

ISRAEL HIGH-TECH REPORT

A MONTHLY REPORT COVERING NEWS AND INVESTMENT OPPORTUNITIES

JOSEPH MORGENSTERN, EDITOR

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From the Editor's Desk

OF ARMS, FARMS AND THE MAN

Until 1979, the whole world was endangered by two military "superpowers," each squandering its resources in the creation of more and more and more nuclear weapons. Then came Star Wars, and the economy of one side, already stretched to the breaking point to "keep up" in this mad race, and founded on a less-resilient, less-productive model than that of its competitor, crumbled. We had a "winner."

So America is today the number one and undisputed military power on the planet. If it chooses to use this power wisely, it can put an end to large-scale armed conflict anywhere in the world. It is conceivable that the United States, under the administration of George Bush, could fulfil prophecy, and bring about a time when nations will no longer need to learn the art of war, and will "beat their swords into plowshares."

But there's money to be made in the manufacturing and exporting of the tools of war. Vast amounts of money. Enough money to addict a nation, its economy and its leaders. Has the United States the willpower to break this addiction, to voluntarily suffer the economic pains of withdrawal? Has it the moral courage to realize that peace brought about through injustice is not peace? Much depends on the priorities of the man in charge.

In the meantime - until this larger Justice can be done, and the fighting can truly stop - the other countries of the world, faced by hostile enemies and all under the sway of the arms "pushers," can do little.

Israel has indicated that it will join the Missile Control Technology Control Regime (MTCR). This agreement deals with the transfer of technology for missiles carrying payloads of 1,000 lbs. or more and a range in excess of 120 miles.

The Israelis, and indeed a growing number of democracies, realize that such arms curbs may in the long term serve the nation's interest. In the short term, however, the country is obliged to maintain its strength, is obliged to keep pouring 25% of every dollar of its annual budget into defence.

The Israeli penchant for self-criticism is seen by others, rightly, as part of the charm of Israeli democracy. But the recent doubts cast upon Israel's economic stability and credit worthiness are less related to economics than they are to politics -- to the imposition of one country's will on another. That the Export-Import Bank has made itself part of this charade is cause for shame.

Is the Israeli economy, then, above reproach? Hardly! Based as it is on a combination of socialism (with its unrealistic ideals and its tendency towards mass mediocrity) and capitalism (with its tendency towards class injustice and mindless self-interest), that it works at all is a testimony to the quality and perseverance of the brains involved. Criticism of the Histadrut's centralized and inefficient control of nearly one quarter of Israel's productive resources is indeed justified. Many ideas held sacred by the Histadrut, Israel's Federation of Labor, are as much a part of today's aggressive, international business community as the dodo.

Fortunately, more than half of the country's growing exports are based on local research and development. And Israeli civilian high-technology exports have been growing rapidly.

Critics of the local economy, in and outside of the country, were surprised after examining one of the most profitable investments in Israel.

In January 1989, Robert Maxwell invested \$38 million in high-tech Scitex Corp., for which he obtained 26% of the equity. On October 9, 1991 Maxwell sold his holding (7 million shares) for \$245 million. In the three-month period before Maxwell's

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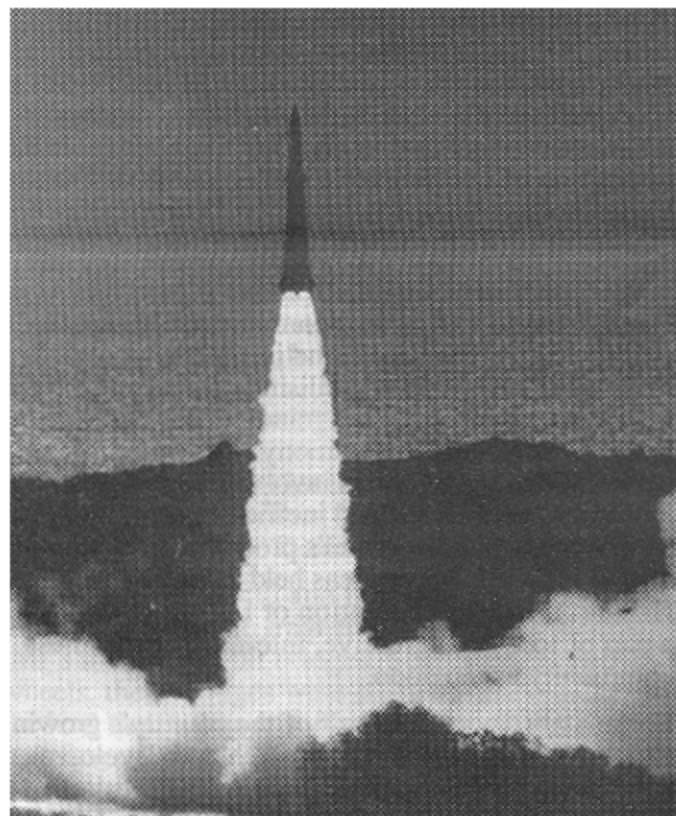
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Attention: Mr. Robert M. Bruckenthal Tel.: 914-723 8321 Fax: 914-723 8340

Editorial Offices: Asia House, 4 Weizmann Street, Tel Aviv 64239, Israel

Tel: 972-3-89798/7 Fax: 972-3-219788

investment, Scitex had profits of \$3.7 million. In the second quarter of 1991, Scitex earned \$103 million. The company works creatively in the same Israel which has found so many detractors - researching, developing and marketing internationally. Maxwell is just one of those who have found Israel a good place to invest.



