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PAPER INDUSTRY IN COMMUNIST CHINA

DURING THE PAST DECADE

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[The following are translations and extracts of selected articles from Tsao-chih Kung-yeh (Paper Industry), Peiping, No 10, 7 October 1959.]

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GREAT ACCOMPLISHMENTS OF CHINA'S PAPER MANUFACTURING INDUSTRY DURING THE PAST DECADE

[The following is a full translation of an article written by LI Tsai-yun, Chief, Paper Industry Control Bureau, Ministry of Light Industry, appearing in Tsao-chih Kung-yeh (Paper Industry), Peiping, No 10, 7 October 1959, pages 8-11.]

Ten years have passed since the overthrow of reactionary rule in China and the establishment of the great People's Republic of China under the brilliant leadership of the Chinese Communist Party. During the brief period of these ten years, the entire appearance of the national economy has changed fundamentally through the united effort of the people of the country and the selfless aid of the Soviet Union and other brother states. This has come about after three years of economic recovery and seven years of economic construction. Like other segments of the economy, the paper manufacturing industry has attained a great growth.

During these ten years the entire corps of employees and workers in the paper manufacturing industry have, under the glorious guidance of the Party's general line, developed their capacity for vigorous action as well as their initiative in increasing the volume of production, raising quality, lowering production cost, diversifying the line of production and accelerating the rate of labor productivity. Great accomplishments have been noted in all these phases of production.

As to the volume of production, the gross production figure for paper and paperboard in 1958 reached 1,630,000 tons, of which 1,218,000 tons consisted of machine-made paper. A greater rate of growth will be in sight in 1959. According to a preliminary estimate, the production level will range between 1,700,000 and 1,800,000 tons, thereby fulfilling three years ahead of schedule the originally planned Second Five-Year Plan production goal of between 1,500,000 and 1,600,000 tons for 1962. Thus, compared with the pre-Liberation figure for 1949, the production figure for machine-made paper for 1959 will have increased by fifteen times, and by ten times as against the peak pre-Liberation production figure of 1943.

Regarding variety, the figure [for types of manufactured paper] had risen from 69 in 1949 to 242 for the period ending in 1958. It is initially estimated that in 1959 some 336 kinds of new products will be either pilot-tested or thrown into production. These varieties will include paper for cultural, industrial, agricultural and technical uses, as well as paper for communication construction and daily use. At the same time, the quality of production will be noticeably raised.

This tremendous increase in the production of paper, coupled with a rapid progress toward diversification, basically helps satisfy the rising demands of the people and actively supports the rapid growth of industry and agriculture. The situation has changed from reliance on imports to self-sufficiency and exportation of a fixed surplus.

During the past decade there has been a change in the distribution of paper mills throughout the country. Instead of being concentrated in large cities and coastal regions, the paper manufacturing industry has penetrated into many provinces, municipalities, special districts, hsiens and people's communes. This was especially true following the national drive for the establishment of small-scale paper mills in 1958 and 1959.

The number of paper mills of all kinds has grown from over a hundred units in pre-Liberation days to almost a thousand at the present time. They are scattered over a broad area, and former imbalance in the distribution of paper mills is in the process of preliminary correction.

The paper-making industry of old China was built on a feeble foundation, for its production capacity was small and its technical equipment was outmoded. These backward symptoms have disappeared completely through technological innovation, reconstruction, expansion and new capital construction during the past decade.

Giant combined pulp and paper mills with a daily production capacity of 100 tons, which utilitize modern sulfite and sulfate methods and are equipped with paper-making machinery having a high speed of over 400 meter per minute as well as large-sized wood-grinding (mo-mu chi) machinery with a daily production capacity of 20 tons, are now in operation. With respect to the pre-Liberation standard, there has been a tremendous expansion in production capacity and an elevation in the technological level. At the same time, factories producing copper screen, flannel and paper-making equipment have also

adequately gained in greatly developing their capacity for production.

