ISRAEL HIGH-TECH REPORT

A MONTHLY REPORT COVERING NEWS AND INVESTMENT OPPORTUNITIES

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HUNDREDS OF MILLIONS OF DOLLARS OF NEGLECTED TECHNOLOGICAL BUSINESS OPPORTUNITIES AVAILABLE FOR TAPPING

Time and again we point to the exceedingly high rate of exports accounted for by science based industries. Nearly seventy per cent of the output of Israel's leading high-technology companies end up being exported to various foreign markets.

Industrial exports, especially those accounted for by technologically oriented industries, when measured in terms of the content of industrial research and development, without any shadow of doubt reveal a highly leveraged relationship. A cinder sized amount of research and development activity is visibly responsible for an explosion of export shipments. The ratio is as high as eleven dollars of exports to one dollar of research and development.

The Government of Israel mainly through the office of the chief scientist of the Ministry of Trade and Industry directed this year $100 million for industrial research and development. Israel's Gross National Product for 1988 is about $35 billion The Governemnt's outlay for r&d comes to about 3% of the GNP. On a percent basis it is acknowled as a very high figure when compared with those of leading western nations. Yet,on an absolute basis the r&d outlay is not all that high. It could be increased sharply and in a direct proportion to the level of exports which industry and agriculture appear to be capable of sustaining.

Is there room for improvement? Yes. There are re sources available which represent hudreds of millions of dollars of neglected technological business oppportunities. They are ready and available for tapping And all to be found within the confines of this small country. Perhaps just because these opportunties are so easily accessible they are mostly overlooked. They are to be found among the thousands of scientific and technological research projects. These projects have been and are being carried out on an ongoing basis in laboratories throughout Israel. Some of Israel's brightest, most committed and dedicated individuals include professional research chemists, biochemists, physicists, engineers, agro-chemists and agro-biologists. With very little public notice they are working in the laboratories of the country's institutes of higher learning. R&d has captured and maintains a high standing among the country's youth when it comes to deciding on the choice of a profession. Professors at the Weizmann Institute or at the Technion do not get the renumeration received by their American and British counterparts. Nevertheless, they rate highly on Israel's social scale.

Typically Israeli researchers are a reserved lot and due this personality trait are not ideal choices for promoting the movement of their own

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To All of Our Readers, in Various Parts of the World, we Extend our Best Wishes for a Happy, Prosperous and Peaceful 1989

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research from the laboratories to local and international users.
Yet there is a pressing need for the transfer and application of laboratory research to the world of industry. From a national view it is exactly what is needed.
Israel's heavy dependence on foreign aid and American grants and its need to service a massive foreign debt are reasons enough for an increased effort. Israeli industry over the past two decades knows that it can look towards the institutes of higher learning for solving some of its research problems...This is particularly so in the area of biotechnology but also holds true in many other areas. There exists a belief that academic researchers possess more creativity than their industrial; counterparts.
Local industrialists have learned to feel comfortable when working with universities They can and do effectively tap a variety of disciplines without the need to build up an in-the-house research team. Yet the sum total of the transfer of research from universities to local industry is disappointingly small. A reasonably accurate estimate of the value of research and development sold to industry annually places it at less than $20 million.
Ministrs in the new Government, industrialists, and taxpayers alike should exercise their inherent right and insist on a greater effort by the universities in makiing available the research findings.
Industry, for its part,can be counted upon to adopt and absorb more research for its needs..
The research used by industry as we have happily noted ,accelerates exports. The Government remains the largest source of financing of industrial research in Israel. It should not be expected to do the job alone. The Government, industry and the public should join and insist on a greater inter-reaction between institutes of higher learning and Israel's industries.
Everyone will benefit including the institutes of higher learning.In time they will benefit as industry will become an ever greater source of capital for financing basic research programs which are now under pressure due to lack of funds. ****