*ARROW: Anti-Tactical Ballistic Missile
(Israel Aircraft Industries)*

NEW TECHNOLOGY CENTER FOR OCTEL

Octel Communications Corp. is a U.S. company based in Milpitas, Calif. with annual sales of more than \$150m. It is active in the production and marketing of complete lines of voice information processing servers and software. Octel has opened a technology center at a suburban Tel Aviv location. The company's product line allows callers to access multiple information sources - voice, image and data - during a single touch telephone call.

"Building upon our existing technology with the expertise and knowledge of highly trained software engineers, we can leverage the strength of our software development teams in the U.S. We feel that by attracting the best employees in the world, we can assure the timely delivery of quality software to our customers," stated Steve Ciesinski, visiting Octel executive vice president.

Octel Communications (Israel), formerly Allegro, has worked with the American company for more than 18 months in developing components for a novel interactive voice system.

RECENT DEVELOPMENTS

OPTICAL SLIP-RING PERFECTED

With the assistance of a special Jerusalem College of Technology research and development team, the designers of an innovative CT scanner (a computerized tomography apparatus used in diagnostic medicine) deftly solved a challenging problem in improving the instrument's capability. Elscint, a leader in Israeli high-tech, turned to JCT for assistance in creating an optical data link to enhance the transfer of data by the CT scanner. Such a device had eluded engineers throughout the world.

Explains Shmuel Kedmi, coordinator of the JCT research and development team: "Within two and half months of receiving the emergency call in July 1990 from Yoav Kanfi, Elscint's director of electronics R&D, we had completed a feasibility study. By April 1991 we'd created and produced the product."

The solution offered by JCT turned out to be so attractive that it was incorporated by Elscint into its new nuclear magnetic resonance (NMR) scanners as well.

Elscint is now equipping its new CT and NMR scanners with the device, and has given prominent display to the streamlined machinery at one of the most important exhibitions of nuclear medical equipment, the SNM exhibition in Cincinnati.

Elscint has applied for a patent for the new optical data link in the names of the inventors, Joseph Bodenheimer, Shmuel Kedmi and Yoav Kanfi. According to the agreement, JCT has the rights to nonmedical uses of the optical slip-ring.

TELRAD TO POLAND

Koor Industries subsidiary Telra Telecommunications and Electronic Industries is to supply telephone exchanges to Poland during the next five years. The order is valued at about \$10 million, and will include Piccolo exchanges in addition to other medium-sized systems, all to be manufactured by Telrad. At a later stage, Telrad will supply components and the systems will be produced in Poland according to Telrad know-how.

Established in 1951, Telrad is based in Lod; the company employs 1,600 people.

ODYSSEY AT MENNEN MEDICAL

Mennen Medical has been acquired by a group of investors headed by Ehud Geller, a former president of InterPharm and deputy managing director of Teva Pharmaceutical Industries. Investors include the U.S. investment fund Odyssey Partners. Sources say the price was in the area of \$3.5 million.

RECORDING WITHOUT TAPE

National Semiconductor (Israel) will soon introduce a tapeless telephone answering machine, developed at its Migdal Haemek facility. The machines will be assembled by an American electronic firm.

Until now, only two other Israeli companies, one of them DSP, have succeeded in developing components for a similar device. Digital technology allows for direct access to all messages, and incorporates a vocal clock that couples each recording with the time it was received.

National Semiconductor estimates that sales will reach about three million units.

TUTTNAUER INCUBATOR

A new state-of-the-art, water-jacketed, carbon dioxide incubator is now available from Tuttnauer of Jerusalem, a veteran medical equipment firm with many high-quality lab systems to its credit.

This newly developed instrument will meet the needs of most medical laboratories as well as that of biological research. It offers fine, automatic control of the three central operating parameters -- temperature, relative humidity, and carbon dioxide content. Alarms are set off whenever those limits are exceeded by +1 or -0.5 degrees.

The incubator is heated from five walls to assure uniformity and stability; three sensors constantly monitor the temperature. Independent external door heating contributes to the stable maintenance of the chamber temperature and prevents fogging of the inspection window.

The entire system is constructed with polished stainless steel surfaces inside and an outside finish of baked acrylic. The water-jacketed walls are insulated by thick layers of polystyrene foam, and shells are of heavy anodized aluminum. With an internal volume of 154 liters, it can be used with either 110 or 220 volt mains current.

TEL AVIV BUSINESS INCUBATOR

This is a plan for a business incubator to be located in the Atidim Business Park. It will be associated with Tel Aviv University.

The incubator is a group of volunteers, businessmen and educators. They are pragmatic visionaries who believe that in order to promote economic development in Israel, small businesses must be encouraged and nurtured. They believe that the correct approach is to encourage individual initiative. The TAIC has been formed through an organizing committee. Its main efforts are to hire a manager, formulate policy, solicit funds to cover a three-year target budget, acquire space, and identify tenants for the incubator.

What is a Business Incubator?

An incubator is defined as an apparatus for the maintenance of a controlled environment especially for the housing of premature babies. A business incubator provides housing for premature businesses within a controlled environment. It provides economic warmth and motherly support until such time as the fledgling business is strong enough to enter the business world on its own. Business incubators are being developed throughout the United States and elsewhere to stimulate and assist the start up of new, usually high-technology enterprises, through three main elements:

- *Below-market-cost facilities.
- *Provision of services to tenants so that the entrepreneur can concentrate on marketing and product development.
- *Advisory Boards of businessmen who review and assist tenants, providing knowledge and experience that would not otherwise be available.