In the wake of this improvement in production capacity and technological standards, there has emerged a powerful force for the construction of the Chinese paper-making industry, which developed almost from scratch. Our country is now provided with a force for comparatively sound planning and installation, capable of furnishing giant paper mills with over-all planning and large-scale equipment planning involving manufacture and installation.

Also, our paper manufacturing industry is strengthened by a vast force of construction workers, composed of personnel from small-sized paper works, and this influence is reflected in the rapid growth of an industry that is blooming across the land.

Simultaneously, our scientific research work on pulp and paper production receives an impetus for great development from this expansion in production, thereby significantly raising our technological level.

All this substantially explains why our paper-making industry, based as it is on a fast-expanding production capacity and a rising technological standard, has already acquired a complete operating unit which will serve as a firm foundation for further rapid growth.

The tremendous growth of the paper manufacturing industry in all facets has been accompanied by a rapid rise in the rate of labor productivity. Considering 1949 as 100 percent, the 1956 figure is 546 percent. During the "leap forward" period of 1958-1959, the rate of growth varied from enterprise to enterprise. Moreover, as the rate of labor productivity rose, the wages of the employees and workers and their welfare benefits were raised and adjusted.

From these great achievements, the paper-making industry has acquired some basic experiences.

To begin with, the masses should be alerted under the leadership of the Party to assure the rapid expansion of the industry; technological revolution and innovation should be energetically pushed and production-equipment potential should be substantially exploited.

In the manufacture of pulp, the main concern is how to step up steaming and boiling so that the capacity of the apparatuses--the principal equipment for pulp production--may be fully developed. By the sulfite method, for example, because the reeds and the solution are delivered to the vat, the temperature are raised rapidly

and the solution churned, not only are temperature and pressure adequately raised but their duration is also maintained and stabilized and hence both the boiling and the non-boiling periods are considerably shortened. The production capacity was raised from 150 kilograms per cubic meter per day in 1949 to 900 kilograms per cubic meter per day at the present time.

By exercising control over the consumption of logs, improving the utilization of chips, boiling the ingredients with acid concentrate and by the method of direct and indirect ventilation, the time required for treating white pine wood with sulfite was very much shortened, and the production capacity of the boiler rose from 84.5 kilograms per cubic meter per day in 1949 to the present approximate figure of 400 kilograms per cubic meter per day.

By improving the mixing of ingredients, lowering the liquid proportion, raising the density of the soda ash solution and by adopting adequate measures for raising temperature while the wood pulp was treated by the sulfate method, the yield in hard pulp rose from 155 kilograms per cubic meter per day in 1949 to about 500 kilograms per cubic meter per day at the present time. An increase in the capacity for boiling non-wood fibers was also noted.

In short, the principal experiences gained through the promotion of concentrated boiling were an increase in the filling capacity of a boiler and a rise in the yield of crude and refined pulp. By interposing the operating periods during boiling, the time needed for boiling and non-boiling operations, such as boiler filling, ventilation, maintenance of temperature, release of steam and emptying out of the boiler, could be greatly shortened.

At the same time, the production capacity of the auxiliary equipment and the manufacture of pulp and paper were kept constantly at equilibrium, so that the yield of refined pulp from the boiler per cubic meter per day might be rapidly raised. Not only was the quality of pulp improved but the consumption of raw materials was also constantly reduced.

The manufacture of paper was kept in full swing, and each operating link of the paper-making machine was patterned after the advanced world experience. For example, to increase the draining capacity of the wet portion of the paper-making machine, measures were taken to raise the temperature of the pulp-making ingredients, to adjust the level of the damming panel and the incline and vibration of the copper screen, to increase the ability of the

water tank to drain off and to step up the pressure of the pressing rollers.

To raise the drying capacity of the papermaking machine, hot blasts were blown from a side position, the capacity for eliminating steam was increased, and the effective index of the drying tank was raised. Other measures involving automatic control devices were taken to reduce breakage and rupture at the copper screen.

By adotping the measures mentioned above, it was possible for the paper-making machine to undergo a much needed technological innovation. Thus, the machine speed of the old-style cylindrically screened machine for producing printing paper rose to about 200 meters per minute, while the speed of the newsprint manufacturing machine was at one time raised to 270 meters per minute. Prior to the Liberation, its speed was 100 meters per minute.

