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INDUSTRIAL PROGRESS THROUGH TECHNICAL INNOVATION  
AND REVOLUTION

-COMMUNIST CHINA-

by Chang Cheng-Chun, Chow Chen-Chin, Lin Hung-Chang

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INDUSTRIAL PROGRESS THROUGH TECHNICAL INNOVATION  
AND REVOLUTION

-Communist China-

[Following is a translation of selected articles from various issues of the Chinese-language newspaper Ta Kung Pao, Peiping. Date of issue, page, and author, if any, are given under individual article headings.]

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I. TECHNICAL INNOVATION AND REVOLUTION OF TRADE  
AND FINANCE UNITS ENTER NEW PHASE

25 May 1960  
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Unsigned Article

In May, 1960, an all-China exhibition of technical revolution and innovation under the auspices of the Departments of Finance and Trade was opened in Peking. The purpose was to examine, display, and promote technical advancement achieved in recent years. The event marked the beginning of a new era in China's technology based on collective effort.

Ever since the 1958 big leap forward, when an extensive production drive towards mechanization, semi-mechanization, automation and semi-automation was started, it has spread far and wide into every sector of the economy and every corner of the nation. According to preliminary estimates in 22 provinces or cities including Peking, Shanghai, Kiangsu, Liaoning, Heilunkiang, up to mid-April 1960, innovated equipment totalled 387,000 units, of which about 3,390 were automatized or semi-automatized. In food industries of which 90% have engaged in this movement, innovated equipment amounted to 400,000 units. In the financial field, the corresponding amount was 163,000 units. As a result, work in transport, storage, food-processing, bank-notes counting, volume computation, where labor use is most intensive, has gradually become more and more mechanized or semi-mechanized. For instance, thanks to the trial-production and large-scale use of food-processing equipment and machinery in areas such as Hunan, Chekiang, Peking, and Chungking, a total of 600 food-processing plants are now equipped with automatic conveyers. Another example is the Yu-Hen Flour Mill of Nanking. Being fully mechanized, this mill which consists of 10 machine mills capable of processing large volumes of flour, now can be run with great ease. This is also true of the well-known Ma-Lin Tao warehouse, which is equipped not only with electric lifting blocks and 680 varieties of loading and unloading machinery and equipment but is also equipped with six 40-metre conveyers and automatic computers.

The main effects of the technical revolution are as follows:

- (a) Tremendous saving of human and animal labor.
- (b) Extensive technical improvement both in every economic sector and in every region of the country.
- (c) Rising interest of the masses of people in more advanced learning. This has been reflected by the increasing number of institutions of higher learning (especially of sciences and technology) for part-time students.

The sustained success of the drive is generally based on a) frequent inspections, b) persistent demands and c) successive campaigns. According to the Chungking Commerce Department with an exceptional record of success in this respect, the movement should be effected in a way similar to a 5-stage battle as follows:

- 1) Large-scale preliminary campaign to make public the general purpose to be served.
- 2) Follow-up campaign to make known specific objectives.
- 3) Be critical. Aim high. Decide on particular methods for improvement. Emphasize experiment and research. Insist on steady quality improvement.
- 4) Insure effective utilization of new materials, both new and used.
- 5) Organize workers for vigorous drives. Fully master and utilize new methods. Push the technical innovation and revolution to a new climax.

Generally, the key factors of success are the ingenuity, initiative and perseverance of the masses of people. A classic example is the food department of Chungking. When planning on making 10 units of conveyers, it was found that for these, they needed 16 tons of steel, 130,000 yuan of fund, and 100 working days. Unable to fulfill these requirements, they finally changed their mind and had their 10 units of conveyers made in one week with bamboo poles, canvas cloth and 1,500 yuan.

## II. MOVE TOWARDS THE NEW DIRECTION OF HIGHER-GRADE AND SUPERIOR PRODUCTS

25 May 1960  
Page 3

Chang Cheng-Chun

The drive towards higher, finer, more specialized and newer products symbolizes the primary motive of modern industry as well as the leading manifestation of technical innovation and revolution which is now in progress. Scientific and technical progress has always involved a process from the low to the high and from the coarse to the fine. In the field of textiles, quantitative increase must also accompany qualitative improvement in order to satisfy the consumer's demand along with a steadily rising standard of living.

