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From the Editor

FREE TRADE, THE HOPE, THE REALITY AND THE BREAKTHROUGH

Industrialists, economists, academicians and government planners unanimously agree that exports are the life-line by which Israel can achieve economic independence. Over the years Israel has signed a number of international economic agreements: GATT; a Free Trade Area agreement with the European Economic Community, and a Free Trade Area agreement with the United States. Israel is uniquely positioned as it is the only country to have free trade area agreements with both the EEC and the United States. These agreements are key factors in a steady expansion of Israeli exports. This was the trend in 1989 and is expected to continue in 1990.

Overseas investors are beginning to take notice of important advantages created from the two sets of trade agreements. They have established industrial plants to gain entry into previously inaccessible markets. Other investors have chosen to enter into partnerships with local companies who export to Europe or to the United States. The foreign investors are astute businessmen who are here to exploit these strategic trading advantages and to profit from the newly created opportunities. They are welcomed in Israel as they are seen as opening new windows of opportunity, and creating jobs and increasing marketing prowess.

As 1990 unfolds and 1992 begins to loom closer Israeli industrialists are becoming increasingly aware of the emergence of new trading blocks. To be competitive is to survive as the fight for international market share is becoming tougher for small countries the size of Israel.

Israel enjoys a positive balance of trade with Japan. A close inspection of the trade figures, however, reveals that the majority of Israel's exports to Japan consists of diamonds with other items less significant. On the other hand Israel imports a variety of Japanese goods. Consumer items and capital goods carrying such names as Sony,

National Panasonic, Hitachi, Toshiba, Mitsubishi, N.E.C., Fujitsu, Canon, Sharp, Sanyo, Pioneer and TDK are highly visible.

Entering the Japanese market is challenging and many times highly frustrating for Israeli high-tech exporting manufacturers. At this point the Elscint experience bears mentioning. The company has developed a niche for its highly sophisticated medical equipment including nuclear imaging cameras, magnetic resonance scanners, tomographic scanners and ultrasound. It sells to Europe and the United States. Elscint, a medical manufacturer, based in Israel, seeks free trade reciprocity as medical equipment imports are exempt from import duties. This policy results in Israeli hospitals at times buying similar equipment from overseas suppliers who drop prices to enter the local market. The difficulties involved for Israeli producers in selling to the local market are sometimes pale in magnitude compared with the obstacles in selling to the Far East. Elscint in sheer frustration filed a list of complaints with the Ministry of Trade & Industry relating to the difficulties encountered in entering the Japanese market. Mostly, but not exclusively these related to administrative procedural barriers.

Elscint sells its nuclear imaging equipment in many parts of the world. However, for three years it has been denied approval to sell its products in Japan though similar equipment is not produced there. The insistence of the Japanese authorities on submitting voluminous material in the Japanese language and demands for detailed specifications which would

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allow copying of the Israeli design, were obstacles erected by the Japanese but not faced by Elscint in other markets.

A study of the Japanese market carried out by Elscint was encouraging as it indicated that there were good prospects for supplying 10%-20% of the Japanese imaging needs in a three year period.

The persisting in its strategy proved fruitful for Elscint. The company entered the Japanese market with the signing of a distribution contract with a major Japanese optical and laboratory equipment company.

The Elscint experience is of particular interest because it reinforces our thesis that Israeli researched and developed high-technology products can compete on the most difficult of markets. This sector will represent a major thrust for the country's exports in the 1990's.

Automating Breathing Could Mean Big Profits

Dr. Zamir Hayek, a graduate of the University of Tel Aviv Medical School, left Israel a decade ago to accept a fellowship in neonatology, the study of the diseases of newborn babies. He specialized in this field, and for the past two and a half years he has worked exclusively in developing a machine to stimulate normal breathing. Seven million dollars were spent on research and development of a prototype. The equipment consists of a belt-like enclosure, which fastens around the chest and is attached to an electronically controlled air pump. A belt alternately inflates and deflates at high frequency, expanding and compressing the chest cavity, thus enabling lungs incapable of functioning normally, due to disease or damage, to inhale and exhale.

Dr. Hayek, states that the major advantage of the Hayek Oscillator is that it replaces the tracheal tube inserted through the mouth, currently in use on infants and adults in intensive care units. Lack of highly skilled personnel, when applying existing techniques, may result in infection, accidental blockages, punctured or collapsed lungs, or extreme discomfort. The oscillator developed by Dr. Hayek, is non-invasive and simple to operate. It was tested at the Beilinson Medical

Center under the supervision of Dr. T. Shoenfield, head of the Children's Intensive Care Unit. At the Heller Institute for Medical Research at the Sheba Medical Center, Prof. Ezra Sohar, has tested the system and enthusiastically endorses the oscillator as a "revolutionary breakthrough from the present state-of-the-art in the field of lung ventilation. It will give relief to many thousands of patients throughout the world who could not be helped until now."

The Hayek Oscillator operates at a very high rate of external positive-negative pressure around the lung's normal negative baseline. This, together with a controlled inhale/exhale ratio, enables control of lung volume with no adverse effect on blood circulation. The method also facilitates maximum oxygen input, oxygen and carbon dioxide exhalation, as well as fast clearance of fluid blockages thanks to the physiotherapeutic effect of high-frequency ventilation. While normal breathing ranges between 12 and 20 breaths per minute, the oscillator can reach a frequency of 1,000 per minute, when needed, and without any side effects.