IHTR FOCUSES ON RECENT DEVELOPMENTS

Offek-1 Israel's satellite which was put into orbit September 19 (IHTR-4/10) continues to orbit well in excess of its original expectation of a a 30 day sojourn in space. Offek-1's performance also continues to raise eyebrows in international political and scientific circles as in their judgment it clearly provides Israel with a tactical advantage and reflects a technological achievement in excess of original evaluations as to the level of technology ++++ Discount Investments, one of the original founding backers of Elron Electronics Industries , in the late 1960s, together with PEC is about to increase its equity stake by $6.0 million.. By way of this investment DIC stands to benefit from a participation in Elbit Computers Ltd.,the premier manufacturer of advanced military electronic systems for military and civilian markets. By the end of May 1989 Elron should have completed its planned merger with Elbit, its 57.1% owned subsidiary. DIC will also be accessing Elron's proven ability to develop state-of-the art technologies.++++ Elbit Computers for its part. is seeking additional joint ventures in the US or even a buy in. Its four year old investment in the US Informatics has led to a bonanza in American sales of over $40 million a year. Elbit's reputation in its field continues to attract interest from US companies. The US Defense News recently pointed to an interest on the part of Rosspatch, a Michigan based manufacturer of anti-submarine systems.++++ Plant Biotechnology Industries, has completed a $10.5 million development including laboratory tissue culture and field trials. The resulting plant propogation process when integrated into a production process utilizing locally developed equipment offers an ability to produce 100,000 disease and virus free plant a day per each worker. The company will be put to test by the major international companies who are undertaking to adopt the local process. PBI's sales forecast is to reach $100 millions annually. The advantages

include a major savings in propogation costs and a reduction in new species nurturing time. In extreme cases it may reduce the nurturing period from ten to two years. PBI is owned by Miluot of Israel and and the American Primerica corporation++++Electronics production in Israel for 1988 is expected to reached peak levels. The latest available statistics indicate that after nine months Israel's electronics industries output was $1.05 billion. Exports accounted $570 millon, a major improvement over the $413 million recorded in 1987. Civilian electronics production at 55% of the total was ahead of defense output. The latter has been hard hit by Ministry of Defense cutbacks++++ Finance Minister Shimon Peres, in the newly established broad based coalition Government will be taking a close look at implementing some of the suggestions from the economists of the Bank of Israel, the country's central bank. These include a continued implementation of the reform of the country's capital market and its tax structure, and a delinking of wage agreements between the various economic sectors. It would appear that Mr. Peres will have little choice but to cut the Government budget drastically and reduce food subsidies++++Cable TV tender winners, manufacturers of electronics and telecommunications equipment systems are gearing up for what is expected to be a a rapid investment in cable TV, of $500 million over the next few years. Israeli companies will be hard pressed by foreign competitors, who are establishing a strong local presence++++In a bid to expand its field of activity Jerusalem based Eldan Electronic Instruments has acquired IDL International Diagnostic Laboratories, for approximately $3.0 million. Eldan is in the health care field and develops systems and kits for early diagnosis of cancer, heart disease and nervous disorders++++ Teva Pharmaceutical's, awash with cash is about to implement a $10 million investment program in Migada, its disposable product company and in its recently acquired ABIC Pharmaceuticals subsidiary. Teva is also embarking on a new product development program ++++ The sharp rise in the level of electricity usage in November, a jump of 17%, has been explained as related to electrical appliances purchases ahead of the expected devaluation of the local currency. The anticipated devaluation of 10-15% will have a marked effect on the rise of the cost of imported products.++++ TAT Aero-Equipment, listed on the TASE, has received a commendation from the American General Dynamics for its development work on parts of the F16. TAT sells to GD about $5 million of its various engineered products.. TAT became an approved GD supplier at the start of the 1980s GD is an important supplier to the Israeli air force, initially had a shaky start in doing business with Israeli companies According to GD Tel Aviv based management the level of satisfaction with local suppliers has increased in the past two years. ++++ Israel Aircraft Industries is seeking international cooperative assistance in developing and producing a fifty seat passenger plane. IAI is seeking outside the company financing as well as cooperative aasembling. ++++ Rafael Armaments Research and Development Authority, leader in devlopment of weapons and sophisticated electronics systems including infra-red imaging, is having dificulties in filling its export order book. As a result, layoffs are in the offing. Rafael's difficulties partially stem from the drop in the spending by Israel's Ministry of Defense as well as due to the limitations imposed on the marketing of its products to a limited group of overseas customers ++++ Amcor Electronics has come to the market with a novel product trade named Bio-Beam. Extensive tests at Beilinson and Rothschild Hospitals have confirmed Bio-Beam's usefulness in healing surface ulcers and bedsores as well as providing relief from arithritic damage. Narrow band red and infra-red light rays are key to the treatment.Bio-Beam comes to compete in a market which is using electronics systems based on laser beam treatment. The treatment is simple and calls for ten minute daily exposures in a darkened room for a period of fourteen days ++++ Diagnostic kits, prepress electronic

