

# ISRAEL HIGH-TECH REPORT

A MONTHLY REPORT COVERING NEWS AND INVESTMENT OPPORTUNITIES

JOSEPH MORGENSTERN, EDITOR

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## From the Editor's Desk

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### **National Competitiveness and Absorbing Immigrants**

A high level of competitiveness on the part of Israel's export-oriented industries is considered critical to the country's economic future and national security. The competitiveness of Israeli high-tech industries depends on many factors: the amount of applied research and development, the availability and quality of scientists and technologists, and the financial support of pure and applied research on the academic level and in industry.

The Israeli government involves itself in educational and industrial research funding. How the government recognizes and responds to the needs of academia and industry is an important factor.

For years, Israel has had to contend with a brain drain. In spite of this, there are gifted individuals working in optics, biotechnology, applied mathematics and lasers. Yet there would be many more if not for the lack of investment capital for major R&D projects.

In a recent editorial, *The Jerusalem Post*, Israel's English-language daily, addressed the subject of absorbing scientists. Noting that two percent of all immigrants from Russia are scientists and engineers of the first rank, it correctly suggested that these individuals are hardly likely to stay if they can find no work in their field, and if facilities for growth and development are unavailable. The Ministry of Science and Technology has a program which offers backing for R&D programs involving ideas brought by Russian scientists, or being jointly researched by Israelis and new immigrants. Three hundred such project requests have been submitted, but the Ministry can afford to finance fewer than 150.

Ministry personnel have been seeking cooperation with local industry, individuals and foundations in Israel and overseas to expand the program. *The Israel High Tech Report*, in support of the Ministry of Science and Technology and OMER, welcomes inquiries as to how our readers may participate.

A group of leading individuals have formed the OMER Foundation as part of their commitment to expand and strengthen Israel's economy by applying the talents of Russian immigrants to existing industries and new enterprises for the benefit of the immigrants as well as their new country. OMER has been offered some excellent ideas for joint development.

Two brilliant Hebrew University scientists have already been highlighted. One is Prof. Aharon Lewis, whose work in near-field microscopy could lead to a light microscope that rivals the electron microscope. The other is Prof. Sorin Solomon, whose experience in supercomputers is helping to speed up computers in industry.

Both of these scientists are employing new immigrants in R&D projects. Both fields can be rapidly expanded with additional funding, and would immediately absorb immigrant scientists with the prerequisite skills.

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**Israel High-Tech Index Sharply Higher**  
**The best of applied research from Institutes of Higher Learning including eggs and sperms**

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## SPERM HOMING SIGNAL LINKED TO FERTILITY OF INTERNATIONAL INTEREST

How does a sperm cell find its way to the egg? A possible answer has been provided by a Weizmann Institute study indicating that chemical signals released by mammalian ova attract spermatozoa, and that such chemical communication might be essential for human fertility. This finding, published in the latest issue of the prestigious *Proceedings of the National Academy of Sciences, U.S.A.*, may facilitate the development of new approaches for dealing with human infertility, particularly in situations where the ovum-sperm signaling mechanism is faulty.

It is now recognized that a large fraction of sperm cells entering the female reproductive tract remain in storage sites until ovulation occurs, at which time sperm movement resumes, enabling the male gamete to reach the fertilization site in the Fallopian tube within minutes. While the nature of the signal triggering this movement is unknown, Prof. Michael Eisenbach, head of the Weizmann Institute's Department of Membrane Research and Biophysics, in collaboration with Prof. David Garbers of the Howard Hughes Medical Institute, Nashville, Tennessee, initiated studies which indicate that chemical factors released by the egg attract sperm cells. This finding has been substantiated in follow-up research by Prof. Eisenbach and Dr. Dina Ralt of the Weizmann Institute, in cooperation with Drs. Mordechai Goldenberg, Jehoshua Dor and Shlomo Mashiach of the Department of Obstetrics and Gynecology of the Sheba Medical Center, Tel Hashomer.

Thanks to the availability of follicular fluids extracted from women undergoing *in vitro* fertilization, it was possible to study – in test-tube experiments – the effects of the fluids on sperm cells, and to determine the correlation between these effects and fertility.

Prof. Eisenbach and his team found that human sperm cells are attracted by fluids from follicles – small organelles that nurture the ovum prior to its release from the ovary. It is likely that the same factors that exist in follicular fluid are released by the egg (or its surrounding cells) once it reaches the Fallopian tube, alerting sperm cells to its presence. Prof. Eisenbach and his team also found a remarkably strong correlation between the ability of fluid from a particular follicle to attract sperm cells and the ability of the egg nurtured by that follicle to be fertilized *in vitro*.

