ISRAEL HIGH-TECH REPORT

A MONTHLY REPORT COVERING NEWS AND INVESTMENT OPPORTUNITIES

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- From the Editor's Desk

A Left Foot Forward

Bezek Israel Telecommunications is the first government 'lamb' to be offered on the 'altar' of privatization. For several years, lawmakers have debated the merits of such a move. In the final analysis, they concluded that anything was better than having the Government of Israel carry and bottle-feed 250 companies, among them some of Israel's major corporations, including El Al Israel Air Lines, the Israel Electric Corporation and Israel Chemical Industries. There had to be some way to reduce the national deficit, they reasoned, and ... well, privatization worked in England.

Israelis have long admired many aspects of the British system and way of life. The Margaret Thatcher-led Government appears to move from strength to strength, and has been closely watched by Israel's ministers of finance. So when the British cleverly and successfully marketed shares of companies such as British Petroleum and British Telecom, the value of the idea was noted here. Surprisingly enough, the traditionally conservative English public discovered a penchant for private ownership, and the concept of popular capitalism received a major boost. Initial profits from these first investments enhanced the public's pride of ownership, and the process became self-generating. Offering after offering came on the market, and each was oversubscribed. The budget deficit was reduced by billions of pounds, and property taxes fell. As a result, the 'privatization of Britain' became a model for the rest of the world.

On September 25, the Israeli public was offered its chance to become partners in Bezek
Telecommunications. Though the \$75-million issue was said to represent only 5% of Bezek equity, it constituted the first chance at public participation in a major company. That the issue was oversubscribed by more than four times was greeted by the media as an overwhelming success. Ze'ev Refuah, head of the Government Corporations Authority dealing with privatization, pronounced himself "encouraged" by the success of the offering, "which showed that the

public has confidence in Government companies. We will now go ahead with the privatization of Israel Chemicals and others."

But was the issue really a success? Hardly!

In fact, in a number of ways it flopped. In advance of the issue, the underwriters - including some of Israel's major banks - were divided as to the valuation and timing for the floatation. There was little excitement generated. In fact, the public was so underwhelmed at the prospect of owning Bezek shares that one bank allegedly pushed the issue on its customers.

On the first day of trading it became apparent that something had gone wrong. The investing public obviously misread the signs. Since the issue was four times oversubscribed, they reasoned, demand should have pushed up the price. Many new Bezek shareholders therefore decided to try for a quick profit by cashing in their holdings right away. Had the public been first persuaded that Bezek shares were intended to represent a good *long-term* investment, perhaps the rush to sell could have been avoided.

In any event, the stock's precipitous return to the marketplace scared off buyers. The value of Bezek shares, rather than appreciating, fell heavily. There were buyers, but only at prices close to ten per cent below the subscription price.

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The British experience could not be reproduced in Israel. Why not?

Rather than strengthening the company's image before offering shares to the public, Bezek's reputation - never good to begin with - had suffered even further when, during the pre-issue period, the company's managing director was replaced by Moshe Levy, former chief of the General Staff of the IDF.

Additionally, the Gulf Crisis created volatile market conditions.

The advance signs were clearly unfavorable when the issue was launched. That it sputtered should come as no surprise.

Has privatization in Israel been dealt a fatal blow?

Not necessarily. Yet any level-headed assessment must take into account the fact that first-time investors who were 'once burned' in the marketplace are likely to be 'twice shy'.

It is essential that public confidence be strengthened before shares of public companies are again offered for sale. Confidence building will be the key issue and challenge. The public will have to be appropriately wooed to the idea that participating in privatization is a good idea. The degree to which confidence is established will determine the prospects for the next stage of privatization.

The issues of timing and marketing, never really Israeli strong points, are critical to the future. They will have to be addressed, as happened in England and other parts of the world.

A small step has been taken on the road to privatization, but in this first offering of Bezek Telecommunications, it was a case of putting the left foot forward.

But let's look at the bright side. The very prospect of privatization (or threat, depending on your point of view) might finally encourage Bezek employees to improve the quality of their service. So perhaps even this first, faltering step may have taken us somewhere.