ISRAEL HIGH-TECH SHARES TRADED IN THE USA

	P-E Ratio	Price as of 12/14/88	Change since 11/14/88		Earnings per share 1986/7	1987/8
BBIO OTC						
BIO-TECH GENERAL Biological products for health care	d	3 1/4	+ 1	9 Mo Sep	d 0.80	d 1.08
ELBTF OTC						
ELBIT COMPUTERS Defense electronics	6	5 1/2	- 3/4	9 Mo Sep	0.78	0.58
ECILF OTC						
ECI TELECOM LTD. Telecommunication Systems	9	4 3/4	+ 1/2	9 Mo Sep	0.10	0.32
ELRNF OTC						
ELRON ELECTRONICS Company investing in high technology	11	3 1/2	- 3/8	9 Mo Sep	d 1.41	d 0.41
ELT NYSE						
ELSCINT Full range medical imaging	d	1	- 1/4	9 Mo Sep	1.23	d 0.14
FBRX OTC						
FIBRONICS INT'L Fiberoptic communications	d	3 7/8	+ 3/8	9 Mo Sep	d 0.14	0.03
IFLLF OTC						
INTERPHARM LAB. Biological products for health care	30	3	n.c.	9 Mo Sep	d 0.34	0.05
LAS ASE						
LASER INDUSTRIES Surgical laser systems	d	3 1/8	- 7/8	6 Mo Jun	0.32	d 0.47
OPTKF OTC						
OPTROTECH Electro-optical systems for PCB	11	5	+ 3/8	9 Mo Sep	0.39	0.39
SCIXF OTC						
SCITEX Computer graphics	5	7 3/4	+ 1 7/8	9 Mo Sep	d 1.63	0.86
IISLF OTC						
I.I.S. Computer peripheral equipment	5	4 5/8	- 1/8	6 Mo Jun	0.37	0.46
SPIXF OTC						
S.P.I SUSPENSION - PARTS INDUSTRIES Military components	d	1/2	- 1/2	6 Mo Jun	0.08	d 0.08

d = deficit

systems are among the $352 million worth of exports to Japan in the first half of 1988. Japanese also include on their Israeli shopping list.... potash, diamonds and salt Since imports totalled only $235 ithe figures point to Israel as being of the few nations in the world to have a positive balance of trade with Japan.. In Tel Aviv's motor supply and spare parts district signs in Japanese indicate the Israeli buyers' prefference. The Subaru and the Mitsubushi lines of cars are big sellers in Israel ++++ Masof MG is attempting to push into the printer market for IBM mainframes. Its product entry for this end use includes the IBM Proprinter and PR/4224 card developed by Adacom Technologies. The printer is priced at a fraction of the widely used System printer. ++++

Israeli Companies on Wall Street

Scitex Shares Soar in Response to New Investment

Scitex Corporation continues to dominate the ICOW news.We hardly had time to assimilate the impact of the above analysts' expectations third quarter profit of $3.87 million when the Robert Maxwell negotiations for not less than 26% of Scitex equity became public. Our calculations indicated that if consummated the English media baron will buy in at $8.43 a share. Barring unexpected developments when you read this the deal will be history after the planned signing in Israel, the first week of January.For Scitex, the $38 million investment is of major corporate importance. It strengthens the company's capital basis at a time when Wall Street can not be turned to for new financing Scitex's future development is related to the amount of resources it can allocate to researching and developing new products.
The Robert Maxwell infusion of capital will allow the speeding up of the development of a number of new products.
We expect that Scitex will now accelerate shipments of its VISIONARY system, a full color pc design layout for direct accessing the Scitex electronic prepress systems from remote areas. This system allowed a Japanese daily to run pictures from the recently held Seoul Olymics and to do so in record time.
Robert Maxwell has proved to the business world that he is a power to be reckoned with. His recent takeover of the American MacMillan publishing company was carried out with consumate ease and several months later the debt accumulated is being paid off with the funds realized from the sale of profitable subsidiaries.
Scitex's Chairman Effie Arazi and CEO Arie Rosenfeld will undoubtedly seek to use the good offices of their new partner within his worldwide communications group. The connections in due course will translate themselves into sales opportunties. The Scitex shares responding to the plethora of good news advanced from $6 to $8. At this level the shares still continue to be reasonably priced in view of expectations of a strong fourth quarter and a good start in 1989.