The location is to be ready by the winter of 1991, with an expectation of initial occupancy by the spring of 1992 and acceptance of three to five enterprises by that time. Increases in occupancy will depend on availability of prospective tenants with viable business plans, space and budget constraints. There will not be more than ten tenants at any given time.

Israel already has the Tefen Park Incubator under the guidance of Stef Wertheimer, an incubator in Haifa at Matam, one near Dimona, one opened recently in Beer Sheva and more either in planning or development. Business incubators have become a well-defined economic development tool when managed by professionals. There are currently over 400 business incubator centers in the U.S. and more opening all the time. It is envisaged that an incubator network will be set up in Israel so that the number of quality Incubators and the number of successful new businesses will grow.

Economic Development Benefits

For years, incubator industry advocates have stressed that incubator success should not be solely

Israeli Companies on Wall Street

Selected income and earnings summaries for the quarters as noted, unless otherwise indicated. Nearly all of these companies are intensively export oriented. Prices are as of October 14, 1991 and the price changes relate to those a month ago.

<u>Company</u>	<u>Revs</u> (in \$ mil.)	<u>Net Income</u> (in \$ thou.)	<u>Price</u> (in \$)	<u>Net</u> <u>Change</u>
ELBIT COMPUTERS Defense electronics ELBTF OTC	196,067 Q1-Q2	10,409	26.750	+1.000
ECI TELECOM Telecommunications ECILF OTC	49,400 Q1-Q2	11,785	43.250	-1.750
ELSCINT Medical imaging ELT NYSE	90,200 Q1-Q2	6,600	5.625	-0.375
FIBRONICS Fiberoptics FBRX OTC	25,712 Q1-Q2	(1,182)	6.250	-1.125
INTERPHARM LAB. Biological products IPLLF OTC	16,000 Q1-Q2	1,800	51.000	-8.000
LASER INDUSTRIES Surgical lasers LAS ASE	8,605 Q1	81	3.750	-0.250
OPTROTECH Electro-optical systems OPTKF OTC	35,900 Q1-Q2	586	17.500	+3.875
SCITEX LTD. Computer graphics SCIXF OTC	173,567 Q1-Q2	47,093	35.500	-0.250
IIS INTELL. Computer peripherals IISLF OTC	20,830 Q1-Q2	2,630	18.000	+0.250
TEVA PHARMACEUT. Pharmaceuticals TEVYF OTC	160,657 Q1-Q2	11,628	17.500	-1.500
ELRON ELECTRON. ELRNF OTC	26,500 Q1-Q2	13,600	16.000	+2.000

measured by the number of jobs created. These advocates speak about a patient development process similar to the long-term positions taken by seed venture capital investors. The industry is still too young to conduct a thorough analysis of job creation results. Using the average of 20 firms and 160 jobs per facility, the average number of jobs per tenant was 8.5. On average, 85 jobs per facility were created after occupancy, or an average of 4.25 jobs per tenant firm. One hundred and seventeen respondents reported an average of seven graduated firms since the incubator opened. However, 50% of the facilities had one or no graduates. To even a greater degree than objective measures, the subjective indicators of performance are long term in nature. Indicators such as creation of positive entrepreneurial climate, new role models for community youth and greater support from local service providers are hard to measure, and may take more than a decade to become noticeable.

Quotations From Respondents

"An incubator is a place where a business prepares for reality and forms the profit habit."

"Flexibility is an important aspect of incubator policy."

Tenants seem to lack the following:

1. A realistic view of the market and their ability to secure a share;
2. Confidence and skills in management ability;
3. Understanding their real costs.

However, they have an overabundance of enthusiasm and energy. The incubator's ability to provide access to a network of community resources is of utmost importance. It is wise not to be too dependent upon governmental agencies. At TAIC, political rather than qualitative considerations prevail.

Submitted by Leonard Bysk

ISRAELI COMPANIES ON WALL STREET

"New Financing" News

Lannet Data Communications Ltd. is offering 2.6 million shares as part of its Initial Public Offering. Underwriters are Lehman Brothers and Oppenheimer & Co.

Initial indications are that the issue will be priced at a maximum of \$12 a share. One million shares are also being offered by a shareholder. At least one bank securities specialist has asked why a manager should

be rushing to sell his shares. However, anticipations are that Israeli investor demand will be strong enough for the issue to be oversubscribed. At the current time, there are expectations of an erosion of the value of the Israeli shekel, and investor are seeking dollar denominated or dollar linked to shekel investments.

Lannet markets its own "intelligent hubs" and other equipment for local area networks, as well as data communications products for IBM mainframe and mid-size computer networks in 39 countries

Elscint to Raise \$35-\$40 million

Elscint Ltd., looking ahead to further developing its business, will seek to raise more than \$35 million on the U.S. markets. Bear Stearns, a major factor in Israeli underwritings in the early 1980s, will be one of the underwriters for the issue, which is expected to reach the market in late October or early November. For Elscint, this will be another step in re-establishing itself as a factor in the international imaging business.

Elscint's main shareholder, Elbit Computers Ltd., which is moving away from being totally committed to defense, will be a major beneficiary of the financing issue.

Pharmos set to Announce Completion of Its Second Round Financing

Israeli and American investors are responding positively to the recent financing offer of not less than \$6 million. Discount Bank Investment Corp., a leader in the financing of Israeli industries and a traditional investor in high-tech and science based industries, is investing \$400,000. Dov Tadmor, DBIC's manager, confirmed this to the *Israel High Tech Report*. Pharmos is expected to announce shortly the completion of its private placement.

This marks the first-time-ever investment for DBIC in the field of pharmaceuticals. David Blech, who has raised \$600 million for biotechnology companies in the U.S., concluded the final negotiations with DBIC' Tadmor.