Only about 200 human spermatozoa reach the fertilization site in the Fallopian tube, out of about 300 million that enter the reproductive tract. Thus it is possible that the attractant factors are a means for selecting the spermatozoa most competent for fertilization, or for coordinating optimum sperm behavior following ovulation. Whatever the physiological significance of these findings, the data clearly suggest that egg-sperm communication may be important for successful conception. Work is underway to identify these signaling factors.

This research was supported in part by grants from the Andrew W. Mellon Foundation, the U.S. National Institutes of Health, the Israeli Ministry of Health and the Yeda Fund.

## RECENT DEVELOPMENTS

### Electronic Output Increase

A survey of the electronic industry conducted by the Manufacturers Association shows that in the past five years, output per worker increased by 81% – from \$52,000 in 1985 to \$93,000 in 1989. According to the survey, 66% of output is for export. The added value per employee grew by 77% in five years, reaching \$42,000 in 1989.

Akiva Meir, chairman of the economic committee of the electronics division, said the U.S. is still the dominant market for electronic products, with 53% of exports shipped there. The survey also indicated the industry's emphasis on R&D investment – 15% of sales compared to an average of 2% for all industrial enterprises.

### New Laser Printer

IIS Intelligent Information Systems of Haifa has announced a new laser printer, model IS-482, designed for use in the IBM 3270 environment. The printer is based on Canon technology, with a rated output of eight pages per minute. The IS-482 has all the features of IBM Host printers, including selective type fonts. The company is now focussing on supplying advanced-technology solutions for IBM central processing units.

### New OCR Reader

At the recent CEBIT exhibition in Hanover, the Jerusalem firm Ligature announced a new optical character recognition reader, LIOCR, designed as an on-line input to an IBM PS2 or Macintosh word processor. In Israel the LIOCR is marketed by Getter Office Automation, while in Europe the reader is available at a new Ligature office in Holland.

### **IAI tows many industries along**

Israel Aircraft Industries provides \$400 million in business to Israeli industries each year, according to the company's Managing Director Moshe Keret. Keret noted that the more IAI's sales turnover increases, the more the amount of subcontracting to Israeli industry will grow. IAI's sales turnover totaled \$1.6 billion, including \$1.3 billion in exports. Military products make up 80% of the company's sales.

### **Rafael armament**

The missile division of the government-owned Rafael Armament Development Authority registered exports of \$200 million last year.

### **Offshore turbines**

Ornat Turbines is to supply power generating turbines to ELF Gabon (a subsidiary of ELF Aquitaine) for installation on offshore platforms.

### **Robomatix Clinches Japanese Order**

Robomatix has received a \$2.5 million order from a Japanese car manufacturer - the first with the company since Iraq seized Kuwait in August. The order was negotiated by the representative of Clal Electronics in Japan.

Robomatix manufactures robotic laser cutting systems for the automobile industry. During the war, the company installed two laser cutting systems in U.S. plants of General Motors, filling an order placed last year.

### **Elor Loss in 1990**

Despite a 145% growth in sales, Elor Optronics ended 1990 with a loss. Sales for the year totaled \$3 million, and the company finished the year with a backlog of \$2 million. Elor specializes in the development and manufacture of non-contact gauging and image processing inspection systems. Elor has developed an optical system to detect flaws on the casings of light ammunition.

The company, established in 1986, is owned jointly by Clal Electronics, Elron Electronic Industries and a company in Western Europe. To date the owners have invested \$7 million.

### **Computerized Translation Helps Immigrants**

Top Technologic, an Israeli company specializing in translation programs, has developed a computer for Russian-Hebrew/Hebrew-Russian translation. The device provides immediate translation of 15,000 words in each language, and corrects spelling mistakes for more than 80,000 words in English.

### **Mashov Profits Up**

Mashov Computers reported 1990 sales of NIS 15.2 million. Exports totaled NIS 5.4 million. President David Assia attributed the increase in sales and exports to the success of the applications generator Magic, and the agreement to set up a subsidiary in the Soviet Union.

### **IAI \$15 Million Retrofit**

Israel Aircraft Industries has been awarded a \$15 million contract by Electra Aviation U.K. The contract calls for conversion of 10 Boeing 747s from passenger to cargo layout. The first aircraft for conversion will be delivered in October 1991.