By constantly improving the slot of the circular net, and especially through the creation of a steam-expelling circular net during the great expansion in 1958, the speed of the circular net papermaking machine once reached the level of 180 meters per minute, whereas it was 30-40 meters per minute before the Liberation.

Simultaneously with the rise in the capacity of the paper-making machine, the technique of pulp preparation was continually improved. By utilizing experiences gained from continuous, spiral and circular dist-grinding methods for preparing pulp, the operational procedure of paper-making was basically adapted to the increased paper for production of the paper-making machine itself.

The speed of the machine was stepped up noticeably, and the "three rates" of the paper-making machine--the machine speed rate, the paper production rate and the finished product output rate--were simultaneously and constantly raised, thus bringing about an unprecedented development in paper production capacity.

Again, while exploiting fully the latent capacity of the pulp and paper-producing equipment, we should firmly pursue a policy of relying on non-wood fibrous materials as the principal supply for raw materials, and of accelerating laboratory research work on the utilization of non-wood fibrous materials.

Through the rectification movement and the "grass-versus-wood struggle," the percentage accounted for by non-wood pulp in the gross volume of paper pulp production had risen from 48 percent in 1949 to 63.8 percent in 1958, as the volume of paper production increased by leaps and

bounds. In 1959 we will witness a further growth in this direction.

At the same time, an active expansion occurred in the variety of timber to be used as pulp-producing material; this was accompanied by a drop from 100 percent in 1949 to 35.3 percent in 1959 in the use of white pine wood for the preparation of paper pulp.

Besides, waste materials were actively reclaimed and utilized, including the application to production of additional substances such as scrap wood, bark, rags, broken shoe soles and covers, waste paper, waste fishing nets and ropes, wild fibers, etc. Thus all kinds of fibrous materials were fully utilized.

In extending the use of non-wood fibers for pulp manufacture, the technique of utilizing reeds, bamboo, "lung-hsu ts'ao" [dragon-whisker grass, Eulaliopsis binata (Retz)], ricestraw, wheatstalk and bagasse for the manufacture of pulp was examined and improved.

Since the Liberation, there has been a spectacular development in the technique of reed pulp production. Because reeds possess properties adaptive to treatment by the sulfate method, a comparatively systematic study and innovation was made and a high rate of yield in soft pulp, through accelerated boiling, was accomplished. The reeds were also compounded with a portion of "hsiao-yeh chang", kaoliang stalk, wheatstalk, ricestraw and other vegetable fibers and were then boiled together.

Moreover, the substitution of a circular disk millstone as the digester in the production of pulp was regarded as a successful accomplishment, for it economized motive power and capital investment and considerably lowered production cost. It is now possible to use extensively reed pulp for the manufacture of convex printing paper, writing paper, single-page rubberized printing paper, typewriting paper, etc., thereby greatly increasing the value of its application.

Since time immemorial, bamboo fiber has been used as a basic raw material for the manufacture of paper. After the Liberation, a new development in pulp production technique came to pass with the utilization of all types of bamboo as raw materials. For example, bamboo pulp was manufactured from green bamboo by the sulfate method; specifications governing boiling with the aid of a transformer were adopted, and measures were taken to raise the temperature of the soda ash solution. Thus, the capacity of a boiler actually exceeded 800 kilograms per cubic meter per day.

The pulp prepared in this way could be used for the manufacture of high-grade printing paper, writing paper and typewriting paper. Natural-color bamboo pulp produced by the sulfate method would be combined with other ingredients for the production of paper bags for industrial and technical uses.

Ricestraw and wheatstalk constitute the principal by-products of our agriculture, serving also as basic raw materials for the manufacture of paper. In the past decade there has been a rapid rise in the boiling strength of the soda ash-bleached straw pulp until a peak of over 1,000 kilograms per cubic meter per day has now been reached. This pulp has been used extensively for the making of paper for cultural purposes.