BioTechnology General Celebrates Tenth Anniversary

David Blech, board member and the company's largest investor, board members and U.S. BTGC president Sim Fass, Prof. Haim Aviv, founder of BTG, scientist and former president of Israel Ephraim Katzir were among those on hand for festivities in Kiryat Weizmann. Blech has injected \$20 million into BTGC, which several years ago was on the verge of collapse. Prospects have improved as

approvals are expected in some key markets for BTG's human growth hormone.

Biotechnology General has attained a wealth of expertise in a number of areas as a result of nearly \$100 million of investments in research and development over the past decade. The company's staff includes more than 125 top-notch local biochemists and other highly skilled scientists and technicians.

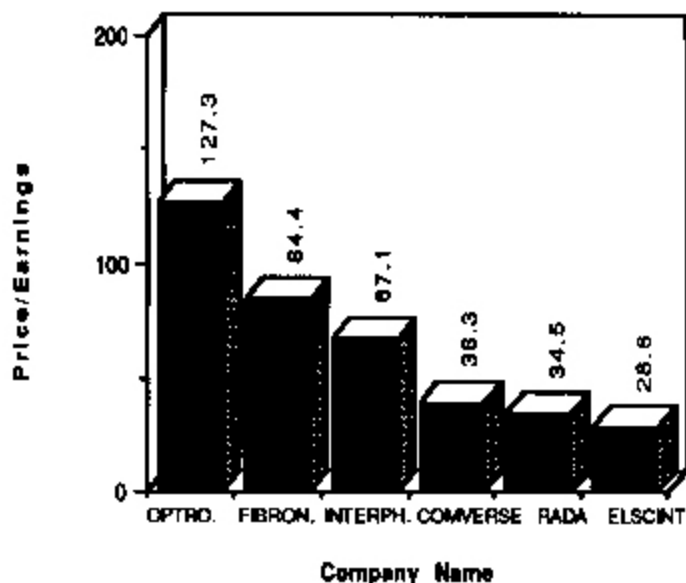
Biotechnology General may seek to tap the Israeli capital market for its next financing offer. Were this the case, it could then join the select group of Israeli companies with the valued rating of "approved Israeli industrial company." BTG from its inception has been an American company.

From local investors' viewpoint, this would allow them to invest in BTG and benefit from tax-free capital gains.

Oshap to Seek Capital on U.S. Market

The company is negotiating what is expected to be a \$13 million financing to be underwritten by U.S. Oppenheimer & Co. Somewhat similar to its IPO offer of several years ago, the offering is being structured to include two types of options along with a convertible security.

WHAT PEOPLE ARE PAYING



The above graph was created in mid-September. It shows a group of shares with price/earnings ratios of over 25. A month later, Optrotech, as a result of a rise in price of its share of nearly \$4, has a p/e ratio of 134. Rada has escalated to a p/e ratio of 42.

This only indicates that p/e ratios have lost their traditional meaning.

ECI Telecom Files Registration Statement

ECI Telecom Ltd. (NASDAQ/NMS Symbol: ECILF) has announced its intention to file a Registration Statement under the U.S. Securities Act of 1933 for a proposed underwritten public offering of up to one million shares, together with an additional one million shares to be offered by certain shareholders.

Fibronics on Hold

Fibronics, designer and manufacturer of sophisticated fiber-optic communications equipment, is concerned at the slow progress of communication networks in adopting its FDDI system, due mainly to delays in approving the applicable standards. In addition, Fibronics is now facing possible competition from a consortium planning an FDDI network with transfer rates of 100 million bps compared to current rates of up to 10 million bps.

The consortium includes Digital Equipment Corp., Motorola, Chipcom, AMD and Synoptics. Computer manufacturers IBM and Digital are deferring announcements of new equipment pending publication of the standards, but Fibronics says the introduction of high-speed networks is inevitable. Fibronics reported a loss of \$1.1 million on income of \$25.7 million for the first half of 1991, as opposed to earnings of \$1.7 million on sales of \$29.4 million for the parallel 1990 period.

IIS Innovation

IIS Intelligent Information Systems recently introduced the IS-372, the latest of its "Display Window" family of workstations. IIS is a well-known developer of peripheral equipment for operation in the environment of IBM and other major mainframes.

BGU Know-How will Help Chinese Deserts Flourish

Two prominent Chinese experts in desert research recently visited Ben-Gurion University's Institute for Applied Research (IAR) in Beer Sheva. Professor Zhu Zhenda, Director of the Institute of Desert Research of the Academia Sinica (IDRAS) in Lanzhou, which has research stations throughout the arid and semi-arid regions of China; and Professor Chen Hesheng, Director of the Shapotu Research Station discussed possible cooperation under the Memorandum of Understanding recently signed between the IAR and IDRAS.

About 16% of China is arid, while the Negev desert, Israel's largest land reserve, covers 60% of the country. The deserts of China and Israel, while

differing in climate, are both characterized by nutrient-poor soil and by an abundance of saline water. The Chinese scientists were particularly interested in learning about saline-water drip irrigation techniques, and methods of using solar energy for greenhouse cultivation, developed over the past few years by BGU researchers.

Their host, Professor Dov Pasternak, Head of the IAR's Institute for Agriculture and Applied Biology - an international expert in saline-water irrigation - heads a team which has achieved outstanding success in growing salt-tolerant melons, tomatoes and other crops. Two young Chinese scientists from IDRAS are scheduled to arrive in Beer Sheva shortly, to spend a year at the institute learning agromanagement techniques applicable to their home country.