### **Galtronics in Scotland**

Galtronics of Tiberias, a manufacturer of antennas for communications equipment including cellular telephones, will invest \$5 million over the next five years in setting up a plant in Livingstone, Scotland.

The project will be in partnership with a Scottish communications company, and will form a base for penetration of the unified European market.

Galtronics reported 1990 sales of \$6.2 million; 98% of production is exported, primarily to Motorola U.S. and companies in Japan, Finland and Great Britain.

### **EIOp goes civilian**

EIOp Electro Optics Industries, specialists in the development and manufacture of optical systems for military use, is entering the civilian field with the development of a telescope for space research. The telescope is light and small, and will be mounted in the Israeli-produced Ofek test satellite. EIOp reported pre-tax earnings of \$3 million in 1990 on sales of \$122 million; 1991 sales are forecast at \$140 million.

### **Arrow Completes Second Test Flight**

The Israeli Arrow anti-tactical ballistic missile program successfully completed an interceptor flight at an Israeli test range. The launch was from east to west in the Mediterranean Sea. This was the Arrow's second fly-out to verify the design and integration of components.

The Arrow project, initiated in July 1989, is funded by Israel and the U.S.; the U.S. is paying 80% of the \$158 million cost, under a three-year fixed-price contract awarded by the Strategic Defense Initiative Organization to Israel Aircraft Industries. The U.S. Army Strategic Defense Command executes and manages the program.

The two test flights scheduled for later this year are

## 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 April 16, 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	363,211 Q1-Q4	22,071	18.750	+2.250
ECI TELECOM Telecommunications ECILF OTC	74,500 Q1-Q4	15,500	62.500	+9.000
ELSCINT Medical imaging ELT NYSE	161,909 Q1-Q4	13,474	4.125	+1.250
FIBRONICS Fiberoptics FBRX OTC	62,500 Q1-Q4	3,800	8.875	-0.250
INTERPHARM LAB. Biological products IPLLF OTC	25,200 Q1-Q4	3,500	29.500	+12.000
LASER INDUSTRIES Surgical lasers LAS ASE	32,943 Q1-Q4	(4,052)	4.750	-0.375
OPTROTECH Electro-optical systems OPTKF OTC	79,100 Q1-Q4	1,100	7.750	+0.250
SCITEX LTD. Computer graphics SCIXF OTC	351,500 Q1-Q4	76,800	28.750	+1.000
IIS INTELL. Computer peripherals IISLF OTC	36,192 Q1-Q4	5,031	15.625	-1.000
TEVA PHARMACEUT. Pharmaceuticals TEVYF OTC	295,169 Q1-Q4	18,650	13.250	+0.375
ELRON ELECTRON. ELRNF OTC	364,300 Q1-Q4	7,017	10.000	+1.250

planned to demonstrate the Arrow's ability to intercept a surrogate tactical ballistic missile. A follow-on program, called the Arrow Continuation Experiment, is now being negotiated.

#### HIGH-TECH SEMINAR

Herzliya Pituach is an excellent location for a high-tech seminar. Twenty minutes outside Tel Aviv, the seaside suburb/resort includes some of Israel's major companies, including Digital Equipment, Scitex and a host of lesser names.

BIRD's executive director and coworkers, numbering eight, put on their annual high-tech baby circus. Ed Mlavsky was in fine form. Those in the audience who heard him for the first time fell under the sway of his colloquial and modest manner. Behind the folksy presentation there is a finely oiled machine which not only channels funds for bi-national industrial, non-defense research.

In presenting BIRD's achievements and introducing satisfied customers such as Shmuel HaCohen- Relational Technology Systems Ltd., Zvi Marom of BATM Technologies, Erez Meltzer of Persys Technology Ltd. and Dov Peer of Com Software Industries, it has become clearer than ever that BIRD- Israel-U.S. Binational Industrial Research and Development Foundation is a unique institution in structure, performance and achievements.

One hundred and twenty seven of 270 projects backed have resulted in products and plenty of sales. The sales are difficult to track, as \$250 million is the figure based on royalties but royalty payments are set at a limit, and many times the sales continue. Ed says funding is on a 50/50 basis, with funds turned over directly to the U.S. and Israeli partner. "BIRD does not involve itself in the "deal" cut by the partner companies, assures Mlavsky.