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MICROELECTRONICS: SEEKING A CHANGE IN OWNERSHIP

Microelectronics Ltd. has been producing capacitors for 28 years. The company was originally American, but today its products are very much the

result of its own R&D. In 1989 its sales were \$2.2 million, of which all but 5% was exported.

Microelectronics is now wholly owned by a British firm. The local company's executives are seeking to orchestrate a management-led buyout. Their accumulated experience in R&D, production and international marketing is a valuable asset. The Microelectronics sales office in France also has an experienced marketing group, which would allow for expanding product lines.

Capacitors:

What they are and how they are made.

A capacitor is an arrangement of conductors and dielectrics used to enable the short-term storage of electricity. A capacitor is made by mixing a ceramic powder according to a company's own formulation and converting it to ceramic sheeting. To obtain the required capacitance - the property in a non-conductor that permits the storage of electrical energy - layers of ceramic sheet are superimposed one on top of the other. The resulting sheet is then cut and heated to about 1600° Celsius. Varying the components and formulations controls the quality of the resulting capacitors, which in turn become critical components in the design of high-end RF, microwave communication and medical equipment.

Products

The company's products find application in thousands of aerospace, medical, communications and civilian-oriented goods. The products can be divided into two categories:

- fixed capacitance microwave ceramic capacitors, and
- variable-capacitance, or trimmer capacitors

These products are aimed at the microwave and RF industry for use in radar, cellular telephones, microwave links, High Definition Television, TV or CATV transmitting equipment, and monitoring/diagnostic tools such as magnetic resonance imagers.

The Market

The RF and microwave capacitor market is estimated to be \$120 million, with annual growth of 10-15%. Microelectronics' management believes its future growth potential lies primarily in the non-military segment.

The company's products are marketed through a network of independent sales agents in a number of countries. The French division is an affiliate, and is viewed as a major asset as Europe moves towards unification.

Key Personnel

General Manager Uri Soudak has 25 years experience with engineering and management in the IAF, IAI, Boeing, Clal Industries and Elco.

Yaacov Golany serves as International Sales Manager, and has accumulated more than two decades of marketing experience in Israel and abroad.

Chief Scientist Mike Albert has served the company for 16 years. He specializes in R&D

Looking to the Future

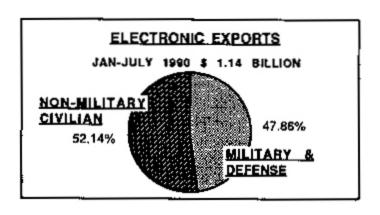
An accelerated program of product development coupled with a modest initial investment for the purchase of specialized equipment will double sales in two years, according to management estimates. An additional investment - the precise figure has yet to be established - would see sales of \$10 million by 1996.

With 2,000 square meters, the existing plant in Rishon le-Zion, a suburb of Tel Aviv, could accommodate three times the present staff.

Potential investors take note: Moshe Nissim, Industry and Trade Minister, has pointed the way towards solving the employment problem for Russian immigrants qualified to conduct R&D. The Government has agreed to finance 60% of R&D programs if they involve a staff increase of at least 5%, and if the company doing the work had exports exceeding \$5 million in 1989.

ELECTRONIC EXPORTS TO TOP \$2.2 BILLION IN 1990

According to Moshe Shamir, Chairman of the Israeli Manufacturers' Association, Electronics Division, Israeli electronic exports in 1990 will exceed \$2.2 billion. Reaching these figures will reflect a 15% year-to-year increase. In the first seven months of 1990, electronics exports advanced to \$1.14 billion, compared to \$980 million in the same period last year.



These figures were compiled from a sampler of 48 Israeli electronics companies which account for 85% of the nation's exports in this field.

RECENT DEVELOPMENTS AND NEWS FROM SCIENCE BASED INDUSTRIES

BUYERS LOOK TO ELBIT FOR PROTECTION AGAINST CHEMICAL WARFARE

The threat of chemical, biological and atomic warfare that has come with the Gulf crisis has created demand for Elbit Computer's Chase. It is a system designed to detect and sound an alarm in the presence of nerve and blister agents. A feature of Chase is that, while other detectors quickly become saturated, Chase is rapidly self-cleaning.