KOOR'S RESTRUCTURING AND $160 MILLION SPINOFFS CREATE INVESTMENT OPPORTUNITIES

Koor, Israel's labor controlled conglomerate so as to satisfy the American Bankers Trust as well as its Israeli bank creditors has come up with a major restructuring plan. Among other points is a decision to selloff $130- $160 million of its holdings from its many subsidiaries. Potential foreign investors due to the complexity involved in

	12/14/88	11/14/88
DJIA	2134.25	2065.08
S&P 500	275.29	267.74
NYSE INDUSTRIALS	186.76	181.25
ASE MARKET VALUE	294.87	289.39
NASDAQ INDUSTR'LS	367.23	365.69
ISRAEL HIGH-TECH REPORT INDEX*	43.39	43.23

*ISRAEL HIGH-TECH REPORT INDEX is a weighted index made up of the shares of 10 leading high-tech companies. Base=100 as of 9/30/84

understanding balance sheets of privately held Israeli companies will have a difficult time in evaluating their investment merit However among Koor's holdings are several companies whose shares are publicly traded and which are profitable. Investors are likely to be offered a 25.1% holding in Teva Pharmaceuticals or a 19.1% holding in Aryt Optronics. Teva's future appears to be bright and an investment in the company is an excellent way to enter the local pharmaceutical industry.
Aryt Optronics is small but a growing company involved in the field of optics.
Teva's shares are traded on the local TASE and in America. Aryt's shares are traded on the American over-the-counter market and on the TASE.
Koor's holdings in Teva recently were market valued $$40.2 million while those in Aryt were valued at $1.6 million.

BIO-TECHNOLOGY GENERAL TAKES AIM AT $500 MILLION HEPATATITIS-B VACCINE MARKET

Scitech Medical Products Ltd of Singapore and Bio-Technology General have entered into a a development and distribution agreement for BTG's recombinnant hepatitis-B vaccine for all the Pacific Rim countries, with the exception of Japan and China Dr.Sim Fass BTG's CEO points at " enhanced immunogenicity and low production costs" as key advantages as his compaany moves ahead towards implementation of clinical testing in the Far East.
Bio-technology companies require large sums to support r&d. Fass is seeking fresh investment capital. At current levels of corporate spending BTG has one and a half years of financial reserves.but Fass is looking to accelerate current programs. For those interested in a discussion of the ethical quandary related to human growth hormone,its Orphan Drug Status and its high cost they can reffer to his provocative article appearing in the Fall 1988 Leaders Magazine.

Israel's Finance Ministry and the US investment Banking Industry

It used to be that individual Israeli companies were the only major seekers of financing assistance in New York's Wall Street. More than two dozen Israeli concerns, over the years, have raised capital there and as a result their shares have been traded on the American securities markets. When the Bank of Israel began to seek ways to reduce the cost of the country's outstanding American debt the Finance Ministry obtained the assistance of such major houses as Solomon Bros., Shearson Lehman and others who put together a novel financial package which recently resulted in a $2.5 billion refinancing. which lowered Israel's debt servicing costs by several hundreds of millions of dollars. Another $ 2.5 billion package is currently in the pipeline.
Recently in New York we spoke to to one of the people with First Boston who opened the eyes to his colleagues to the potential of financing possibilities in Israel. The Israeli privatization program which has been moving slowly, may now move ahead at a faster pace as a result of the Israeli Ministry of Finance and the Ministry of Trade and Industry appointing First Boston to sell the Government's share in Israel Chemicals, a major industrial concern.. When the sale materializes it should start the move towards several billions of dollars of privatization activity. and lead to a major improvement in Israel's budget. It will also serve to reduce the Government's overinvolvement in the country's economy.

New US Science Attache

Dr. Charles Lawson will be assuming this month the post of Science Attache at the American Embassy, Tel Aviv.He replaces Bud Rock, with whom we had close contact over the past three years. Bud,a marine biologist, established close working ties with members of Israeli scientific community both in academia and industry. His next assignment is with the Department of State in Washington.

HIGHLIGHTS OF RESEARCH & DEVELOPMENT FROM: ISRAEL'S INSTITUTES OF HIGHER LEARNING

Worldwide research efforts aimed at solving the technical difficulties related to the development of a miniaturized optic fiber capable of transmitting a carbon dioxide laser beam in non-invasive heart surgery are still to be rewarded with workable solutions. But as a result of experiments towards this end researcher Professor Nathan Croitoru of Tel Aviv University has invented a method whereby numerous non-cardiac surgical laser procedures can now be carried out by means of endoscopes, or non-invasive "keyhole" surgery, as it is popularly called. A major problem overcome by the researcher was the difficulty of making the existing optic fiber burn resistant. The solution to the problem was mechanical . The solution was to coat inner wall of the optic fiber with insulating metal layers. Patents have been applied for in Israel and the know-how is being marketed internationally. The procedure has been used with satisfactory results on dogs. Experimentally induced bleeding ulcers were destroyed by a laser beam transmitted by menas of the optic fiber and with the use of an endoscopic device. The procedure resulted in the eradication of the ulcer with lesions healing six weeks after the operation. The next resarch challenge is to develop a fiber with an inner diameter considerably smaller than one milimeter thus making it possible to introduce it through veins and to reach the heart area. Surgeon will then have new life saving options in carrying out heart surgery noninvasively.