The ideal marriage for the Israeli high-tech group is an American company which has a market presence. "When seeking a partner, speak to the CEO openly. The U.S. company should ideally have sales in excess of \$10 million annually, and be a public company, as they are easier to understand.

So what do satisfied customers say?

Shmuel HaCohen loves BIRD, and the feeling is mutual. The young executive trumpets BIRD's skill in finding and checking out potential U.S. partners.

The key is for an Israeli company to present a technology beneficial to the American partner. The head of the software company finds Israeli software developers less expensive than Indian programmers

#### New Route for Drug Administration

The Yissum Research Development Company of Hebrew University has developed a novel way of administering drugs to humans and animals. Various routes of drug administration have been introduced into therapy for a number of reasons, including poor absorption, drug stability, lower cost and great convenience.

Other newly developed technologies, such as intranasal, transdermal and implantable systems, are limited in applicability and very expensive.

The Yissum invention is particularly useful for high molecular weight drugs such as hormones and peptides for chronic drug therapy.

These drugs could be administered in a controlled-release fashion for long-term treatment of chronic diseases, with the additional advantages of non-invasiveness and cessation of treatment on demand.

#### ISRAELI COMPANIES ON WALL STREET: FINANCIAL RESULTS

Elron's net income in 1990 reached \$7 million, or \$0.46 per share. The company's net income in 1989, before extraordinary gain, was \$10.72 million, or \$0.87 per share.

Elbit's 1990 revenues, after consolidation with Elscint, reached \$363.2 million, compared with \$180.1 million in 1989. Elscint's revenues in 1990 were \$161.9 million, compared with \$147.5 million, and its net income reached \$13.5 million, up from \$3.1 million in 1989, before extraordinary gain. Consequently, Elbit's net income in 1990 reached \$22.07 million, in contrast to the \$13.3 million recorded in the prior year.

Elbit declared quarterly dividends that totalled 26 cents per share for the year ended December 31, 1990, up from 23 cents per share in 1989.

Upon completion of the transaction whereby Elbit bought Elron shares in Elscint, Elron received \$4.8 million in cash and 517,193 additional ordinary shares of Elbit, thereby increasing Elron's holdings in Elbit to 8.5 million ordinary shares, or 55.4% of Elbit's outstanding share capital.

Optrotech Ltd., a 38% affiliate, achieved revenues of \$79.1 million in 1990, versus \$73.0 million in 1989. Optrotech's net income for the year under review was \$1.1 million, compared with \$4.5 million in 1989. The decrease despite the increase in revenues was mainly due to the softness of the electronic components and printed circuit board

market, primarily in the U.S.

Fibronics International Inc., a 30% affiliate, recorded revenues of \$62.5 million in 1990, compared with \$48.9 million in 1989. Fibronics' net income reached \$3.8 million in 1990, an increase of 36% compared with 1989.

#### ELBIT'S NEW ORDINARY SHARE OFFERING

Elbit has filed with the SEC a proposed offering of up to two million ordinary shares. Half will be sold by Elron. As a result of the sale, Elron's holdings in Elbit will be reduced to 45.1% from 54.5%. The American part of the offering will be managed by Lehman Brothers and Oppenheimer and Co.

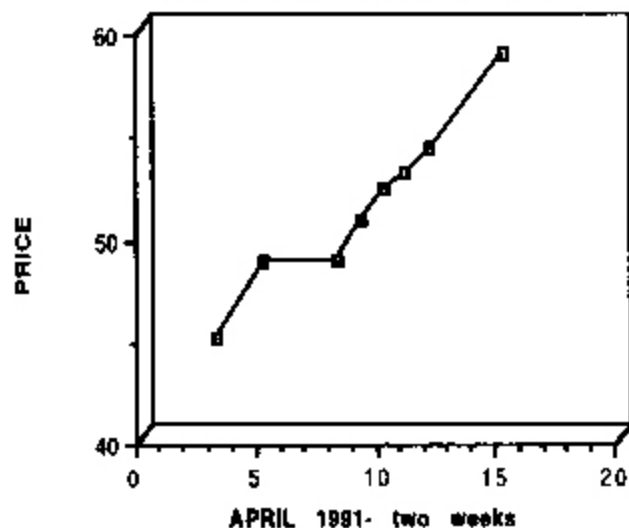
#### ECI TELECOM GETS CLOSER TO MAJOR PENETRATION OF U.S. MARKET

The share price of ECI Telecom has been in a sharply rising trend. The first two weeks of April, as seen on the graph, have been accompanied by steady demand for these shares. It now appears likely that their price will surpass \$60.