Trial production and production increase of finer, newer products require ambition, a lofty motive, a daring and a scientific approach. The fact that this has been the case with the Shanghai textile industry is supported by a slogan made early in 1960: "First in everything, advanced in every respect, so as to meet the international standard." The result has been very encouraging. They have introduced 14,800 new patterns so far in 1960, including 4,200 of finer quality and 1,000 very fine quality, both by domestic and world standards.

The quality improvement of Shanghai textile products can be described in 8 ways, i.e., high, fine, wide, blended, resistant, pretreated, improved and new. "High" means high fibre count or high-class fabrics such as 200-count cross-woven cotton cloth. "Fine" means well combed and woven fabrics such as 200-count fine cotton cloth. "Wide" refers to the width of fabrics such as 54" and 42" khaki and fancy flower-patterned cloth. "Blended" refers to fabrics woven with a variety of different fibers such as Venus woolen cloth made of synthetic fibres and wool. "Resistant" refers to quality with respect to wrinkle, shrink, water and fire as embodied in high class khaki. "Pretreated" refers to treatment against moisture and heat as in the case of nylon. "Improved" refers to quality improvement such as elastic satin, a fine fabric made of coarse yarns through special treatment. "New" refers to their design and pattern.

In the field of technical skill, proper importance should be attached to both native and modern methods and to small and large producers. For example, such fine products as nylon stockings, artificial blood vessels, industrial glue are all started by small producers. One very important fact to keep in mind is that technical progress would be more costly and slower if research on new products were monopolized by a small group of scientists on units. It is, rather, in the collective intelligence of the masses of workers that solutions to technical problems are usually found with greater economy and speed.

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Self reliance should be the key policy governing the supply of machinery and equipment required by the textile industry since only a small part of capital investment is provided for in the national investment plan. A good example is the Second National Cotton Factory which produced its own combing machine and a large quantity of dyeing material.

Trial production of finer and newer products should be supported by continuous research and improvement. Such products should also be produced in a larger volume rather than be used as samples or as an object of exhibitions. Meanwhile, steady improvement in the quality of existing products should also receive adequate attention.

### III. IDENTIFY THE LENGTH, WEIGHT, AND NUMBER OF WOOLEN YARN

25 May 1960

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Chow Chen-Chin

#### Woolen Yarns

What do the code numbers such as 268, 275, 219, 218 used for wool stand for?

A. Wool yarns made entirely of wool are called pure wool yarns, those made of a mixture of synthetic fibers and wool are called mixed wool yarns.

The first figure, (2), in code numbers such as 268, and 275 denotes pure wool yarns. Those yarns designated by codes beginning with a number (3), such as 375, and 368 refer to mixed wool yarns. The second and third figures of each code denote the quantity of fibres or the degree of fineness.

In China, the degree of fineness is expressed in terms of the metric system with one kilogram used as the standard weight, and one kilometre as the standard length of yarns. Each kg. of wool yarn with a length of one km. is called one count yarn and so on. The finer the yarn the greater is the count. The code 268 refers to one kg. of yarn 6,800 metres long, in other words, 6.8 counts yarn. Similarly, the code 275 refers to one kg. of yarn 7,500 metres long, or 7.5 counts yarn. From this we know No. 275 is finer than 268.

In commercial classifications, 268 refers to low-class, coarse yarns; 275, medium-class, coarse yarns; 272, special-class coarse yarns; 285, high-class, coarse yarn; 282, special-class, high coarse yarns, and 219, fine yarns.

It should be noted that the number of counts shown in the code refers to that of wool yarns and not to that of wool. Most wool we see is woven with 4 single yarns. Therefore, 275 wool refers to pure wool woven with four yarns of 7.5 counts.

#### Length and Weight of Wool

It normally requires 1.2 kg. of coarse wool to make a sweater or less than 1 kg. if fine wool is used, instead. This is because the finer the wool, the longer it is, and vice versa.

The table below shows the length and weight of various kinds of wool.

