INSTITUTE OF CURRENT WORLD AFFAIRS

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CHGO-12
Science in Hong Kong III:
Science and Industry

December 12, 1962.

Mr. R.H. Nolte,
Institute of Current World Affairs,
366 Madison Avenue,
New York 17, N.Y..

Dear Mr. Nolte,

On January 1, 1963 Hong Kong will officially cease to be an 'under developed area'. Officially that is, in the eyes of the United States Government which on that date will designate Hong Kong as 'developed'. American businesses and American citizens in Hong Kong must then pay U.S. income tax accordingly. This action by the United States Government draws attention to the fact that Hong Kong has become an industrialized country. In fact, 80% of her earnings now comes from the sale abroad of locally manufactured goods.

In itself it is not surprizing that Hong Kong should have become industrialized. After all, she has 3¼ million people to support, with almost no natural resources, almost no foreign aid (not even from Britain) and with much of her traditional entrepot trade with China at a standstill. What is surprising is that Hong Kong's 'industrial revolution' could have occurred within the past decade without a corresponding scientific revolution (1). Industry has come to Hong Kong in much the same way as the industrial revolution brought industry to Britain two hundred years ago. Factories have been built, machinery installed, men and women are employed making things, but there is very little application of science or scientific method - innovation in Hong Kong is a hit and miss affair. The following are some of the facts and background which support this conclusion.

Employment of scientists and technologists in Hong Kong industry

My survey of 'science in Hong Kong' has mainly been limited to the natural sciences, but in discussing industry I think the study becomes more meaningful if the scope is expanded to include technology. Therefore in this letter, although the main emphasis will still be on the work of the natural scientists, I will also include something about engineers and technicians.

There are no published figures on the number of scientists, engineers or technicians employed by industry in Hong Kong. The Committee for Scientific Co-ordination (see CHGO-11) is carrying out a survey of scientists and scientific facilities, but in order to

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(1) I use the term 'scientific revolution' in the sense defined by C.P. Snow in the 1959 Rede Lecture, "The two cultures and the scientific revolution".

get a rough idea of numbers before its report is published I went to the source of supply and tried to find out how many Hong Kong University and post-secondary college science graduates had gone into industry. The University did not have an up to date record of its graduates' present employment, but in 1958 Mr. R. Simpson of the Education Department made a survey of the employment of Hong Kong University graduates. He sent a questionnaire to most of the business enterprizes in Hong Kong and got about a 50% response. His survey showed that only 4 Hong Kong University science graduates were employed by business. In May of this year I asked some of the graduating University students in Chemistry and Physics how many of them were going into industry. The reply was - one.

The Registrar at Chung Chi College, the only one of the post-secondary colleges to have had a science faculty for several years, told me that only ten of the Chung Chi science graduates had found employment in industry. All ten were chemists.

There remains the possibility that industry mainly hires those scientists who trained outside Hong Kong. Mrs. Yuen, Secretary of the Federation of Hong Kong Industries, thought that this was indeed the case. While freely admitting that there were very few scientists in Hong Kong industry, she thought that scientists who had experience of foreign industry stood a better chance of employment than locally trained people.

At the technical level the employment situation is not much better. Mr. Lau Kwok-Ching, Principal of the Victoria Technical School, said that large numbers of graduates from technical schools were taking unskilled jobs because they were initially better paid. Mr. Burt, Principal of the Technical College, told me that although he had no problem in finding jobs for his technicians, it was a problem for the better qualified men to find employment which made use of their advanced training.

One Hong Kong Chinese industrialist, bemoaning the lack of technicians in industry, wrote in a recent article called "Technical Know How - Our Prime Requisite" that "The pattern (in industry) has been that of follow my leader. ... Trial and error in production methods has been the way, and the Chinese saying 'to know how but not why' can best describe conditions of manufacture in many factories".

The Colonial Secretary, speaking to Hong Kong industrialists at the opening of the annual Exhibition of Hong Kong Products two weeks ago, said "Can you agree that there is a place in your firm for the young engineers coming from our University or for the technicians trained by the Technical College? Are you willing to accept that there may well be things that they know, in spite of their limited practical experience in industry, which, when coupled with your experience, can result in startling improvements?"

Thus, although there are no statistics to rely on, the evidence is pretty conclusive - industry in Hong Kong is largely ignoring science and technology.

The Historical Development of Hong Kong Industry

To understand the reasons for the lack of any real scientific base to Hong Kong's industry we must consider how industry first came to Hong Kong and the problems it has to contend with. Prior to the late 1940's, Hong Kong was almost entirely an entrepot. There were a few industries, mainly those needed to service shipping, but in 1947 the export earnings from locally produced goods amounted to only 10% of total earnings. Then, in the late 40's and early 50's, came the upheavals in China and the Communist victory, closely followed by the Korean War, and the consequent embargo on trade with China. These events had two main effects on Hong Kong. They meant the end of her lucrative entrepot trading with China, and they resulted in the entry of a large number of political refugees seeking haven from the Communists. Among these refugees were wealthy Shanghai factory owners who brought their capital, their know-how, often their technicians, and some even had machinery,which was en route from Europe to Shanghai, diverted to Hong Kong. Encouraged by non-interference of Government here, and the extremely low taxation, they established textile factories. The industry grew and prospered. Soon many other people jumped onto the textile bandwagon and as all Hong Kong knows, this has led to vicious competition, oversupply, and now tariff walls imposed by her best overseas customers. In the last three years or so, there has been a cry for diversification. Now there is a plastics industry and others, such as electronics, optical, and rubber, have recently been established. Industrial products now amount to 80% of Hong Kong's earnings.