Is there justification for the meteoric rise? There are those who anticipate that the company will be awarded a major contract from one of the American telecommunications giants. Undoubtedly they are involved in the rush to invest in ECI's shares.

Investors and speculators alike are probably correct in their assumptions. *IHTR* has confirmed that ECI is through the American field trials. If contracts follow, then the company's engineers will have to strain in expanding the company's production capacity.

ECI TELECOM: investors rush in



#### INTERFERON MARKETS LOOK PROMISING

Prospects for the commercial success of the antiviral, antitumor agent interferon are finally turning rosy. Among the pharmaceutical manufacturers likely to benefit is InterPharm Laboratories, an Israeli company that produces and markets several varieties of interferon, in particular human beta-interferon, all based on biotechnology know-how developed by Prof. Michel Revel's group at the Weizmann Institute's Department of Molecular Genetics and Virology. Some portions of this development were carried out with the collaboration of his colleague, Prof. Menachem Rubinstein.

Prof. Revel, who divides his time between the Institute and InterPharm, is clearly pleased at this turn of events.

"When interferon and its activities in the body were first discovered," he recalls, "the protein was hailed as a wonder drug that would cure cancer, the common cold, and scores of other diseases. Today, while realistic estimates point to more restricted applications, interferon has already been approved for use in various herpes and papillomavirus infections, particularly of the genital region, as well as in therapy for AIDS-related Kaposi's sarcoma and in a rare form of leukemia. Many other applications are being tested, and markets for the drug are expected to reach the \$1 billion level."

In 1983, Revel's group – including Dr. Yves Mory, today with InterPharm – developed a genetically engineered cell line derived from Chinese hamster ovary tissue, which produces massive amounts of beta-interferon identical to that manufactured in the human body. Following extensive development during the past three years by InterPharm and Weizmann Institute scientists headed by Prof. Rubinstein and his colleague Prof. Orgad Laub, an FDA permit has been issued in the U.S. for clinical testing of this beta-interferon. This technology provides the company with a front-running product in an expanding interferon market.

The Weizmann Institute and InterPharm are also collaborating in the development of engineered hamster ovary cells producing the natural biological modifying agent interleukin-6 – discovered and cloned 11 years ago in the Institute labs. This protein has shown promise for treating cancer and facilitating bone marrow transplants. But clinical trials are still about a year off. Commercial development of interferon and interleukin-6 was negotiated by Yeda Research and Development Company, responsible for assigning technology developed at the Weizmann Institute.

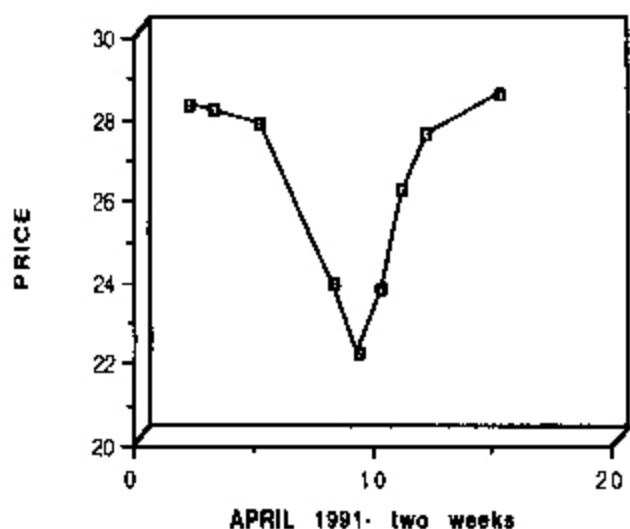
### InterPharm Shares Jump

Following the news that commercial sales in the U.S. of Interferon – an anti-virus, anti-cancer drug developed by InterPharm Laboratories – are in the offing, the company's OTC stock rose by 52% in one week, closing at a record level. Ares-Serono of Switzerland, which holds 76% of InterPharm shares, recently tried to buy up the remaining shares and withdraw them from Wall Street. Share prices fell precipitously on news of a contamination-related production stoppage.

Management confirmed this had occurred, but stressed that the problem had been corrected. The shares responded by advancing to a near-all-time high. (See graph)

InterPharm Laboratories reported a 1990 profit of \$3.5 million on sales of \$25.2 million, which includes \$19.2 million in exports of Interferon to Italy; the company lost \$600,000 on sales of \$13.8 million in 1989. Profit per share in 1990 was 55 cents, compared to a loss of 10 cents in 1989.

