more economical to use the drop forging method, which will greatly save the use of metal and skilled labor, and the quality of the forged products is good and the building of such facilities is speedy. The extending of "cast steel, forge welding, drop forging and drop hammer with no

anvil" is the path of increasing production, speeding up production, producing good quality products and practicing economy, toward which, the universal use of the drop forging method will become realized.

On welding work, we have, during the past several years, mastered quite a number of new operations and made numerous creations, which, in the course of our manufacturing work, have been extensively utilized. We have, for example, used the welding method for manufacturing ocean going steamers and high pressure boilers, the quality of which are entirely satisfactory. The use of the electric welding method on large blanks has been a great success. The Ta-lung Machine Works in Shanghai is now using it for manufacturing the support of Type 1200 thin plate rolling mills. From now on, these new accomplishments should be more extensively utilized and continuously developed. Our slogan for this field of work is "castings, forged parts, plates, blanks and electric welding," which means to utilize the electric welding method for welding castings, forged parts, steam turbine blades, steel plates and plate blanks, allowing the medium and small enterprises to be able to manufacture heavier and larger types of equipment with a view to greatly increasing the production capability of these types of products.

On cold machining work, we have to extensively develop such methods as punching, pressing, extruding, drawing-out and rolling, and extend the "bit-by-bit" method, electrical machining, high speed cutting and the use of hard alloy. The use of punching, pressing, extruding, drawing-out and rolling in cold machining can save labor and material, plus the fact that the efficiency is high and the quality is good. They should be continuously extended and developed. Simple facilities used for "bit-by-bit" operations were created by workers during the period of the great leap forward development. This method, which has been in great progress and improved during the past year, should be further extended to solve the inadequacy of machining larger parts. Electrical machining (including electrical machining lathes, electrolytic machining and electrical polishing) is an effective method for making molds and parts of complex shapes and patterns. To extend the use of hard alloy is not only for satisfying the need for high speed cutting but is also for making measuring instruments and molds, enabling this equipment to become more durable. During the past several years, the use of hard alloy and the employment of high speed cutting have made great progress; however, the utilization of this material and method has not been sufficiently extended, and therefore, a tremendous amount of potentiality can still be developed.

10. MACHINE INDUSTRY WORKERS IN SZECHWAN  
MANUFACTURES CHEMICAL FERTILIZER EQUIPMENT

No. 51

Unsigned article

19 December 1959

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At present, machine industry workers in Szechwan Province are striving for the manufacture of large quantities of whole sets of chemical fertilizer equipment for the chemical industry to aid in agricultural production by chemical means and to insure a big harvest in the coming year.

Since the beginning of this year, machine workers in the entire province have exerted vigorous efforts in carrying out a technical reform, overcoming various technical difficulties and completing a set of chemical fertilizer equipment. According to an estimate, the annual chemical fertilizer output of this set of equipment will bring about a food production increase of three hundred million catties.

Inspired by the outcome of the eighth session of the Eighth CCP Central Committee Meeting and the machine industry workers leap forward broadcasting campaign, machine industry workers of the province are determined to complete, before the end of the year, ten sets of calcium magnesium phosphate fertilizer equipment, each capable of producing 20,000 tons annually, one set of calcium magnesium phosphate fertilizer equipment with an annual output of 10,000 tons, one set of calcium phosphate fertilizer equipment with a yearly production of 400 tons, one set of synthetic ammonium fertilizer equipment with an annual production of 800 tons, and a number of accessories for the equipment.

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