"Lung-hsu ts'ao", as attested to by several years of production experience, serves very well as a raw material for paper making. When adequately treated, it is well suited for the production of copying paper, high-grade printing paper and paper for technical industrial uses.

Because of the large-scale utilization of non-wood fibrous raw materials, the volume of straw pulp production rocketed from 16,500 tons in 1949 to 560,000 ton in 1958--an increase of over 33 times within nine years. A further increase will be registered in 1959. A broad path is blazed for the acquisition of paper-making raw materials.

Under the major policy direction of employing non-wood fibers for paper making, there also was a great achievement in broadening the varieties of timber used for processing by the paper making industry. In this connection, timber which has little valeu in construction or in the manufacture of furniture, and which is now available in different areas, was usually utilized.

For example, "yang-mu" [or spruce], found in abundance in the northeastern region, and "ma-wei sung" [or horse-tail pine], grown in south and southwest China, were used. It was proved by experience that ground wood pulp made from spruce (about 85 percent) could be compounded with chemical wood pulp made from "chen-yeh shu" or needle-leaf variety (about 15 percent) to produce good quality newsprint, which surpassed that prepared with white pine wood in quality, color, smoothness, evenness and suitability for printing.

"Ma-wei sung" [Pinus Massoniana Lamb] was used on a large scale for the manufacture of ground wood pulp and chemical pulp by the sulfate method. This pulp figured in the production of newsprint and other varieties. During the great leap forward in 1958, the production of pine

wood pulp by the sulfate method was accelerated by boiling with acid concentrate. Hard pulp was also produced, enabling the capacity of the non-compulsory circulation boiler to rise above 400 kilograms per cubic meter per day and surpassing the level attained by boiling with white pine wood.

Although "ma-wei sung" pulp prepared by the sulfate method was somewhat encumbered by the presence of resin particles, the machine pseed, if adjusted properly, could still be set normally at over 400 meters per minute. Pulp prepared in this way serves as satisfory raw material for the manufacture of paper bags and paper for industrial and technical application.

Through the pursuance of a correct policy for the acquisition of raw material, the rapid growth of the paper-making industry is assured.

Furthermore, only by practising diligently the experience of Soviet construction, by improving constantly the organization of the labor force and by strengthening the administration of the production operation can this rapid development be assured.

For example, the paper-making enterprises have, on the one hand, not only formulated and carried out three major regulations governing the technique of operation, the utilization of equipment and the maintenance of security, but also have established two important systems relating to inspection of production technique and planning concerning repairs. Also, systems for the control of raw materials and the establishment of responsibility have been set up.

On the other hand, the existing equipment has been provided with the necessary technical renovation so as to achieve the present operating schedule of about 345 days per annum and an average operational period of about 23½ hours for boilers, over 22 hours for cylindrical net machines. The rate of equipment utilization has been raised considerably and high production volume, superior quality, economy in consumption and production security have also been assured.

In the field of construction, the adoption of a policy of combining foreign with domestic methods and of operating large, medium and small-sized enterprises simultaneously has been decidedly successful. Through the rectification campaign, the "major and minor debate," the promotion of the "small native group" movement and the great development of small-scale paper mills, speed in construction, economy in investment and effectiveness have been brought about.

At the same time, only through the acceptance of these measures can the irrational distribution of paper mills be changed and the growth of technological strength as a preparatory condition for the further development of the papermaking industry be nurtured.

To carry out this pokicy of construction, coal gas-fired and simple-steamed drying tanks have been put to use. To economize the consumption of steel, paper-making machines made of nonmetallic material and pulp-making boilers operating under "constant pressure" have been used. "Two-stage" boiling is also restored to, thereby greatly reducing the consumption of metal goods and chemical engineering raw materials.

Since the inauguration of the small-scale paper mill movement in the provinces (autonomous regions) and municipalities, the current production capacity of small-scale paper-making machinery has already exceeded 200,000 tons per year. The limitless growth of these mills in the future is bound to be reflected in the accelerated development of the paper-making industry.