INTERPHARM-dives and recovers



### Grace Seeks Buyer for Teva Shares

W.R. Grace & Co., the U.S. pharmaceutical firm, is looking to dispose of its 13.5% ADR share holding in Teva Pharmaceutical Industries. The asking price is \$40 million. Teva recently completed its acquisition of Grace's 50% holding in TAG Pharmaceuticals - their U.S.-based joint venture - for \$20 million.

Dan Suesskind, chief financial officer of Teva, says controlling interests have the right of first

refusal: 22% of Teva shares are held by its founders; 18% are owned by Bishopgate Investment Management – a Robert Maxwell company; 8% are controlled by the Bronfman group of Canada; and 4% are held by Sami Shamoon of London. Some 22% of the shares are traded on the Tel Aviv Stock Exchange, and the remaining 12.5% on NASDAQ in New York.

### AN INTERVIEW WITH PROF. MORDEHAI HEIBLOM

The head of a new Institute research center tells *Interface* how Israel's brain drain might be reversed.

*What brought you back to Israel after 17 years in the United States?*

I came back because I have a skill I thought was important to Israel. The Weizmann Institute agreed, so it established the Joseph H. and Belle R. Braun Center for Submicron Research, soon to begin operation in the Hermann and Dan Mayer Building for Semiconductor Research.

*Isn't that a comedown after holding a senior post at a giant corporation like IBM, with all its resources and opportunities?*

There is something in what you say. I had a group working under me in the U.S., and as much money as I wanted to finance my research. But I didn't feel there were big enough challenges in the States. Here I feel there are such challenges, and trying to meet them is important to me. What my colleagues and I will be doing in the new facility should be of significance not only to the Weizmann Institute, but to Israel as a whole. It will permit Israel to enter a field which might be very important ten years from now, but by then it would be too late to begin.

*Why is submicron research likely to be so important?*

There is reason to believe that research will lead to

Israel High-Tech Report Index\*

**251.38 + 14.95 %**

\*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

semiconductor chips more compact than today's silicon chips, thus enabling electronic instruments to operate at much greater speeds. This may give us improved transistors, lasers, and electro-optic and microwave devices. Our entry into this field will help ensure that Israel keeps abreast of these developments, and will give us an opportunity to make our own contributions.

*Have you found as much interest in this undertaking as you expected when you arrived in August?*

Absolutely. Quite a few people in industry and at universities wish to explore our future capabilities. I hope this interest will lead to collaboration with many institutions.

*In a field like submicron physics, can a small institution, or even a small country, afford to compete with giant firms in wealthy countries?*

The \$15 million raised for the new center – a great deal of money for the Weizmann Institute – will keep us in competition for a few years. If we are successful, I'm sure we'll get additional support.

*Do you believe your findings will help Israeli industry?*

I didn't come here to develop new technology or to save Israel; I came to do good science. I expect to go on doing basic research in quantum and device physics. Yet our particular field has the advantage of having potential industrial applications. In five to ten years, new technologies may begin to emerge. During the intervening period, I hope to learn about the needs and potential of local industry, and possibly engage in some collaborative efforts that could lead to new products.

*Aren't local companies too far from their potential customers to compete in overseas markets?*

Japan is also very far from its major markets, yet it does pretty well. I'm sure that if we are among the first with new products, and if we have sophisticated production facilities, distance won't prove a problem.

*Are local students interested in studying submicron physics?*

Physics seems to be rather popular these days. Moreover, the foundation of the new center seems to attract students. About 10 have approached me in the few months I've been here.

*Do you have Russian immigrants on your team?*  
So far, two. One is an absolutely first-rate scientist from Leningrad who will be supervising the operation of a \$2 million instrument for electron beam "writing." The other is a student who just arrived in this country.

*Do you think your new center might set a precedent for Israel?*

I hope so. I think we must create a few centers of excellence in various fields across the country, most of them at institutions of higher learning or in their vicinity. In microelectronics and electro-optics, such centers are already emerging at the Haifa Technion (where electro-optics is stressed) and here (where the emphasis is more on electronics). Centers of excellence should also have a positive influence on the morale at academic institutions and in industry.

*Will they be staffed primarily by Israelis who, like yourself, have spent many years in the States?*

To some extent, certainly. There are plenty of talented Israelis over there who would be willing to come back if they were assured of the funds and equipment they require to do serious work. Salaries are much less important to them. They'll be bringing back with them – aside from their specific expertise and a wealth of important contacts – an understanding of efficient operational methods, some of which can be adopted here.