Professor Pasternak recently spent a month at the Shandong Cotton Research Center of the Chinese Academy of Agricultural Science in Jinon. He was advising the SCRC as part of a new R&D program aimed at reclaiming 600,000 hectares of highly saline wastelands in the delta of the Yellow River.

Professor Pasternak explains that a vast sea was gradually covered by soil deposits from the Yellow River, creating the wasteland, so that the high water-table in the region consists essentially of concentrated seawater. He proposed that this water be pumped up in order to lower the water-table and allow fresh river water to replace it. The saline water will then be evaporated in small-scale village salt ponds. This solution, he believes, will both reduce the salinity level, enabling crop cultivation, and provide the farmers with an additional source of income - salt production. Professor Pasternak's mission to China was funded by the UN Food and Agriculture Organization.

JAPANESE AND S. KOREAN DEALS FOR NATIONAL SEMICONDUCTOR

National Semiconductor (Israel) recently signed an agreement with the Japanese Fujitso company for facsimile machines containing National Semiconductor components in the U.S. This is the first such venture on this market for National Semiconductor, which employs 500 people, with 1990 exports of \$75 million.

MICROSOFT DEVELOPMENT CENTER

The Seattle-based software giant Microsoft is to set up a program development center here. Microsoft, the world's largest software company, will open its center in the Haifa industrial area, initially to be staffed by a team of 10 local engineers, headed by Yaron Shamir.

Microsoft is the developer of DOS, the most widely used programs in personal computers, and recently enjoyed considerable success with its new "Windows" program. The company's board of directors believes that the professional manpower available in Israel will enhance Microsoft's R&D in the field of computer programming.

ITI MARKETS FIRST PRODUCT

Integrated Technology Incorporated (ITI), a Jerusalem-based high-tech electronics company, has put its first product on the market. CompuPhone, which combines a personal computer keyboard and a telephone, was displayed this past spring at Comdex, a major U.S. computer trade show in Atlanta, and at PC-Expo at the Javits Convention Center in New York.

CompuPhone saves desk space and increases efficiency because the user no longer needs to go back and forth between computer and telephone. ITI founders Alan Haber and Roy Saslow noted that the keyboard received an enthusiastic response from several large computer equipment manufacturers and retailers at both shows. It was featured at the booth of KeyTronics, America's largest keyboard manufacturer.

"KLITEX" PROVIDES A DATABASE OF IMMIGRANT SCIENTISTS

Irina M., a 40-year-old biochemist, held a prestigious position in Leningrad prior to her aliya in 1990. Her integration here was less than encouraging: unable to find suitable employment in her field, Irina eventually took a job cleaning floors.

Today she is once again pursuing a career in chemistry at a plant in the Haifa industrial region, after being "discovered" by her new employers in JCT's KLITEX databank.

KLITEX is a national system listing the professional skills, educational background and work experience of immigrant scientists.

Israel High-Tech Report Index*

377.34 - 1.91 %

*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

Explains Charles Maurice, KLITEX marketing manager: "Israeli companies have been dazzled by the arrival of tens of thousands of university graduates. Many of these had been leaders in their fields, and a number have proposals for commercial applications. KLITEX is the first large-scale computerized effort to match Israeli companies with these potential employees."

The Managing Director of KLITEX is Dr. Moti Reif of JCT's computer department.

The project is supported by the Ministry of Science and Technology and the Absorption Ministry, and works in close cooperation with the Ministry of Communications.

"The KLITEX project is part of the existing KLITEX system at JCT, a computerized communications network used by universities and commercial establishments throughout Israel," says Maurice. "Our work isn't just a matter of inputting statistical information — we provide a conduit for the talents of scientists into the mainstream of Israeli industry."

Maurice emphasizes that the service is complimentary: neither the immigrants nor the employers are charged a fee.

WHAT IS NEW AT INSTITUTES OF HIGHER LEARNING?

H.U. AND KAZAN INSTITUTE TO SHARE PROFITS

In an unusual and possibly unique arrangement, a device invented in the Soviet Union by a scientist now at the Hebrew University of Jerusalem will be marketed world-wide, with profits shared equally by the Kazan Institute of Biology of the Academy of Sciences of the U.S.S.R. and the Hebrew University.

The arrangement specifies that Dr. Yuri Feldman, previously with the Kazan Institute, will continue to develop and adapt his Time Domain Dielectric Spectrometer (TDDS) for practical applications. Once the equipment is ready for sale, Yissum Research Development Company will market it in Western Europe, the U.S., Canada, Japan, South Africa and Australia. The Institute of Biology of Kazan will market it in other countries. Profits from all sales will be divided equally between the institute in Kazan and Yissum.

Dr. Feldman developed the TDDS as a means of examining microemulsions as well as the physical-chemical properties of various substances.

The equipment was left in Kazan when Dr. Feldman immigrated to Israel in January of this year.

The Hebrew University will finance the moving of the equipment from the U.S.S.R. to Israel, and the institute in Kazan will send experts to install it at the Hebrew University.

It is expected that the TDDS will be adapted for additional areas of research and — because of its unique scientific capabilities — will prove to be a marketable product for laboratory applications.

The agreement between Kazan and the Hebrew University provides for cooperation between researchers studying the properties of microemulsion and proteins. An understanding of these properties would have practical application in medicine, the food and chemical industries and other fields.

This commercial arrangement was worked out during a recent visit to the Soviet Union by Prof. Nissim Garti, head of the School for Applied Sciences and Technology at the Hebrew University, and Dr. Feldman.