Inframetrics, Elbit's American subsidiary, was awarded a U.S. Army contract for chemical agent detectors two years ago.

EL-OP OUTSTANDING SUPPLIER AWARD

El-Op Electro-optics Industries Ltd., a producer of defense electronics, has earned the Outstanding Supplier Award by the American Martin Marietta aerospace company. El-Op is a partner in the development and production of Appache helicopters for the American armed forces. In the past, El-Op has supplied more than 500 systems - components in the Appache's target acquisition and aiming and night vision units.

ISRAEL-SINGAPORE SCIENTIFIC LINK

The establishment of joint scientific projects is being studied by members of the Singapore and Israeli academies of science. Medicine and microbiology are just two areas under consideration. There has already been seven years of scientific cooperation between Singapore and Israel.

ELTA BACKLOG

Elta Electronic Industries reports that at mid-year its backlog of orders exceeded \$540 million. Elta develops and produces a variety of defensive systems for Israel and other customers. These include a family of airborne radar for fighter aircraft; an airborne early warning system; and mini RPV payloads.

The company is a subsidiary of Israel Aircraft Industries Limited.

Israeli Companies on Wall Street

Selected income and earnings summaries for the 6 months ended June 30, 1990, unless otherwise indicated. Nearly all of these companies are intensively export oriented. <u>Prices are as of October 16, 1990</u> and the price changes relate to those a month ago.

Revs (in \$ mil.)	Net Income (in \$ thou.)	Price (in \$)	<u>Net</u> Ch <u>ange</u>
87,992	5,341	13.625	-0.375
17,696	3,632	22.750	-3.500
38,800	2,800	2.250	-0.375
14,748	.922	5.625	-3.000
4,700.	300	4.875	-0.875
8,700	(66).	4.000	-0.375
19,242	.867	4.625	-0.375
84,061	18,555	14.375	-2.125
4,781*.	1,075	8.375	-1.000
140,662	8,671	10.375	-1.125
88,000.	3,746	6.250	-0.375
	(in \$ mil.) 87,992 17,696 38,800 14,748 4,700. 8,700 19,242 84,061 4,781*; 140,662	(in \$ mil.) (in \$ thou.) 87,992 5,341 17,696 3,632 38,800 2,800 14,748 .922 4,700. 300 8,700 (66). 19,242 .867 84,061 18,555 4,781*, 1,075 140,662 8,671	(in \$ mil.) (in \$ thou.) (in \$) 87,992 5,341 13.625 17,696 3,632 22.750 38,800 2,800 2.250 14,748 .922 5.625 4,700. 300 4.875 8,700 (66). 4.000 19,242 .867 4.625 84,061 18,555 14.375 4,781*. 1,075 8.375 140,662 8,671 10.375

^{*}Q1/90

IMI MOVES INTO THE CIVILIAN MARKET

Israel Military Industries is made up of nearly 40 factories and operational units, and employs 14,000. It is wholly owned by the Ministry of Defense, and nearly 10% of its employees are involved in DNA research. Annual turnover is between \$500 and \$600 million.

IMI specializes in conventional weapons and ammunition, as well as producing highly sophisticated products such as "Smart munitions", anti-electronic warfare devices and innovative anti-tank missiles. Moreover, IMI works in such diverse fields as composite materials, laser communication and chemical products. Many of these have non-military applications.

In recent years, IMI, along with other defense-oriented companies, has reacted to budgetary cuts by diversifying into the civilian marketplace. A spinoff of these efforts was the development of a card-operated public telephone. IMI has started to supply Bezek Israel Telecommunications with the space-age phones. These card phones, costing about \$2,000 each, eliminate the need for tokens, using two kinds of cards instead. One is a personal one allowing anywhere between 10 to 240 calls and being made available through local post offices.

Even with no increase in the use of public telephones, total market potential for the card phone is in the order of \$32 million, based on the existence of some 16,00 public telephones in this country.

In addition to the local market, IMI is targetting Eastern Europe as having export potential.

ISRAELI COMPANIES: ON WALL STREET

RADA CONSOLIDATES HOLDINGS

Rada Electronic Industries Ltd. has acquired the remaining 49% interest in its subsidiaries, Vectronic Limited and Arcom Electronic Holdings Ltd. Rada acquired the minority interest in exchange for 250,000 of its ordinary shares.