## TWO NEW DRUGS DEVELOPED IN ISRAEL

Alpha D3, a drug developed by Teva Pharmaceutical Co. on the basis of research conducted at the Weizmann Institute, can increase the bone density of patients suffering from osteoporosis at a rate of 2% a year, according to recent studies performed in Israel. Osteoporosis leaves victims highly vulnerable to fractures, and affects one in three women over the age of 50, as well as men to a lesser degree.

Victims of osteoporosis lose bone mass at an average rate of 2 to 4% a year, sometimes resulting in a bone loss of 30 to 50% over a decade.

The drug was developed several years ago by Teva Pharmaceutical Co. on the basis of research carried out by Weizmann Institute Profs. Samuel Edelstein and Yehuda Mazur. Alpha D3 is widely used to treat osteoporosis in Israel, as well as in Italy and Japan.

Experiments conducted on women suffering from osteoporosis show that Alpha D3 is almost as effective at restoring bone density as is estrogen therapy. When administered at recommended dosages, Alpha D3 has no side effects or long-term risks.

Osteo D, another drug developed by Teva based on the research of Edelstein and Mazur, is currently undergoing clinical tests at several medical centers in Israel in the hope that it will prove even more effective than Alpha D3 in treating osteoporosis.

Osteo D is already widely used in Israel, in



combination with Alpha D3, for restoring bone loss associated with kidney disease. Now Osteo D is undergoing clinical tests in the U.S. and is being registered with the European Economic Community for clinical use there.

Each of the two drugs is a synthetic form of a vitamin D derivative normally produced by the kidneys. Alpha D3 helps increase absorption of calcium from the digestive tract, while Osteo D permits the formation of normal bone. They are the first two totally Israeli-developed drugs on the market.

#### Expertise may facilitate better drug-delivery systems

Following a successful 10-year stint at the Exxon Corporation, Prof. Shmuel Safran – known for his theoretical studies of structured fluids – has been appointed Acting Head of the Weizmann Institute's Polymer Research Department. Although recent events in the Middle East have deterred many people from visiting Israel, Prof. Safran, accompanied by his wife and three children, experienced what he calls a "smooth landing" in the country: "We feel right at home here; it's new, but not strange."

Prof. Safran's expertise is complex or 'structured' fluids – liquids containing structures many times larger than the molecules of the liquids themselves. For example, relatively small oil and water molecules, ordinarily immiscible, can be emulsified in the presence of a soap or surfactant. Safran has a theory that explains why a mixture of two surfactants rather than a single variety produces emulsions with superior stability. This improved "encapsulation" of one liquid within another can be exploited to create more effective drug-delivery systems.

#### WHEAT YIELDS INCREASED BY CHROMOSOMAL ENGINEERING

Chromosomal engineering techniques developed or refined by Prof. Moshe Feldman and Dr. Eitan Millet of the Weizmann Institute's Department of Plant Genetics have produced an unprecedented increase of up to 40% in the yields of Israeli durum wheat, used for making pastas, and an increase of up to 15% in the yield of Israeli bread wheat. These results were first obtained in harvests on experimental plots near Rehovot in the spring of 1989, and were confirmed in the harvests of 1990.

Prof. Feldman and Dr. Millet identified the genes in wild wheat that are responsible for its relatively high grain protein percentage (GPP), found the chromosomes in which they reside, and successfully transferred the genes to cultivated wheat.

The results were unexpected: while a few of the resultant lines did indeed exhibit increased protein percentage, most gained in yield instead. For example, yields rose from around 4,450 lb. per acre to 6,250 lb. per acre with Inbar, a variety of durum wheat, and from 4,100 lb. per acre to 5,600 lb. per acre with Deganit, a bread wheat cultivar. Also of interest is the fact that these lines have more efficient nitrogen uptake than existing varieties. The few breeding lines that *did* gain in protein percentage decreased in yield. However, their protein enrichment was so great – some reaching 18% GPP, a 30% increase over cultivated wheat – that they might prove beneficial in the manufacture of high-protein foods such as cereals, granola and vegetarian meat substitutes.

Prof. Feldman and Dr. Millet are investigating the physiological bases of these phenomena. The new high-yielding lines are to be tested by the Israel Ministry of Agriculture in a further two-year trial. Although the two types of wheat are particularly suited to the Levant and North Africa, the possibility of applying the same technology to wheat lines grown elsewhere is being examined by a major company.