In recent years, the Hebrew University has signed a number of agreements of scientific cooperation in various fields with research institutes in the Soviet Union. This is the first time, however, that a commercial interchange has been attempted.

ETHIOPIAN STUDENT TO SURVEY HEALTH OF ETHIOPIANS

All immigrants face culture shock, but Ethiopian Jews transplanted to Israel are confronting an additional trauma: the drastic change from a "natural" environment to an industrialized society, with its air pollution, chemically contaminated water and food, and tensions — social, economic, psychological and political.

Ethiopians who have been here for a while are already beginning to develop some of the ills which plague native Israelis — including asthma and psychological ailments, according to a Tel Aviv University doctorate student in preventive medicine.

Seffefe Aycheh, a student in the Sackler Faculty of Medicine who immigrated from Ethiopia five years ago, plans to study disease patterns in the Ethiopian community for his doctoral thesis. He will interview 400 families throughout the country, collect information from medical centers, and analyze the data to determine the health profile of immigrants before and after making aliya.

"Ethiopia is one of the least-developed countries," Seffefe comments. "Despite its great natural resources, there is a lack of bread. The old feudal

regime did not do much to develop the country, and the Communists destroyed what little *had* been accomplished. These man-made problems further slowed technological development, and social development has suffered as a consequence. The environment is not controlled, so there are many diseases such as malaria and yellow fever, which are transmitted by mosquitoes."

Malaria is common in the lowland areas of the Gondar region, where most of the Jews lived, he said. There is typhus, relapsing fever, and tuberculosis. Poor hygiene and contaminated drinking water cause a variety of ailments, ranging from abdominal parasites to bacterial skin diseases, says Seffefe.

The Ethiopian environment is a natural one. Here in Israel it is totally different, and all this – the change of diet, the air pollution, exposure to chemicals – we expect will lead to the development of the common health problems. I am trying to study to what extent this shift is taking place."

Although even the most veteran Ethiopian immigrants have only been in Israel for seven or eight years, "westernization" of their health is already beginning, he observes.

"Asthma – which was not common in Ethiopia – is showing up frequently, as are skin problems of fungal origin. Then there is the psychological aspect. The process of adaptation is not easy, and the language barrier prevents people from communicating. This research will show what health problems they brought with them, and what the newly developing problems are. I hope we'll be able to see some patterns."

Seffefe came to Israel with a wealth of public health experience in Ethiopia, including four years as administrator of district health centers. Each center, with a team consisting of seven nurses, 12 assistant nurses and a few health inspectors and laboratory technicians, was responsible for a population of about 200,000 people.

After that, he was selected to take advanced management courses at the World Health Organization's Health Personnel Training School in Lagos, Nigeria. "When I came back, I was promoted to regional health service manager, and worked at this for six years." Then Seffefe went to Belgium to do his Master's Degree in Management and International Health Services Development, with a view to making aliya afterwards. He sent his wife Leah and four children on to Israel, and joined them when he finished his studies at the Tropical Medical Institute of Antwerp.

TURKISH RESEARCH AT WEIZMANN INSTITUTE

A first step has been taken towards improving scientific ties between Israel and Turkey. Turkish scientist Prof. Hasan Bagci is studying the latest techniques in gene cloning and sequencing at the Weizmann Institute. But in addition to finding a scientific niche in Rehovot, Bagci found a cultural one: three colleagues in the department where he works speak Turkish.

EARLY DIAGNOSIS OF HIGH-RISK FETUSES

Identification of fetuses likely to suffer from future neurodevelopmental problems due to placental malfunction may become possible as early as 4 to 6 weeks after conception, thanks to a technique developed in a joint study by the Weizmann Institute and the Tel Aviv Sourasky Medical Center. Based on a simple urine analysis, the new method should facilitate the prevention or mitigation of such postnatal problems as morbidity and mental retardation.

Prof. Ephraim Yavin of the Weizmann Institute and Prof. Shaul Harel of the Tel Aviv Medical Center and Tel Aviv University have studied the link between "ischemic," or blood-deprived, fetuses and intrauterine growth retardation (IUGR), a condition which occurs in 3% to 10% of all pregnancies and is responsible for 33% of all low birth-weight infants. IUGR – often recognized at birth by large head circumference relative to body weight – is common among low socioeconomic populations, certain ethnic groups and smokers, and as a family trait. Although up to 30% of IUGR infants "catch up" to normal children within a few years, the disorder is strongly linked to infant and early childhood mortality, cerebral palsy, assorted speech and learning disabilities, and small body size.

IUGR may arise from diverse causes, the most prominent being circulatory problems in the expectant mother, which produce a temporary disturbance in the flow of oxygen and glucose to the fetal brain. However, if oxygen supply returns quickly enough, damage can be kept within a recoverable range.

Yavin and Harel found that the oxygen-resupply stage is not all that simple, as partial restoration of oxygen-rich blood causes the fetal brain tissue, its cerebral blood elements, and the placenta to produce lipid-derived hormones called prostaglandins. One of them, thromboxane, acts to constrict the blood vessels, thus exacerbating the ischemic damage. The other, prostacyclin, serves to dilate the vessels, leading to a reduction of damage. Thus by measuring

the ratio of these two metabolites in mothers' blood and urine samples, it should be possible to determine the danger of developmental retardation for their unborn babies.

Current diagnostic procedures rely on Doppler ultrasound testing, and become reliable only after 18-20 weeks of pregnancy. The new early-warning procedure could greatly facilitate preventive or therapeutic drug treatments *in utero*, once such approaches become available.