Vectronics and Arcom's wholly-owned subsidiary, Unitec-Universal Technologies Ltd., are engaged in the sale and marketing of electronic components manufactured by approximately 30 American and Far Eastern companies. The two firms, which are based in Israel, had revenues of approximately \$4.6 million in 1989.

The company also announced it had reached an agreement with owners of the remaining 39%

minority interest in Tasco Electronic Services Inc. of Anaheim, California. Rada will acquire their interests in exchange for 275,000 ordinary shares.

Tasco owns Active Technologies Inc. of New York and Adar Active Technologies B.V. of Amsterdam, both of which are engaged in the sale and marketing of electronic components and IBM-compatible peripherals. Tasco's consolidated revenues in 1989 totaled approximately \$9.6 million.

MORE OF ECI'S DIGILOOPS FOR GERMANY

The Deutsce Bundespost Telekom, Germany's telecommunications administration, has signed a new DM 8-million contract for ECI's Digiloop PCM2 units. The PCM-2 has become the standard for the Coman and other European networks. It allows single twisted-pair subscriber loops to carry two voice or data transmissions at the same time. ECI will complete the order in 1991.

ECI's management is achieving new efficiencies by forming one production, R&D and marketing organization. Until recently, the telecom and systems divisions were independently managed. The company employs 550 people, of which all but 40 are in Israel. Reports from New York indicate that, at the recent John Westergaard ERA conference, ECI's presentation was met with great interest by financial analysts.

IIS AND MASHOV IN JOINT VENTURE

IIS-Intelligent Information Systems and Mashov Computers are cooperating in adapting Magic for use on IIS built-equipment used in conjunction with IBM 3270 computers.

PRESSURES FOR A NEW STOCK MARKET

The Association for High-Tech Industries in Israel identified in our June 1989 issue as an increasingly visible group championing the interests of small

Harael High-Tech Report Index*

136.09% - 11.3%

*ISRAEL HIGH-TECH REPORT INDEX is a weighted index made up of the shares of leading high-tech companies.

BASE=100 AS OF Sep 30,1984

companies in Israel - is trying to persuade the board of directors of the Tel Aviv Stock Exchange and the Israel Securities Society to establish an over-the-counter stock market. Such a market, claims Moshe Cohen, the association's President, would allow small firms which cannot meet TASE requirements to raise capital. Sources within the TASE appear unconvinced as to the need for a new market, especially since many of the 265 companies now listed on the exchange are small ones.

REACHING THE WORLD FROM ISRAEL: CONFERENCE ON INVESTMENT OPPORTUNITIES

"Investing in Israel: Opportunities and Challenges" is the title of a one-day conference being sponsored by the American Stock Exchange and Operation Independence, a voluntary group of businessmen. It will take place November 20 at New York City's Pierre Hotel. Dr. Marsha Kramer Mayer, V-P of Research, reminds IHTR that Israeli listings on the Amex include AIP, Carmel Containers, Laser Industries, PEC, Ampal and Electrochemical Industries (Frutarom). For a number of these companies the Amax is a second public listing, as their shares also appear on the Tel Aviv Stock Exchange.

A number of Israeli companies, among them Israel Land Development Corporation, are considering listing shares in the U.S. in the form of American Depository Receipts, or ADRs.

The conference will showcase companies which are already publicly listed. Presentations will be delivered by key individuals from Israel's corporate world, and panelists will include Eli Hurvitz, Teva Chairman; Arie Rosenfeld, Scitex CEO; Uzía Galil, Elron Chairman; Emmanuel Gill, Elbit's CEO; Mair Laiser, President of ECI Telecom, and Dov Frohman of Intel Israel. A keynote presentation will be delivered by Yitzhak Moda'i, Israel's Minister of Finance. Arie Mentkavitch, Director of the Israel Securities Authority, and Haim Stoessel, Chairman of the Tel Aviv Stock Exchange, will represent the views of their institutions. Harvey Krueger, Lehman Brothers' Managing Director, will chair the conference. Dr. Pedro-Pablo Kuczynski, Chairman of First Boston International, and Paul Berger of Arnold & Porter will discuss privatization.