However, the establishment of large and medium-sized modern enterprises must be emphasized, for the experience of the past decade has attested to the fact that the industrialization of socialism must be based on the development of such enterprises for the promotion of technological innovation in the existing means of production and the cultivation of technical strength. The importance of this measure will be reflected in the firm foundation upon which industrialized socialism will rest.

The accomplishments mentioned above and the major experiences obtained were possible only through the correct leadership of the Party, the tremendous effort of the corps of employees and workers and the creativeness of labor. Without the support of the masses and the promotion of technological revolution and innovation, this achievement could not have been made. All this has tended to prove that the Party's general line for socialist construction and the policy of "walking the path on both legs" were perfectly correct and wise, and that the system of socialism could not be equaled.

On the basis of the great achievements given above, the entire corps of employees and workers, responding to the clarion call sounded by the Eighth Plenary Session of the Eighth Party Congress, are now, with determination and unparalleled zeal for labor, rising against rightism, greatly encouraging the powerful mass movement and pressing

forward the gigantic campaign to increase production and effect economy to new heights, in order to usher in the tenth anniversary of the founding of the Communist regime with higher and greater production accomplishments, to struggle for the completion of this year's leap forward plan and to strive for the fulfillment of the production goal for 1962, as originally set by the Second Five-Year Plan, three years ahead of schedule.

RESULTS OF EXPANDED OPERATION OF SMALL-SCALE PAPER MILLS DURING THE PAST YEAR

[The following is a full translation of an article written by the Paper Industry Control Bureau in Tsao-chih Kung-yeh (Paper Industry), Peiping, No 10, 7 October, 1959, pages 11-12.]

Under the brilliant guidance of the Party's general line for socialist construction and the leadership of the Party Committee at all levels, and thanks to the untiring and dexterous effort of the expanding corps of employees and workers, the expanded operation of small-scale paper mills during the past year has been immensely successful.

For the period ending July 1959, 718 units of small-scale paper-making machines of various models had been put on trial or in actual production with a planned daily average capacity of 701 tons. Of these, 317 units kept their drying tanks in operation by steam pressure and had a planned daily average capacity of 404 tons; 157 units used coal gas and had a planned daily average capacity of 156 tons, while the drying tanks of the remaining 244 units, with a planned daily average capacity for 141 tons, were fired by other means.

Of the small-scale paper-making machines already completed and put in production, 221 units which were rated normal attained over 40 percent of the planned daily average capacity, while 75 units attaining over 75 percent of the planned daily average capacity were dubbed by the critics as "standard soldier" machines, of which 42 units had already exceeded the planned capacity for production. Furthermore, their production level had remained stable.

For the period from January 1959 to the present time, the number of small-scale machines completed and thrown into production has grown from month to month, and their capacity for production has also risen each month. Measured by the statistics and the actual plan figures released at the Cheng-chou Conference in early August, the small-scale paper mills throughout the country are expected to produce 50,000 tons of paper, 10,000 tons of handmade paperboard and 36,000 tons of native straw pulp in 1959.

Small-scale paper mills, while mainly geared to produce glossed paper, also manufacture "slogan" paper, printing paper, wrapping paper and straw paperboard, satisfying in no small way the requirements of various hsiens and municipalities for writing paper, newsprint for local use, industrial and commercial wrapping paper and sanitary (wei-sheng) paper.

In Honan, Szechwan, Hupeh and other provinces, many hsien newspapers and local publications were printed on paper produced by the small-scale mills, proving that the quality of their products had measured up to the standard.

Some mills manufactured mailing paper of better quality. Because of the low volume of production during the pilot-manufacture period, the operation of the small-scale paper mills was handicapped by a high cost of production in the beginning although a general drop in the cost of production was recorded in mills where production was normal. For example, production costs at many mills in Honan Province had dropped from about 1,000 yuan to about 700 yuan [unit not given, per ton?].