This first decade of real industrial growth was carried out without any thought of planning. It was first and foremost a question of survival, and then a question of making as much money in as short a time as possible before being swamped by competitors - or before China laid claim to Hong Kong.

Factors which contribute to the lack of science in Hong Kong industry

Although it is remarkable that a community can industrialize in the mid-twentieth century without incorporating science, there are a number of factors which, when considered together, do make it easier to understand.

The first is the size and organization of the industrial enterprizes. A few are subsidiaries of large European and American companies, but most are locally owned family businesses. The subsidiaries may have some scientific facilities, and are certainly conscious of the value of science in industry, but most of their research and development needs are catered for by their home offices. Of the local companies, only two or three employ several thousand workers and are really big enough to have a staff of scientists. But these companies are either in ship building or textiles, both traditionally conservative industries which employ few scientists even in the more technically advanced countries. Most of the registered industrial enterprizes have from 50 to 100 employees, but Government does not require factories with less than 20 employees

to register. The number of these unregistered companies has been estimated at between 12,000 and 20,000. Thus the average factory in Hong Kong probably has about 30 employees, and is much too small for efficient operation.

Management frequently has no technical knowledge of the products being manufactured, and management positions are often filled on the basis of family connections rather than merit. The Vice Principal at the Technical College told me that College graduates frequently return to the College after a few years and ask for help in finding new jobs. Almost invariably they have done well in their old jobs and may have risen to junior management positions, but were dismissed when a member of the employer's family wanted a job in the firm.

Another factor which hinders the development of a science-based industry is the difficulty in getting mid- and long-term loans. This is a reflection of the uncertain political future of Hong Kong. It means that industrialists think in terms of the next five years rather than the next twenty. In the long run this is likely to be a suicidal policy, but again it is easy to understand the reasons behind it. I shall have more to say about this point in my next letter.

<u>The Federation of Hong Kong Industries and its efforts to infuse science and technology into industry</u>

About three years ago, some of the industrialists realized that their heyday was over and that in the future there must be some degree of planning. They formed the Federation of Hong Kong Industries, and it is through the efforts of this organization that there is a glimmer of hope that a change of heart may take place. The Chairman, Sir Sik Nin Chau, set the key for their work when he said, "We are aware that industrial progress will depend increasingly on systematic, science-based discovery, rather than empirical invention".

I asked the Federation's Secretary, Mrs. Yuen, how they proposed to go about creating the conditions necessary for science-based discoveries to take place. She said that a number of projects were either under way, or being planned. "We felt that the first need was to improve the quality of management, so two years ago we formed the Hong Kong Management Association". Its Chinese title includes the word 'scientific', (The Hong Kong Scientific Management Association) and I asked whether this implied that they were trying to introduce such techniques as linear programming and operations research into management. "Oh no," she said, "There is no place for these techniques in Hong Kong yet. What we are trying to do is to convey the idea that management is a science, something which can be taught and learned."

The next project was aimed at combating the two problems of high cost of industrial land, (which at HK $60 to $90 per square foot must be the most expensive in the world) and small size of the

industrial enterprizes. It consisted of building, with Government help, "flatted factories". In these factories several enterprizes of the same type are housed under the same roof. There are common buying and marketing facilities and technical services are provided. It is hoped that the advantages to be gained from this form of co-operation will ultimately lead to amalgamation, "Because," said Mrs. Yuen, "It's not until we have bigger units that it will be possible to introduce much science or technology."

A third project was carried out this year when the Economist Intelligence Unit was called in to make a survey of industry in Hong Kong. They were asked to advise what existing industries had growth potential, and what others might profitably be introduced. Their report has just been received by the Federation.

A fourth project is a technical information and translation service which the Federation provides for its members.

Early in 1963 a Standards Committee will be formed. One consequence of the slap-dash entry into industry, and cut-throat competition, has been the poor quality of many products. The Standards Committee will help combat this by testing products and issuing certificates. The University Engineering Faculty will help by providing facilities for the mechanical tests and the Technical College will do the tests on textiles.

Also in 1963, a Technical Committee will be formed which will advise members of the Federation on technical problems.

There are plans for a Productivity Council. This will be a joint venture with the Government Department of Commerce and Industry and the Technical College. First the Government must decide whether it will give financial support. If a Council is formed it will try to join the Asian Productivity Organization; and in this way Hong Kong may finally be eligible for foreign aid funds. A research organization may develop from the Productivity Council. But Mrs. Yuen said "So far there has been no decision on how such a research organization would function nor how specifically it could be used to stimulate industrial growth".

The present situation in Hong Kong is reminiscent of conditions in British industry in the late 19th Century. In fact many of the leading articles in the science journal "Nature" at that time read as though they had been written for 1962 Hong Kong. The British Government and British industrialists were severely taken to task for allowing Germany to take the lead in applying science to industry. It was repeatedly pointed out that industry devoid of science could not compete in the world markets with industry which was science based. It was also stressed that 'technical education' was not enough. A scientific education was needed so that the workers could adapt and improve - not just operate.

In Britain, it was not until World War I that government and industry finally took heed of the scientists' warnings. Then the Government formed the Department of Scientific and Industrial Research (DSIR), which ever since has played a major role in introducing science into British industry. Hong Kong probably has the freest enterprise society in the world, its Government is reluctant to interfere in any way with the business of making money. But I'm afraid there is not enough time to let the industrialists go their own way. If Hong Kong is to compete successfully with the rest of the world in the sale of its goods, then industry here must make greater use of science and technology. For this to happen quickly enough, I believe that Government must take the initiative - perhaps by forming its own DSIR.

Yours sincerely,

C.H.G. Oldham.

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