A clinical program is already underway at the Child Development Assessment Center and the Pediatric Neurology Unit of the Tel Aviv Medical Center and Tel Aviv University, where a team of obstetricians, neonatologists, pediatric neurologists, psychologists and statisticians are using developmental assessment techniques to study and follow up high-risk IUGR fetuses from the prenatal period to the time they enter school. Yavin's biochemical approach is expected to be included in this program.

In a related study, Yavin attempts to pinpoint the causes of brain damage resulting from placental malfunction. Here he has developed an experimental animal model to investigate acute and chronic effects of reduced oxygen supply on the developing fetal brain. As recently published in the *Journal of Biological Chemistry*, he showed that protein kinase C, a key regulatory enzyme in the brain and a possible component in memory processing, is lost after repeated episodes of oxygen deprivation. This research is supported by the Gulston Foundation NY, Fidia s.p.a., Italy, and the Revson Foundation of the Israel Academy of Sciences and Humanities.

BRAIN ENZYME MAY AID DESIGN OF DRUGS FOR ALZHEIMER'S

The detailed spatial configuration of a key enzyme involved in nervous system communication has been determined by researchers at the Weizmann Institute. The enzyme, acetylcholinesterase, breaks down the signal chemical acetylcholine, believed to be deficient in the brains of Alzheimer's disease victims.

Taking advantage of this new structural information, it may be possible to custom-design drugs capable of controlled inhibition of this enzyme, leading to an enhancement of acetylcholine levels in the brain and perhaps to the relief of some of the more severe symptoms of Alzheimer's, a widespread debilitating neurological disorder of old age. This achievement was reported in the latest edition of *Science*.

This new structural work has been carried out by Prof. Joel Sussman, Dr. Michal Harel and Dr. Felix Frolov of the Weizmann Institute's Department of Structural Chemistry, and Prof. Israel Silman of the

Institute's Department of Neurobiology. The researchers chose the electric organ tissue of the electric ray, Torpedo, as their source of acetylcholinesterase (AChE). Torpedo is the world's most active producer of this enzyme. A novel procedure to purify AChE was developed in collaboration with Lilly Toker.

In the high-quality crystals grown at the institute, millions of AChE molecules line themselves up in a precise three-dimensional formation. When exposed to a narrow X-ray beam, the crystal reflects the radiation in a characteristic pattern, from which a three-dimensional computer reconstruction of the precise location of the roughly 4,000 atoms in AChE can be obtained. Elucidation of this structure - which cannot be seen with even the best electron microscopes - may permit the development of new drugs capable of targeting and binding to the enzyme.

AChE terminates message impulses traveling between nerve cells in the brain by breaking apart and thereby neutralizing the action of the neurotransmitter acetylcholine, a process occurring at the astonishing rate of 10,000 molecules per second. Inhibition of AChE may therefore alleviate the acetylcholine deficiency characteristic of Alzheimer's disease. For this reason, pharmaceutical companies are designing and testing new anticholinesterase agents as possible drugs for Alzheimer's sufferers. Detailed information on molecular structures is an important tool for carrying out rational drug design; the structure of acetylcholinesterase now available puts this too into the hands of researchers seeking to control the ravages of Alzheimer's. Interestingly, many insecticides are also anticholinesterase agents, so the Weizmann scientists' advance may also be important to the design of better insecticides, as well as antidotes to insecticide poisoning.

A surprising discovery made by Profs. Sussman and Silman may facilitate the development of anticholinesterase drugs that are both mild and reversible. They found that the AChE molecule has a very deep chasm, in whose depths acetylcholine is broken down. This structure, referred to as the "aromatic gorge," has walls lined with numerous aromatic groups jutting out from the amino acids phenylalanine, tyrosine and tryptophan. These walls provide numerous sites to which potential drugs could bind. One might thus imagine families of mildly acting drugs that would penetrate partway into the gorge, modifying enzymic activity without blocking it completely, thereby maintaining the inhibitory effect within manageable limits.

The state-of-the-art laboratory in which the crystal structure was solved uses a novel technique

implemented by Prof. Sussman, Dr. Felix Frolow and Prof. Hakon Hope, a visiting scientist from the University of California, Davis. It allows protein crystals to be frozen at temperatures approaching that of liquid nitrogen. This enables them to survive almost indefinitely, despite repeated exposure to X-rays.

This research was made possible by grants from the Institute's Kimmelman Center for Biomolecular Structure and Assembly, the U.S. Army Medical Research and Development Command, the Association Franco-Israelienne pour la Recherche Scientifique et Technologique, the Minerva Foundation, The Charles H. Revson Foundation of the Israel Academy of Sciences and Humanities, and the U.S.-Israel Binational Science Foundation. professor Silman is the incumbent of the Bernstein-Mason Chair of Neurochemistry.

WEIZMANN LAB DATES MASADA FINDS TO SECOND TEMPLE

Radiocarbon dating at the Weizmann Institute provides strong evidence that 25 skeletons found at Masada belonged to the Jewish defenders of the stronghold, which was conquered by the Romans in 73 C.E.

The test established that remnants of fabric, found with the skeletons, dated to 77 C.E., with a margin of error of plus or minus 37 years, according to Israel Carmi, who heads the radiocarbon dating lab of the institute's Department of Environmental Sciences and Energy Research.

Although the skeletons were discovered over 25 years ago, during excavations led by the late Prof. Yigal Yadin, it is only now that an effort has been made to date them.