The masses are now being encouraged to promote the development and growth of small-scale paper mills, and the leap forward is continuing. The varied mills and machines are developing like a"hundred flowers blooming," and the mills are dotted across the country. As models combining foreign and native styling, these mills excel in many respects, for, scattered over the land, they are broadly distributed, low in investment, effective in operation, diversified in production, capable of turning out goods of fair quality at no higher cost, and suited to local production and consumption needs both in the acquisition of raw materials and the sale of finished products.

As of now, the following achievements have been made by the paper-making industry through the operation of small-scale mills:

1. By carrying out the Party's policy of "walking the path on both legs", the growth of the paper-making industry has been further accelerated.

The planned capacity for production by small-scale machines now in operation is estimated at 701 tons per day, which is equivalent to seven large-size papermills with a daily production capacity of 100 tons each. It would take three years to set up a mill with a daily production capacity of 100 tons, whereas a small-scale paper mill

could be thrown into production in two months. In less than a year's time, the capacity for production was raised to 701 tons per day. This high rate of production had not been attained when large-size mills were put into production. This growth was unparalleled in the history of the paper-making industry in China.

According to our experience, it would take a minimum of three months, or a maximum of six months, for a small-scale mill to pass from pilot to normal production. By this computation, the period could be shortened by two and one-half years if small-scale mills were established. If the planned capacity were cut back by one half, about 250,000 tons of paper would be produced.

Should the mills be kept in normal operation as planned, the annual volume of production would exceed 200,000 tons, which was higher than the peak figure of 165,000 tons, attained in 1943 before the Liberation. It was initially estimated that 50,000 tons or more would be produced by small-scale mills in more than six months this year.

The product was sent to the market, thereby ameliorating to some extent the tight situation created by the shortage of supply. For example, the municipality of Cheng-chou was supplied in August by the locally-operated, native and foreign-styled, small-scale mills that had embarked upon production instead of relying on the supply of imported glossed and wrapping paper. Evidently, the great achievements made in a short period of time in setting up as many small-scale paper mills as possible resulted from following the Party's policy of "walking the path on both legs."

2. We should establish as many small-scale paper mills as possible, in order to practice economy in national investment and to reduce iron and steel consumption.

Between 30 and 35 million yuan would be needed to finance the construction of a large-sized, combined pulp and paper mill with a daily production capacity of 100 tons. By this computation, the investment would exceed 200 million yuan if seven such mills were to be established. In establishing large-sized mills, the outlay for factors of production, such as raw materials, equipment, technological requirements, manpower, etc., would be much higher, especially the supply of a large quantity of iorn and steel and the provision for technological power.

About 30,000 yuan would be a reasonable average for establishing a small-scale paper mill with a production capacity of one ton per day. There would also be some savings in iron and steel. For the erection of 700 units of small-scale paper mills with a gross daily production capacity of 701 tons, the investment would be 10 percent of what was required for the establishment of large-sized mills. Apparently, great economy would be involved in the national investment figure.

Moreover, iron and steel thus saved would be available for the construction of more important industry. Because of their adaptability to local conditions and because of the availability of local resources, small-scale mills could suitably be operated by the masses and the hsien cooperatives. The mills are now being operated not only by hsiens, municipalities and people's communes, but also by organizations, military units, factories, schools, commercial departments, collective farms, postal and telegraph offices, publishing houses, etc. A massive foundation has therefore been laid to assure the rapid growth of the paper-making industry.

3. The rapid development of small-scale paper mills has transformed the appearance of areas where formerly no facilities existed, thus laying a foundation for the further development of the paper-making industry.

In the past, our paper-making industry was distributed along the coastal areas of northeast, east and south China. This concentration had caused many "blank areas" on the paper-making production map. Through the rapid growth of small-scale paper mills, a change was brought about by the appearance of machine-made paper.

For example, 127 units of paper-making machinery already are in operation in 74 hsien and municipalities in Honan Province. In Ninghsia, Tsinghai, Sinkiang, and Kwangsi provinces, and in other autonomous regions where a paper-making mill was formerly conspicuous by its absence, paper mills varying from a few to several units were observed to have gone into production.