(Unit of Length: Metre)

Code	Description	% of Raw Material Content			
		Wool	Other Fibres		
275	Medium Coarse	43 counts wool	100%	---	
368	Mixed Medium Coarse	48 " "	75%	25%	
365	Mixed Medium Coarse	48 " "	50%	50%	
272	Medium Coarse (Special)	50 " "	100%	---	
366	Mixed Medium Coarse (Special)	50 " "	50%	50%	
285	Super Grade, Coarse	56 " "	100%	---	
380	Mixed Super Coarse	56 " "	75%	25%	
219	Fine Wool	60 " "	100%	---	
318	Mixed Fine	60 " "	75%	25%	

Table Continued --

Code	Length Each Combing	Each kg.	
		No. of Combing	Length
275	1.86	496	922.56
368	1.80	480	864.00
365	1.75	448	784.00
272	1.80	496	892.80
366	1.75	448	784.00
285	1.84	560	1030.40
380	1.78	560	996.80
219	1.73	1280	2224.40
318	1.75	1232	2156.00

#### IV. WIDESPREAD DEVELOPMENT AND PRODUCTION OF COMPLICATED FOREIGN-TYPE CALCULATING MACHINES AND APPARATUS IN HARBIN

26 May 1960

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Unsigned Article

The production enterprises of Harbin are embarking on a large-scale innovation program of production control devices. At present, there are more than 300 data processing machines and 9,300 calculating devices of various kinds. Such automation has been instituted in all enterprises where unit production control is in operation.

Early in 1960, in the wake of the rising trend towards production control and technical innovation, a number of machines designed for simple computation was put into use by various enterprises. As a result of steady technical improvement, there now exist 3 classes of computing machines, ranging from a) "devices" -- i.e., simple devices such as "wage computers," "abacus" and "frequency counters" used mainly by small businesses or by unskilled labor; b) "machines" i.e., more complicated computers such as "output calculating machine" and "performance reflectors" used by medium-scale or semi-mechanized enterprises, and c) the high-speed readout system for production data processing, which is composed of a variety of complex machinery and devices, such as "automatic adding machines", "automatic figure recording machines", "electronic output indicators", "high-speed computers" and the "3-phase system."

With the continuous data processing system, the foreman of Harbin Rubber Co. now can find out its output volume by means of "automatic adding machines"; the production chief can get information on the hourly output by means of "automatic volume recorders", and the plant manager, in turn, can read out the output figures from the electronic production indicators installed in his office. Meanwhile, through loudspeakers, the entire labor force of the plant is kept informed on the progress of its output.

As a result of automation, there has been a great reduction in labor force. The trend towards remote control in factories has also led to a rising demand for more advanced calculating machines and equipment as the conventional ones are fast becoming obsolete. This is illustrated by the experience of Harbin Battery Co. As soon as a remote-control system was installed, the original computing equipment was found to be inadequate. Now, with a complete data-processing system, every unit of finished products, wastes, and every idle minute are automatically reflected by electronic computers.

According to the experience of Harbin, the advantages of the system are as follows:

(a) It has made it easier for workers to join in production control. An interesting case is the Vanguard Community Bleaching and Dyeing Factory. With new computing machines, it now can figure out daily production value very quickly, whereas it used to take workers 2 or 3 hours after closing time to evaluate the daily output.

(b) The improved computing machines have not only greatly enhanced workers' enthusiasm about their work but have also helped production leap forward. In the case of Harbin Rubber Shoes Co., its daily output rose from 5,700 pairs to 7,500 pairs.

(c) The new system has greatly facilitated production control problems. In some cases, it now takes only one hour instead of days to arrive at the production figures. Also with the new technical improvement, the manager of Harbin Rubber Co. now can devote more time to production planning and to personal contacts with individual workers instead of occupying himself constantly with statistics.

(d) The new system also helps economize the labor force. In the case of the Second Machine Tools Factory, there has been a 50% reduction of employment.

(e) In the technical field, the new system has enabled workers to discover new techniques such as the new welding method suggested by one worker of Harbin Electronic Machine and Equipment Co. immediately after the installation of the data-processing computer. As a result, the daily productivity was increased by 10%.

The technical improvement in Harbin was mainly attributed to the ingenuity and initiative as well as to the perseverance of the Party and financial workers. In this, the contribution of financial workers have been particularly impressive. They not only sent representatives to accompany officials of Harbin Rubber Co. to Turtan Rubber Co. on a fact-finding mission, but also took part in research work and trial production on the model machine. It was largely through the untiring effort of the financial workers that no less than 8 enterprises, including chemicals, sugar, and steel manufacturers, are now equipped with electronic production data processing systems.

## V. CONTINUED PROGRESS IN TIENTSIN URBAN PEOPLE'S COMMUNE

26 May 1960

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Unsigned Article

The stores along Kwang-Fu Road in Tientsin, in accordance with the new nation-wide trend towards the people's communization under the leadership of the Party, are actively helping to develop commune-run industries and resolutely adhering to the rule of "one hand grasp production, the other, livelihood."