The conference's participants and the scope of its subject assure it a place among the most important of its kind in recent years. It promises to deal with some of Israel's unique advantages in respect of international trade and investment.

AN INSIDER'S VIEW OF ARTERIES

Moving into the 1990s, Israel's medical and healthcare facilities consist of a developed infrastructure of medical and paramedical research and bioengineering facilities, as well as a growing pool of trained medical practitioners and researchers. The importance of the role attached to medical research and development is reflected in the large number of professional papers published. According to the Ministry of Science and Development, more than 50 per cent of the publications appearing in scientific journals relate to clinical medicine and biomedicine. Cardiovascular disease, cancer, aging and mother/child health are key areas of research, and in Israel also these are designated as national priorities.

In IHTR-1/90, angioplasty procedures at Tel Aviv's Elias Sourasky Municipal Government Medical Center Tel-Aviv-Jaffa (Ichilov) were reviewed. Dr. Hylton Miller, cardiologist and head of the hospital's catheterization unit, is now preparing a major study of 400 high-risk atherosclerosis patients - people who have suffered heart attacks in the past and have undergone either angioplasty or open-heart surgery.

Measuring the progress of heart disease can only be achieved by the use of angiography, but results vary, points out Dr. Miller. Since changes in the interior diameter of arteries cannot be accurately and conveniently assessed, a system is needed which will measure the narrowing of the vessels. The technology is known as quantitative angiography. Dr. Miller is now seeking funds for the acquisition of a Cardiovascular Angiography Analysis System.

The aim of the long-term study is to compare the relative benefits of two differing approaches, each aimed at reducing the incidence of angina pectoris, myocardial infarction and death from cardiac arrest. Two groups of patients will follow a strict regimen of diet and exercise, but one will also undergo an aggressive lipid-lowering therapy to reduce the cholesterol count to less than 150 mg. per cent.

Two years into the program, all participants will undergo angiography to evaluate the relative benefits of diet and exercise versus diet plus exercise plus medication. Incidentally, Lovastatin is still the only medication able to affect changes of up to 50% in serum cholesterol.

But Dr. Miller and his team want an even better understanding of cardiac vessels and structures. The technological answer is ultrasound angioscopy. Ultrasound is not a new imaging modality, but the introduction of an ultrasound transducer at the tip of a catheter into the vascular system is relatively new. Dr. Miller believes that viewing arteries in this manner will generate images of pulsatile arteries in vivo, resulting in improved diagnosis and a more accurate assessment of the success of angioplasty procedures.

NEWS FROM INSTITUTES OF HIGHER LEARNING

RAT BRAIN GABA TRANSPORTER CLONED

A team of researchers from the Hebrew University of Jerusalem, the California Institute of Technology and the Roche Institute of Molecular Biology has succeeded in cloning the transporter of GABA in rat brains -- the first time that a cloning of this type of material has been accomplished.

It is hoped that this work may someday lead to development of a new class of medicines to control diseases related to the nervous system, including epilepsy.

The team that performed the cloning included Prof. Baruch Kanner of the Department of Biochemistry at the Hebrew University-Hadassah Medical School, Prof. Henry Lester of the California Institute of Technology, and Prof. Nathan Nelson of the Roche Institute. The results of their research appear in the latest issue of Science magazine, published in the U.S.

The researchers achieved their feat after Prof. Kanner and his associates at the Hebrew University-Hadassah Medical School purified the GABA transporter protein from rat brains. The researchers succeeded in breaking the protein into fragments and determining the amino-acid sequence of the largest of these. This led to the design and synthesis of a DNA probe to find the match-up with a large DNA fragment containing the full genetic coding for the rat-brain GABA transporter.

The scientists say their work will lead to production of the cloned material in large quantities - a prerequisite for detailed, three-dimensional structural studies of the transporter protein.

FLOUR WITHOUT GLUTEN

The Department of Food Engineering and Biotechnology at the Technion has developed a recipe for gluten-free bread. Gluten is a protein which gives bread its coarse texture. However, one of every 1,000 people suffer from Celiac Disease an ailment which makes it impossible to digest and absorb gliadin fraction of glutein, the main protein in wheat, barley and rye. Celia-affected individuals are unable to eat anything prepared with flour.