In provinces where a foundation for the paper-making industry had existed, the industry was seen to have spread to hsien and cooperatives where it was hitherto non-existent. With the expansion of small-scale paper mills throughout the land, an industrial base for paper making had sprung up. The industry would grow from small to large [in size] and from native to foreign in style,

thereby laying a sound foundation for the future development of our paper-making industry.

4. The expansion of small-scale paper mills provided favorable conditions for the growth of the paper-making industry through the extension of the industry's technological capacity.

The labor force of a small-scale mill with a daily production capacity of one ton ranges between 30 and 40 employees and workers. All in all, there were between 20,000 and 30,000 employees and workers in some 700 units already in operation. These new workers, recruited from villages and all walks of life, had to learn everything from scratch, and to acquire skill and technique during the past year, when the mill was put into pilot and then actual production upon its completion. The majority of them had already acquired an elementary knowledge of paper-making technique, and they were engaged in production. Eventually, they will become trained workers contributing their share in the development of our paper-making industry.

5. The acquisition of technical experience by the small-scale paper mills will assure their further consolidation and the elevation of their capacity for production.

During the past year, the gain in technological experience was considerable in the construction, pilot production and production potential of the small-scale mills. This achievement came about through the adoption of the constant-pressure method for the boiling of straw pulp, the substitution of the "Liberation-style" water wheel for the water pump and the introduction of the simple-form pulp digester, the coal-gas drier, the roller-type and direct-fired drier, etc. The utilization of coal-gas to dry paper by directly heating the drying tank was introduced by the small-scale paper mills. Since it was unnecessary to use the boiler for drying, conservation of steel material and equipment resulted. Thus, small-scale mills could be established in areas where a shortage of boiler equipment was experienced.

Moreover, in the manufacture, installation and production of paper-making equipment, parts and accessories, and apparatuses for the transmission and development of motive power, there was considerable gain in experience, which was being rapidly promulgated throughout the country, thereby consolidating and improving the production potential of the small-scale paper mills.

The success and achievement resulting from the promotion of small-scale paper mills fully testified that the Party's general line for socialist construction and its policy of "walking the path on both legs" were both wise and correct, thereby vigorously repudiating the distorted and derogatory practices of the Rightist opportunists in respect to the Party line.

Only by following the leadership of the Party, by clinging steadfastly to political dogma, by strictly putting into effect the Party line, by alerting the masses to exert themselves diligently, fully and dexterously, by overcoming all kinds of difficulties and by combatting Rightist thinking, could this great achievement by the small-scale paper mills be made possible during this year.

In the beginning, because of the lack of experience in the construction and production phases of a small-scale paper mill, the shortage of trained operatives, the inability of small-sized paper-making machines to rapidly fulfill the prescribed production quota, the irregularity of production, the rise in the cost of production, the fall in quality, etc., many defects had been experienced; these temporary shortcomings, however, were overcome and resolved after a few months of constant adjustment, consolidation and improvement.

Nevertheless, the temporary, local drawbacks encountered in the course of establishing small-scale paper mills had been exaggerated by those contaminated by Rightist thinking and temperament; by selecting and emphasizing certain defects, to which the facts themselves would offer a rebuttal, they became totally blind to the great accomplishments and contributions to the paper-making industry of the small-scale paper mills. In the short period of a year, the small-scale paper mills had accomplished much, and their power for growth was assured.

At the present time, the small-scale paper mills have already assumed a part of the national burden for paper production, and their share in the performance of this task will increase in importance with the progress of adjustment, consolidation and improvement. Contrary to some people's belief that it would not be worthwhile to establish small-scale mills, it is a proved fact that much has already been accomplished. For the further development of these mills, our policy should be directed toward adjustment, consolidation and improvement instead of procrastination. It would be incorrect for one to entertain suspicion and inaction toward the

expansion of small-scale mills.

In developing our paper-making industry, we should cling firmly to the Party's general line for socialist construction and its policy of "walking the path on both legs." Let us, under the leadership of the Party, resolutely oppose Rightist conservatism! Let us exert ourselves with greater vigor in accelerating the growth of our paper-making industry through the accomplishment of the task of promoting small-scale paper mills.