In March 1960, a commune centered on the people around Kwang-Fu Road was born. In fact, even prior to its birth, considerable production and service industries had already been started; about 95% of part-time women social workers had joined in street production and service activities; and about 50% of the area population had enrolled for services in community dining-halls. The primary objectives of the commune are a) to promote production; b) to improve social welfare, and c) to encourage the growth of new community industries. To fulfill these purposes special attention is directed at closer relationship between retailers, wholesalers and producers, through production units composed of selected members of stores and the Party.

Some of the most significant contributions made so far have been related to the formulation of a more rationalized production plan of commune-run enterprises, on the one hand, and to the initiation of new business ventures on the other. The latter included packaging, wrapping, and the manufacture of zippers. Such production units have not only brought more and new business to the community but have also helped to produce, out of used raw materials and waste, a great variety of products such as wallets, travelling bags, toys, cotton socks, electric welding-rod, and metal frames. As a result, there has been a great expansion of community industrial production value which reached a level of 1.74 million yuan in the first quarter of 1960 and consisted of no less than 40 varieties. The corresponding figures in April 1960 were 840,000 yuan (or 42% over March, 1960), and 88 varieties respectively.

In the technical field, the commerce-production units not only have helped to set up sewing combines composed of salesmen, technicians and workers, but have also helped to electrify hand- and foot-operated sewing machines. In another instance, they have helped to increase the production of rain-coats, to a large extent through the use of electric cutting machines. In the field of finance and management, a joint supervision team was formed by accountants, salesmen, and bankers to inspect inventory, warehouses, cash fund position and to improve the existing accounting and cost-accounting systems or institute new ones.

In eating facilities, great progress has been made in the organization and management of community-dining halls, partly through the establishment of such organizations as the society of delegates of members of community dining-halls and committees for democratic control. The main objectives are to a) improve both the quantity and quality of food served and b) fulfill the special requirements of members engaged in collective production activity. At present, community dining-halls in the area concerned have, on the whole, succeeded in providing 3 meals daily (serving both liquid and solid food) in those locations where the masses of workers congregate. A normal meal costs from 10-20 cents. Special delivery service is available to the aged or the sick. The hours of business are very flexible in order to accommodate production workers. However, the large-scale patronage to community dining-halls has complicated the food distribution problems. To cope with this new situation, the main criterion of food distribution has been equal attention to both members and non-members of community dining-halls in the light of supply. Broadly speaking, the aim has been to feed both categories of people to their greatest possible satisfaction. Nevertheless, when certain food is in short supply, a priority system has to be introduced. On account of proper management, the basic membership of community dining-halls has remained stable. This factor has greatly facilitated business planning. Improvement in many other aspects, especially finance, food supply, and sanitation has also been considerable on account of the generous assistance from the departments of banks, food, and health.

VI. SHANGHAI FINANCIAL AND BANKING DEPARTMENTS PROMOTE TECHNOLOGICAL  
REVOLUTION IN INDUSTRIAL ENTERPRISES

26 May 1960

Page 2

Lin Hung-Chang

The financial and banking departments of Shanghai have played an important part in the promotion drive for technical innovation and revolution through differential study. They have helped uncover inefficiency in production and made valuable suggestions concerning technical improvement based on the discrepancy between production-leap-forward plan and actual production, by means of auditing and analysis. In the case of one glass factory in Chapei District, thanks to the financial and banking personnel concerned, its low volume of production and high cost were found to be attributed to the unevenness of the furnace heat. Necessary improvement in the facility was made according to their recommendations. As a result, the production of the first 10 days of April was 11.6% higher than the same period of March, and the cost became 48.6% lower. Similar progress was registered by garment manufactures through the joint efforts of financial and banking personnel connected with the business.

Great effort has also been made by the financial and banking departments to uncover bottlenecks, promote the exchange of experience in thrift and substitution mainly by means of differential analysis on material consumption of identical products. For instance, it was found in one piston ring factory that in every 10,000 units there was a difference of 1,000 kg. between the net weight of finish products and gross weight of semi-finished products. The mould was subsequently standardized. The result was a saving of 189 tons of metal per annum, or about enough for 1.4 million piston rings. In the case of cotton yarn, a difference of 8 kg. of raw cotton for each piece of yarn was found to exist among 16 factories with varying degrees of technical skill. As a result of technical improvement recommended jointly by engineers, production and financial workers, a general reduction of raw cotton consumption equal to 36,000 kg. was reported within a fortnight.

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