INSTITUTE OF CURRENT WORLD AFFAIRS

CHGO-15
Science in Israel I:
Glimpses and Impressions

27 Lugard Road, 1/floor,
The Peak, Hong Kong.

April 23, 1963.

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

Dear Mr. Nolte,

At first sight it does not appear likely that Hong Kong and Israel should have much in common. Separated by 5,000 miles, they are at opposite poles of the great Asian Continent, and are inhabited by peoples of vastly different cultural backgrounds. Yet just consider: Both are very small countries, Israel is approximately 8,000 square miles in area and Hong Kong 356 square miles. Both have roughly similar populations, just over two million for Israel and just over three million for Hong Kong. Both have very little in the way of natural resources. Both are desperately short of water. Both have border problems, and both have had to assimilate about a million new immigrants into their societies within the past fifteen years.

The British have been deeply involved in both places. It was the British Balfour Declaration of 1917 which first proclaimed the possibility of a Jewish state. It was the British who held the Palestine Mandate and who gave the country its legal system and many of its roads. It was also the British who, for political reasons, turned back would-be Jewish immigrants in the immediate post-war years. The British finally left after the United Nations vote on partition, leaving the Jews to proclaim their sovereignty and to fight their battle of independence with the Arabs. In Hong Kong, Britain's involvement is both longer and more complete. But once again Britain is stopping ships bringing illegal immigrants, although this time it is for economic reasons. Hong Kong too had to face a major upheaval shortly after Israel's independence, when she lost much of her entrepot trade and had to change from commerce to industry for her livelihood. In effect, both countries started their development anew at about the same time.

In the informal survey I made of science in Hong Kong, I had seen the results of imposing the British system of secondary and university education on the Chinese. I had also seen the meager support which the Government gives to scientific research, and the limited extent to which science and technology are used in industry. What I read about Israel suggested that her use of science for economic development was much greater than Hong Kong's. Bearing in mind the similarity of many of the basic problems of the two

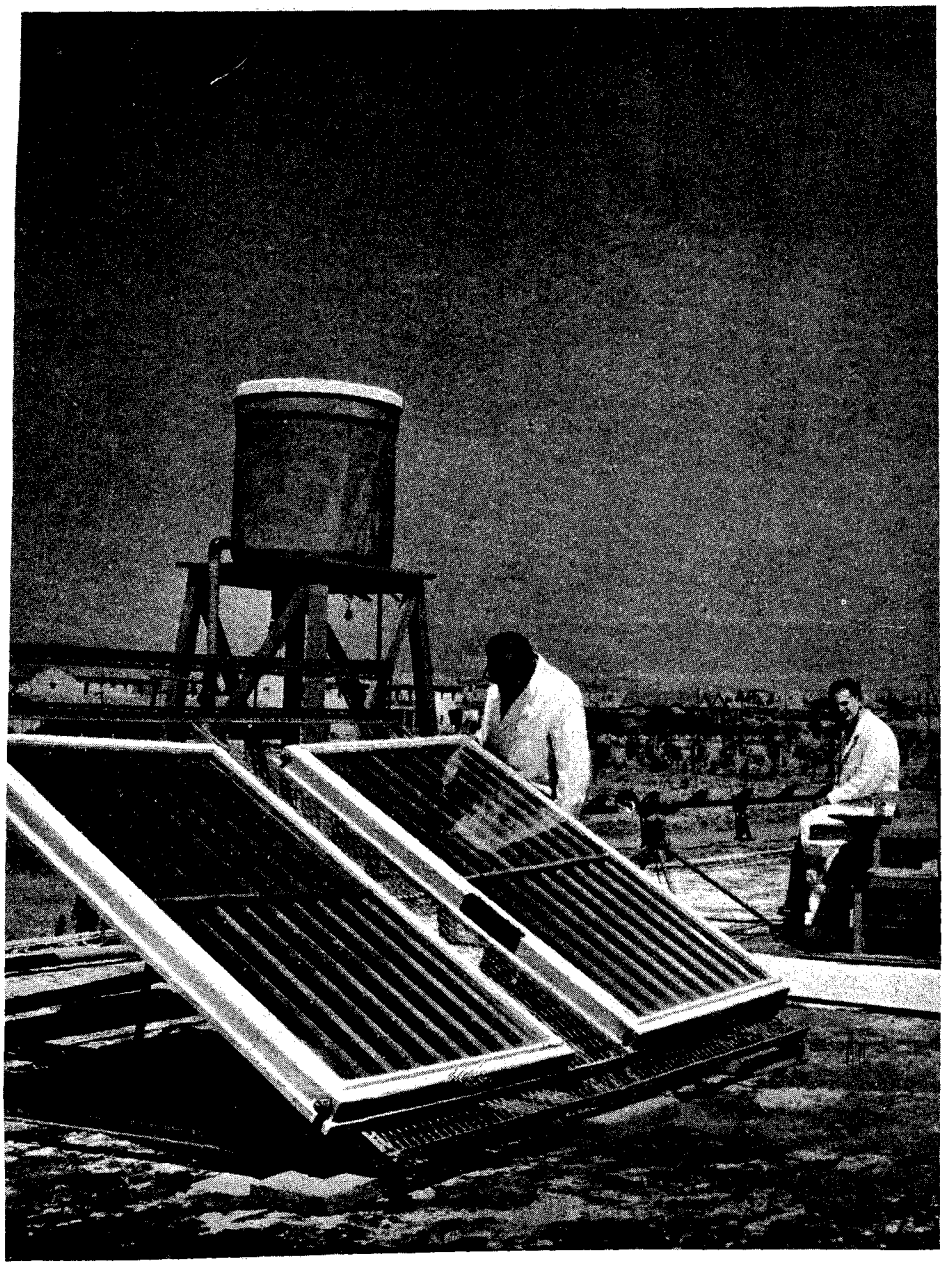
places, I decided to spend a few days in Israel on my way back from Geneva in the hopes of getting some ideas which might help Hong Kong.