CERTAIN PAPER-MANUFACTURING ITEMS FROM THE PEIPING EXHIBITION

[The following is an extract from an article written by Kuan Chia-jui in Tsao-chih Kung-yeh (Paper Industry), Peiping, No 10, 7 October 1959, pages 45-56.]

1. The Growth of the Paper-Making Industry

By means of large-sized, automatic lantern slides and charts, the tremendous development of the paper-making industry during the past decade, under the correct leadership of the Party, was explained at the Exhibition. How the volume of production had risen by eight times during the past decade was graphically illustrated by lantern slides and charts. The production figure for machine-made paper in 1959 will rise almost tenfold, compared with the pre-Liberation showing. By completing this year's expansion project, the production goal set originally by the Second Five-Year Plan for fulfillment in 1962 will be completed three years ahead of schedule.

2. Paper-Making Raw Materials

As shown by lantern slides, charts and samples at the Exhibition, our policy is to "subordinate wood to plant fibers" as raw materials for the paper-making industry. Illuminated charts, combined with colored lantern slides, clearly indicate that our country is richly endowed with paper-making resources such as timber, bamboo, rice-straw, reeds, cotton waste, hemp waste, etc.

A breakdown of the raw materials consumed in 1958 for producing 1,630,000 tons of paper indicated that timber accounted for 23.8 percent; bamboo, 26.9 percent; ricestraw and wheatstalk, 25.8 percent; reeds, 16 percent; cotton waste and hemp waste, 4.2 percent; and other wastes, 3.3 percent.

Thus, the policy of using "plant fibers as principal raw materials" for manufacturing paper had been fully carried out. According to the goods placed on display,

high-grade paper, such as rubberized printing paper, cement paper bags, cable paper, etc., were already manufactured with plant fibers as the raw material. The employment of plant fibers as raw material in the production of pulp and paper was a basic accomplishment of the paper-making industry.

3. Utilization of Synthetic Materials

The large-sized calligraphy--"utilization of synthetic raw materials"--revealed by Committee Chairman Chu at the Exhibition emphatically recommended that bagasse and waste sulfite pulp solution be used synthetically for the production of paper. Over 20 varieties of synthetic products made with bagasse, such as rubberized printing paper for pictorial use, rayon and rayon textiles, fiber boards, etc., were already put on exhibition. It was possible to manufacture alcohol, ferment, mucilage and tannin with waste sulfite pulp solution and to turn waste sulfate wood pulp solution into resin soap, turpentine, etc. The exhibits graphically described how otherwise discarded materials could be utilized for the production of great national wealth.

The leap forward achievement in the paper-making industry relating to the rapid production of pulp and high-speed paper-making could be readily gauged from another statistical chart placed on display. Through continual technological innovation the pulp-making industry had scored a great success.

For instance, in 1949, it took 13½ hours to boil a batch of sulfite reed pulp at the Ying-k'ou Paper Mill, whereas the work may now be done in 2½ hours. Consequently, the volume of pulp production had risen from 1,184 tons in 1949 to 95,000 tons in 1959.

Likewise, the time required for working a batch of sulfite wood pulp at three pulp-manufacturing mills (the Canton, K'ai-shan-t'un and Shih-hsien mills) had decreased from 14½ hours in 1949 to 5 hours in 1959. Much economy was also shown in the time needed for working a batch of sulfate wood pulp or straw pulp by the soda ash method.

Since the great leap forward the employees and workers of the paper mills have, by their active effort, made outstanding contributions to the advancement of the paper-making industry. Let us take the speed of an ordinary cylindrical net paper-making machine as an example.

At the Kirin Paper Mill, the speed had increased from 148 meters per minute in 1957 to 270 meters in 1958, while that of the circular net machines at the Shantung Paper Mill had also jumped from 120 meters per minute in 1957 to 180 meters per minute in 1958. This improvement was made possible by the invention of the steam-extraction type of circular net. The rate of paper production was thus stepped up constantly.

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