#### KOREAN STUDENT AT FEINBERG GRADUATE SCHOOL WINS PRIZE

Byung-Sun Suh, one of seven Korean students enrolled at the Weizmann Institute's Feinberg Graduate School, has been awarded the prestigious Polyshuk Prize by the Israel Society for Fertility Research.

Scientists have long been searching for an efficient way of studying the ovarian granulosa cells that surround and nurse the egg prior to fertilization, and that produce steroid hormones such as progesterone and estrogen, necessary for pregnancy and for regulation of the menstrual cycle. The problem is that under laboratory conditions these cells reproduce for only a brief time. As part of a team headed by Prof. Abraham Amsterdam of the Weizmann Institute's Department of Hormone Research, Suh introduced into the granulosa cells of rats a particular oncogene-virus combination that enables it to reproduce indefinitely.

This provides an important tool for studying the formation and regulation of steroid hormones and other substances that influence fertility. Moreover, since the genetically engineered cell-lines are highly malignant in certain laboratory animals, the system may also contribute to the understanding of ovarian cancer.

### BOTANISTS DISCOVER TREASURES IN AMAZON RAIN FOREST

A large number of indigenous societies in Ecuador still rely on wild plants for medical and nutritional needs. Living in the rain forests of the Amazon, these peoples are food gatherers who forage rather than cultivate crops.

Tel Aviv University botanists are working with the University of Ecuador and the Institute of Economic Botany - The New York Botanic Gardens, to identify indigenous plants, collect germ-plasm and establish nurseries for *in situ* cultivation. They hope to encourage the indigenous societies of the region to cultivate plants that grow wild in the jungle, thus providing a plentiful supply of food and medicine - and saving the plants from extinction.

Prof. Ya'acov Friedman of the Department of Botany and his doctoral student, Ms. Ziva Shapira, are involved in this three-year project. "Slowly but surely," said Prof. Friedman, "the inhabitants' foraging grounds are being encroached upon as forests are cleared and modern agriculture expands. These developments place valuable plants - many still unknown to science - at risk of extinction. Some have been over-exploited, while information on important medicinal species has been disappearing as the older generation passes away."

The scientists must first identify the plants deemed best for nourishment and medicinal use. Prof. Friedman, who initiated the project and heads the Israeli research party, uses a quantitative method developed in Israel during an ethnopharmacological survey among the Bedouin. "This method allows the consumers of indigenous plants to rate them in an objective manner. In this way, we hope that the most important plants will be discovered, propagated and adapted for cultivation by traditional societies. Likewise, some of the edible plants might be adopted for cultivation by Western societies," he explained. Over the past six months the group has established four nurseries containing more than 1,000 plants representing 60 species. Approximately half of these species have medicinal value, while the others are food plants.

Principal funding for the project - the first of its kind - is being provided by U.S. AID (U.S. State Department Agency for International Development).

### CHEMICALS THAT CLEAN OIL SPILLS COMPOUND THE DAMAGE

The chemical dispersants used to attack an oil spill often do more harm than the oil itself, according to Prof. Yosef Loya, Dean of the George S. Wise Faculty of Life Sciences at Tel Aviv University.

Commenting on the recent spill in the Persian Gulf, Prof. Loya said allowing the oil to disperse naturally would do less harm to the ecosystem.

Prof. Loya, an expert on marine pollution, explained that the spill's impact on the ecosystem would be immense, with a number of varieties of flora and fauna inhabiting the Persian Gulf facing extinction.

Asked what could be done to reverse or lessen the damage already caused, Prof. Loya cited a conflict between the kind of action taken by oil companies to "clean up" the spill and what ecologists would recommend. "Unfortunately," he said, "the bottom line is that there is virtually nothing we can do to reverse damage caused by an oil spill."

### DPA JOINT VENTURE WITH JAPANESE FIRM

Precision Measurement System Co. from Phoenix, Arizona, a subsidiary of the Tel Aviv-based DPA Group, announced a joint venture to be formed with SpeedFam, a Japanese company with subsidiaries in Taiwan, India and Singapore. SpeedFam's annual sales reached \$120 million in 1990.

The new company will develop a generation of precision measurement equipment for the computer and semiconductors industries, based on the DPA Group experience in this area and SpeedFam's advantageous position in the Japanese and southeast Asian market.

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