I arrived in Israel with three objectives in mind. The first was to talk with leading Israeli educators and scientists about specific problems in science and its relation to education, government and industry. The second was to see some of the applied research which was geared to the economic development of the country, and the third was to see something of the scientific work in my own field of geophysics.

I first talked about science and education with Dr. Rinot, the Director General of Education and Culture, and later with Mr. Bentwich, one of the chief science men in the Ministry of Education. Then I discussed science and government with Mr. Danny Shimshoni, the Director General of the Research and Development Council in the Prime Minister's Office. Visits to applied research institutes included the National Physical Laboratory, the Negev Institute for Arid Zone Research in Beersheba, and I include in this category a visit to the new Hadassah Hospital and Medical Research Center, just outside Jerusalem. The third objective was met by visits to the Geophysical Institute near Tel Aviv and the Weizmann Institute at Rehovoth.

The information I derived from discussions with Dr. Rinot, Mr. Bentwich, and Mr. Shimshoni will be incorporated in the next letter, in which I intend to select a few of the problems I first met in my study of science in Hong Kong, and show how the Israelis have tackled similar problems in their own country. In this letter I shall give a few examples of the scientific work of general interest which I saw and heard about, and then give some general impressions of science in Israel.

The scientists at the National Physical Laboratory do some work on standards but their main activities revolve around solar energy. The work is mainly applied research, although some fundamental studies have been made on the physics of selective surfaces. The solar collectors on most roof-tops in Tel Aviv are sufficient testimony of the succes of this work for heating water. But the problem of getting power is another matter altogether, and according to Dr. Tabor, the Director of the Laboratory, it is unlikely that solar energy will ever be an economically competitive source of power in Israel. He described one scheme however, which may provide an economic source of power in those areas which do not possess an electric grid system. This is the solar pond -- a project which is now undergoing extensive testing at Sodom near the Dead Sea. The principle is quite simple. If the bottom of a tank of water which is exposed to the sun is coloured black, and if convection in the tank is stopped somehow, then the bottom layers of water become very hot. One way of preventing convection is to increase the salinity of the water as a function of depth. Temperatures as high as 96°C have been achieved in model tanks, and now a full size unit is being tested. The difficulty is to withdraw the bottom layer of hot water, and then use this for generating electricity. I gathered that the problem had been solved in theory and it now remained to work out the practical details.