The Technion researchers - a wife and husband team, Professor Shimon Mizrahi and Sylvia Mizrahi developed a recipe based on cornstarch, flour and natural gums. The result is a loaf which is nearly identical in all aspects to the texture, appearance and taste of regular bread.

In Israel, Telma-Israel Edible Products markets baked goods for Celiac sufferers.

DRUG DEVELOPED FROM AVOCADO SEEDS FOR SKIN TREATMENT

An agent made from avocado seeds is being developed into a partial cure for diseases such as schleroderma, osteoarthritis and paradontopathy by a research team led by Professors I. Neeman, S. Mokady and Dr. M. Werman. The agent has been found to effect collagen metabolism by increasing the soluble collagen content in skin. Although it is still early, and the tests required are extremely complex and costly, the research team is confident it will soon have a marketable product.

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CITY/STATE..... CODE.... COUNTRY.....

PROCESSING OF SMALL FISH FOR HUMAN CONSUMPTION

One of the sea's most abundant resources is small fish. These fish, which are high in protein, are largely ignored by the fishing industry because they are difficult to process and have a much shorter shelf-life than larger fish.

Professors S. Mokady and U. Cogan of the Technion and Dr. A. Gelman of the Fish Products Laboratory of the Veterinary Services have developed a process by which tiny fish are cut, rinsed and treated under special conditions, causing the tissues to soften. This simplifies the removal of inedible portions such as bones and scales, and results in a high-quality mince that can be used to make fish balls, spreads and other useful products.

The researchers hope to promote this source of nutritious food in developing countries.

NEW COCKTAIL MIXTURE IN WAR AGAINST WEEDS

Can farmers using herbicides save money and reduce environmental risks?

Yes, say a group of Weizmann Institute scientists who have developed a novel "cocktail" consisting of a small amount of herbicide mixed with a special chemical agent which lowers weeds' resistance to herbicides. Intended for conservation tillage - the removal of weeds from a field before cultivation - the "cocktail" includes a synthesized herbicide additive. This additive, according to the Weizmann team, blocks the enzyme activity which usually obstructs the action of herbicides.

Weed enzymes, say the WI scientists, require trace metals to be effective. Dr. Abraham Warshawsky, a specialist in the field of molecules for metal binding, came up with a substance which forms the herbicide "cocktail" additive. The chelator, as this special substance is known, removes metals from weed enzymes when introduced with the herbicide, thus inactivating them.

Laboratory and greenhouse experiments reveal the chelator to be highly effective with a number of herbicides. The "cocktail" holds commercial promise. The project is being supported by the National Council for Research and Development, as well as by the Weizmann's own Yeda Research and Development Company.

SEEING THE STRUCTURE OF MATTER WITH MAGNETIC RESONANCE

Nuclear Magnetic Resonance (NMR) is generally associated with exceptionally accurate, non-invasive scanning of the human body, used when maximum knowledge of the inside of the body is required.

Besides its application in human healthcare, diagnostic magnetic resonance coupled with the much older technology of nuclear spectroscopy is used by chemists to determine the structure and dynamics of molecules. Molecular makeup is determined by studying the magnetism or "spin" of electrons.

Electron Spin Resonance (ESR) refers to spinning electrons and their observation. Metallic ions, radicals and unpaired electrons may be studied. It's important to understand them in order to determine whether they are useful in industry, or cause carcinogenic mutations in human beings.

Pulsed NMR has been in use for a quarter of a century, but pulsed ESR spectrometers are less than three years old. They represent a major technological advance, since they allow scientists to study the molecular structure in greater detail.

Weizmann Institute researcher Dr. Daniella Goldfarb built the first ESR spectrometer in Israel in 1988. The techniques and technologies resulting from this and similar work attracted scientists to Israel last month for a workshop on the applications of high-power pulsed ESR spectrometers. The subject is of sufficient interest to have attracted scientists from as far away as Japan, Russia, the U.S. and Europe.

FROM THE LABORATORY TO THE MARKET PLACE

Israel's technological edge-taking products.... from research and development to the production stage.

by Joseph Morgenstern

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