BIRD-1989 SEMINAR FEATURES PRACTICAL EXAMPLES OF ENTERING US MARKET

A number of leading high-technology personalities, from companies who are recipients of BIRD-Foundation R&D funding will lead discussion in this year's BIRD SEMINAR. Scheduled for Tues. Jan. 17 at the Sharon Hotel, Herzliya Pituch, the program promises to serve as a useful guide on how to convert a good idea in Israel to a useful product for the US market.

Wolf Prize Winners Receive 1988 Nobel Prize

American Professor Leon Lederman and British Sir James W. Black have just been awarded in Stockholm the prestigious Nobel Prize for physics and medicine, respectively. Both of the men are Wolf Prize recipients. The Israel based Wolf Foundation presents annual awards of $100,000 each for achievement in the sciences and arts. We are told that within a month the Wolf Prize winners for 1989 will be announced.

INTERDISCIPLINARY RESEARCH PRODUCES NEW CHEMICAL COMPOUNDS

Two Tel Aviv University scientists, chemistry Prof.Edward Kosower and his wife and colleague, Prof.Nehama Kosower, a medical doctor and hematologist who is Chairperson of the Sackler School of Medicine's

Department of Human Genetics, and their research team, have developed a number of new chemical compounds used in research laboratories around the world. Their teamwork has led to the development of a new area of chemistry, biophysical organic chemistry, whose applications range from the molecular basis of learning and memory to the fluorescent labeling of biologically important molecules and the fusion of cell membranes.

One of the compounds is bromobimane, a new molecule derived from the bimane system, and discovered by Edward Kosower and one of his students. It is marketed as one of several Thiolyte Fluorescent Labeling Reagents by the U.S. biochemical firm, Calbiochem. Thioloyte has been used in labeling cell membranes, brain slices, sperm, chloroplasts, muscle proteins and other biological materials. With a colleague in the U.S., the Kosowers have begun to test a new bimane labeling agent in research on cystic fibrosis.

In addition to a number of significant discoveries in basic science, the Kosowers' research has led to the development of important practical applications. They say that working together also enables them to make the most of limited funding, at a time when Israel's institutions of higher learning are struggling to conduct scientific research on an increasingly short shoestring.

Another creation of the Kosower team is the membrane mobility agent, created to promote the motion of proteins in cell membranes. They have been found to be useful in cell-cell fusion, a process now of extremely great technological importance for the introduciton of new genetic material into cells. (Cell fusion is one step in the production of monoclonal antibodies, which are used extensively in genetic engineering and medical diagnosis and research). The membrane mobility agent, known as A2 C, is sold commercially and used in many types of research, including the mechanisms of fertilization and cell fusion.

Another project relates to the functions of glutathione, a small molecule present in almost all living cells. One of its functions is the protection of the cell against harmful agents. The Kosowers discovered how to change the concentration of glutathione inside cells in a reversible way, using a reagent called Diamide, which is now used in reseach laboratories around the world for this purpose. The new approach revealed many previously unsuspected functions of glutathione in the regulation of protein synthesis, control of cell division, response to external agents and nerve action.

The Kosowers are now initiating or working on projects involving the cause of schizophrenia, factors in ageing, and potential cures for tropical parasite diseases.

AWARD

EXPORT AWARD FOR MANOF SYSTEMS

In the past year, 187 Israeli companies passed the $1 million annual export mark for the first time. Bank Hapoalim has instituted an annual Awards for Export Promotion program. In the high-tech field, the award was extended to Avi Ze'evi of Manof Systems. Manof specializes in developing computerized communications systems for banks and international organizations.

CARP GONADOTROPIC HORMONE

The hormone has been isolated and purified and is injectable into fish to initiate ovulation. The fish farmer can now regulate ovulation according to a predetermined schedule which he chooses and normally in keeping with market timing and demand.
As a result he can determine in advance the ovulation season as well as the ultimate yield of the fish.