Test rig for solar water heaters at the Negev Institute for Arid Zone Research.
(Photograph from Negev Institute handbook)

The Negev Institute for Arid Zone Research is a good example of scientific research specifically geared to economic development on a large scale. The Negev is a vast desert which covers almost half of Israel. If the country is to accommodate all those who wish to live there, the Negev must be made habitable. To achieve this aim, research in several subjects is being carried out at the Arid Zone Research Institute which is located on the fringe of the Negev at the rapidly growing Biblical town of Beersheba. The work there is concentrated on four main problems: 1. A botanical study aimed at finding the most suitable plants for both arresting erosion, and for field and forage crops. 2. A physiological study aimed at finding out more about man's capability for living and working in hot climates. 3. A study of solar energy (which is done in collaboration with the National Physical Laboratory). 4. A study of ways to desalinate water. I spent most of my time at the Institute talking with the groups working on solar energy and desalination.

Later I had lunch with one of the engineers involved in planning the development of the Negev, and heard from him of the new experiments in communal living. "Two years ago," he said, "We had a conference on development problems to which many delegates came from the African countries. We told them about our Kibbutz and Moshav, and at the end, one of the Africans said, 'I shall go home and recommend that we try to combine the living conditions of the Moshav with the working system of the Kibbutz.' We thought about this ourselves and decided that maybe it was a good idea, so we have tried out a few groups with this system. We find that as many of the young people who started the Kibbutz ten years ago are now in their mid-thirties, they are beginning to hanker after a family life. This system permits it."

He then told me of two contemplated development schemes on the grand scale. Quickly sketching a map of Israel on his table napkin, he said, "Here is the Mediterranean, here the River Jordan, and here the Dead Sea ... so. We build a channel or huge pipe-line from the Mediterranean across country to the Dead Sea. The Dead Sea is thirteen hundred feet below sea level, then as the sea water drops into it we have a source of power."

"But what about the rise in the level of the Dead Sea?" I asked.

"We will take fresh water from the Jordan and use that in the North and fill up the Dead Sea at the same rate with sea water."

The next scheme he described was even more fantastic ... "We are thinking of constructing a canal from Eilat on the Red Sea to the Mediterranean. It would be twice as long as the Suez, but we tell Nasser -- either he lets us use the Suez Canal, or we build this new canal and under-cut him when it is finished!"

I asked where the money was going to come from. "Look," he said, again scribbling the figures on his napkin, "three percent of the population of the United States is Jewish. They own ten percent of the wealth. If each one were to give one percent to Israel, we would have more than enough for a canal!"

Dr. Tabor shows the late Mr. Hammarskjold the first experimental solar pond at the Negev Institute for Arid Zone Research.
(Photograph from Negev Institute handbook)

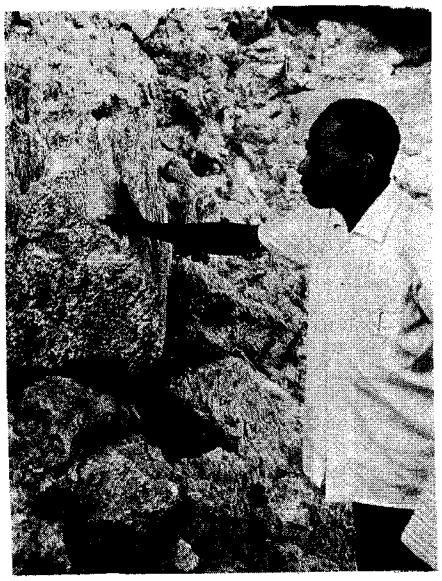
Although I only spent five days in Israel (and these included a Jewish Sabbath in Jerusalem) I was able to achieve my three goals. This was partly due to the generous hospitality of the Israelis, but it also shows how well they are geared to receiving foreign visitors and showing them around their country. Two of the places I visited, the Arid Zone Research Institute and the Weizmann Institute, had public relations officers, and even with the short warning they had of my visit everything had been carefully arranged. I was told of the numerous visitors, particularly leaders from African countries, who come to see for themselves what a country can do when it puts science and technology to work for economic development. I was reminded too, that it was Israel who had hosted the Rehovoth Conference on "Science and the New States" in 1960, which was the forerunner of the U.N. conference on the same theme from which I was returning. In a booklet, Science for Freedom, published by the Continuation Committee of this Rehovoth Conference, it is stated ... "Israel, acting as a pilot plant is giving of her knowledge and experience in the belief that free and happy nations will lead the world to peace." Abba Eban writes in the same publication, "To Israel and the Weizmann Institute have come the heads of African States .... they look upon our laboratories, libraries and family of scientific workers not in distant and hopeless envy, but in a serious mood of ultimate emulation."