"At first everyone assumed that the skeletons belonged to Jews, but recently some scholars have questioned that assumption. Academics in certain circles have suggested that the skeletons may have belonged to Byzantine monks who inhabited the site during the seventh century," says Joe Zias, an anthropologist with the Israel Antiquities Authority, who brought the finds to the Weizmann lab for dating. "The result of this test clearly disproves that claim," says Zias. "At the same time, it lends more credence to the story of Masada as recorded by Josephus," he adds.

Josephus Flavius, who lived during the Second Temple period, described how 960 men, women and children under siege at Masada committed suicide rather than be taken captive by the Romans. Their stronghold near the Dead Sea was the last pocket of

Jewish resistance against the Romans in the aftermath of the destruction of the Second Temple in 70 C.E.

"Until now, Josephus' account constituted the only record of the mass suicide," notes Zias. "This additional evidence, suggesting that the skeletons belonged to Jews of that period, tends to strengthen Josephus' version of events," he says.

COFFINS DATE TO 1st and 2nd CENTURIES B.C.E

The institute's radioactive carbon lab -- the only one in Israel -- analyzes over 100 archaeological artifacts a year. Most recently, the lab established that six wooden Jewish coffins found in Judean Desert burial caves date to the first and second centuries BCE, and a seventh one, to the first century CE. The coffins were discovered near Kibbutz Ein Gedi by Gideon Hadas, a member of the kibbutz and an archaeologist with the Antiquities Authority. "There were almost no other finds in the caves that could have established the date of the site," says Hadas. "Knowing when these coffins were made should teach us a great deal about Jewish burial customs during that period," he added.

ISRAEL'S ROLE IN DESERT 'STORM

Before the Gulf War, IMI was a regular supplier of hardware to the U.S. Armed Forces, providing them with specially designed bridges and mine-clearing devices. IMI was also responsible for building the Vertical Launch System (VLS) that fires the U.S. Navy Tomahawk cruise missile.

The Tomahawk was first fired on January 17, 1991, a night that also saw the IMI's Tactical Air Launched Decoy used for the first time in combat. The unmanned, unpowered gliding decoys were released from U.S. Navy attack aircraft. Carrying electronic devices, their mission was to thwart Iraqi radar, something they did most successfully, confusing enemy radar while airstrikes were pressed home against a range of targets. The new decoy worked much the same way as the Samson decoys used against Syrian radar during the 1982 Peace for Galilee campaign.

Another major contributor of combat systems was, of course, IAI, Israel's largest, most diversified arms manufacturer and the most successful Israeli company in the Desert Storm campaign. IAI's Pioneer, a small, unmanned air drone, was flown over enemy positions to provide reconnaissance, target and bomb damage assessment. Some 40 Pioneers were operational in Saudi Arabia, as well as on U.S. Navy warships in the Gulf.

The Pioneers were operational around the clock. This was due to the special equipment installed, including an optical module developed and produced by Tadiran, Israel's largest electronics manufacturer, and El-Op, an electro-optics systems firm. The optical module gave Pioneer operators the opportunity to identify targets at night, through fog, dust or the dense smoke of an oil fire. The intelligence passed back during helped increase the coalition's combat effectiveness. They spotted difficult targets such as Scud carriers and launchers, artillery units or command and control bunkers. Able to loiter over targets, they were sometimes used in suicide missions.

Clearing the Minefields

The U.S. Army and Marine Corps relied heavily on IAI for part of their difficult minefield-clearing operations. They ordered hundreds of mine ploughs from Ramta, an IAI subsidiary. The mine-clearing devices, mounted on the leading tanks, helped penetrate minefields and pave a mine-free lane. During Operation Desert Shield, Ramta stepped up the supply of ploughs for the M1 and A1 tanks then stationed in Saudi Arabia. Nearly all the ploughs were supplied before Desert Storm was launched.

Among the successful and innovative systems used to rapidly bridge the Iraqi anti-tank ditches were IMI's mobile assault bridges. Supported by two wheels, these bridges were pushed across ditches by the lead tanks, thus ensuring quick and easy crossing.

Apache: The Israel Connection

Several highly successful subsystems have been incorporated into the McDonnell Douglas Apache attack helicopter. Included are the IMI missile launch systems and the integrated mechanical and electronic devices that support the Hellfire weapons system. The Head Out and Head Down displays were supplied and installed in Apache cockpits by the El-Op company. El-Op also supplied a laser tracker system installed in the Apache's pilot vision and weapons control system.

BARAK ANTI-MISSILE MISSILE DOES WELL IN 'REAL TEST'

The Barak naval anti-missile missile, tested for the first time in real sea conditions last month, performed satisfactorily, according to its developers.

Israel Aircraft Industries, the main contractor, and Rafael, the Arms Development Authority, said results indicate that all systems tested functioned properly.

The Barak is designed to intercept and destroy

incoming missiles, regardless of their size or trajectory. It can provide Navy ships with a defensive capability traditionally reserved for escorting vessels, and has a sophisticated computer system allowing it to be operated automatically and instantaneously. It would be used on the Navy's new Saar 5 missile boat.

The Barak is a relatively small missile, weighing 98 kg and measuring 2.175 meters. But it carries a disproportionately large, 22-kg warhead. Its velocity is Mach 2 -- a peak velocity of 700 meters per second -- and its effective range is 500 meters to 12 km.

A ranking Navy source said the system will give the Navy an added defensive dimension. The source also estimated that the Barak has good prospects for export.

The Navy is expected to be supplied with the missile once tests are concluded and production is commercial.

Barak 1 - ship point defense missile system

A joint development by Israel Aircraft Industries Ltd. and Rafael Armament Development Authority for the Israel Defense Forces (IDF) -- to counter aircraft, helicopter and missile attacks, including sea skimmers.

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