The politicians in Israel are holding up their country as a model. Is it a good model to emulate? I am not so sure. At the same time as the Rehovoth Conference was being organized, Prime Minister Ben Gurion asked Danny Shimshoni to review science in Israel. Shimshoni's report, published in Hebrew, gave a dismal picture. Writing in his Council's annual report five months ago, Shimshoni said of the conditions in 1960, "Despite the substantial scientific potential of the country, industrial research lagged far behind the needs. The relationships of science and industry and the impact of science on government, were inadequate. We lacked a national policy for science. Science and scientists participated but little in forming of overall national policy."

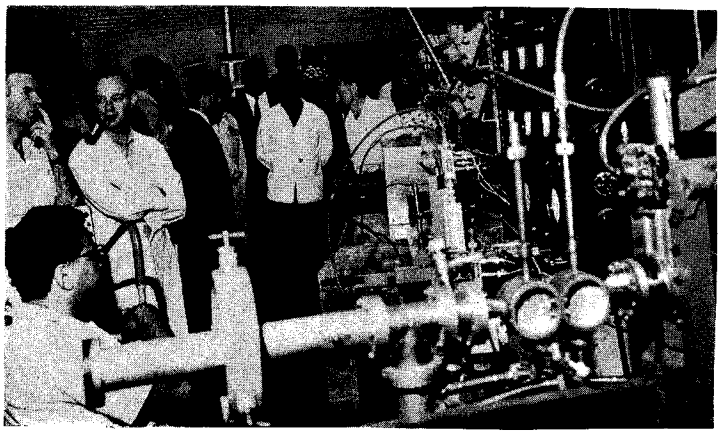
I was told that Israel is spending less than 1% of her gross national product, probably nearer ½%, on research and development. This is low compared with many countries. Yet some of the money goes on just those projects that less developed countries were advised at the Geneva (UNCSAT) conference, not to spend their money -- research in desalination of water, and solar energy. In this same connection, it was the unanimous opinion of the experts at Geneva that newly developing countries should not try to build up their own geophysical crews for oil and mineral exploration, but should rely on existing contract geophysical companies. Israel has her own geophysical company.

I am not suggesting that what Israel has done is wrong, although her own scientists say that in the past the State has not used her scientific resources particularly wisely. But it is important to remember that Israel's situation is unique in that many of her best scientists are immigrants. As a new nation, she started out with far greater resources in the way of trained manpower

African leaders visit Israel.



(left) President F.Houphouet-Boigny of the Ivory Coast examining salt rocks at Sodom.
(below) Dr. Okpara, Premier of Eastern Nigeria visiting Weizmann Institute.



(above) President Dacko of the Central African Republic visiting Nuclear Physics Laboratory at the Weizmann Institute.
(right) Israeli Prime Minister D. Ben Gurion with Chief Akintola, then premier of W. Nigeria.

(Photographs from pamphlet Science for Freedom)

than any other nation. Also her universities and Weizmann Institute are heavily subsidized by world Jewry, a source of income which other new nations simply do not possess.

So that although I found in Israel many exciting examples of what science, technology and enthusiasm (particularly the latter) can achieve when they are applied to economic development, I do feel that leaders from less developed countries who visit Israel should be warned not to follow the Israeli pattern too closely.

Yours sincerely,

C.H.G. Oldham

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