The oscillator prototype was completed in the spring of 1989, and since then the British based Breasy Medical Equipment Ltd. has begun its production in England. Manufacturing in Israel is to commence in six months.

Breasy Medical is in the midst of negotiating licensing and/or technology transfer agreements. The distance from the production floor to the marketplace is shortened in countries, such as the U.K. and Israel, where approval by governmental regulatory agencies is not required. In Japan and in a number of other countries applications for regulatory approval are on file.

A world market of \$300 million is the target and the Israeli doctor and his associates and backers are taking a global view.

Angioplasty the State of the Art

The practice of angioplasty in Israel and the use of diagnostic imaging equipment, also produced in Israel, have reached an advanced level. IHTR visited Tel Aviv's Ichilov Hospital, the city's largest medical institution to see first hand how this modern technology is revolutionizing health care, providing earlier diagnosis of vascular disease and more sophisticated treatments to save patients' lives.

Heart disease is Israel's biggest killer, and the deep national concern for human lives has led to the rapid adoption of angioplasty techniques. Another benefit of angioplasty, is that it shortens the waiting time for cardiac surgery for patients who will need it. In Israel

the queue for cardiac surgery is six to twelve months, or even longer. Cutting the queue, as angioplasty does, by avoiding surgery, also saves lives.

Angioplasty is capable of saving some heart-attack victims without resorting to open heart surgery. The affected arteries can be unblocked with a procedure called Angioplasty, technically known as PTCA (Percutaneous Transluminal Coronary Angioplasty) which is the introduction of a tiny balloon into a clogged artery.

Highly sensitive detection equipment produce images of blocked arteries in patients who complain of chest pain, to guide placement of the balloon catheter. When the balloon is inflated it forces open a passage to allow proper blood flow. Arteries are thus pushed back to normal size; plaque deposits on arterial walls are sometimes also reduced.

The catheterization lab is the "dynamo" of Ichilov Hospital's whole cardiac department. It deals with a number of vital areas, including intensive intervention, imaging, angioplasty and the implant of cardiac pacemakers. If these procedures do not suffice then the open heart surgery team takes over.

The Ichilov Hospital cardiac department according to Dr. Hylton Miller, head of the catheterization unit, has just emerged from the middle ages with a new \$1 million investment in intensive coronary care equipment. Among the equipment is a computerized arrhythmia detection system and a monitoring unit. The key instruments have been developed by Mennen Medical Inc. of Rehovot, Israel, whose R&D and production facilities are located only thirty minutes away from Ichilov Hospital. Mennen is a world leader in the development, manufacturing and marketing of critical care monitoring systems. The American company was founded in 1963 and the Israeli subsidiary in 1981. The Rehovot facility occupies 50,000 sq.ft. of manufacturing and office space.

Mennen Medical has installed at Ichilov its Horizon 9000 monitoring system which represents the latest technology in physiological signal acquisition, colour displays, and information processing. The company claims that "the equipment has the most straightforward human interface available in any cath lab system today".

The company's R&D and marketing staff follow closely the activities at Dr. Miller's unit. The quickly obtained feedback, due to the proximity of the manufacturer from the user, is invaluable.

Historical Background

Angioplasty is the use of catheters of increasing size for gradual opening of vascular lesions. The catheter is introduced into the body through the femoral artery in the thigh and then snaked through to the clogged vessel near the heart. The procedure is a relatively recent development. In 1977 Dr. Andrea Gruentzig was the first to use angioplasty for coronary dilation, which marked a breakthrough in cardiac vascular treatment. He pioneered the use of smooth balloon catheters of variable sizes to dilate clogged arteries and remove blockages.

Another major advance was Dr. John Simpson's development, in the late 1970's, of an independently movable wire system using dilation catheters. This system is used to this day.

Ichilov's cardiologist, Hylton Miller became convinced in 1982 that angioplasty was a critically important life saving-technique. He flew out to meet with Dr. Geoffrey Hartzler, who pioneered treatment of multi-vessel diseases with multiple dilations in the United States. Dr. Miller studied under Dr. Hartzler and brought his techniques back to Ichilov Hospital where the major push toward using the procedure began two years later, in 1984. Before then only fifty patients had received angioplasty treatment. Since 1984 and until the end of November, 1989 altogether 1,356 patients have been treated.

One thousand patients arrive at Ichilov yearly for angiograms. Of these on the average one out of every four patients admitted receives angioplasty treatment. A large proportion of the patients undergo dilation immediately when the angiogram reveals occlusion or narrowing of the blood vessels. Dr. Miller's department carries out approximately 250 such procedures a year.

Typically when a patient is brought in, arrhythmia studies are done which indicate whether to intervene through angioplasty. Angiogram imaging is useful on individuals of all ages. Pediatric surgeons have been known to carry out urgent shunts to provide oxygenation, on one-day old babies. Patients in their 70's are being treated including those with lesions and who had previously undergone open heart bypass surgery. The Ichilov unit also applies out-patient monitoring, including halters, around-the-clock monitoring of ECG for arrhythmia detection. Rate of blood flow tape recorders provide around the clock monitoring either of ECG data alternatively smart systems record only abnormal symptoms.

Israeli Companies on Wall Street

Selected income and earnings summaries for the 9 months ended September 30, 1989, unless otherwise indicated. Nearly all of these companies are intensively export oriented. Prices are as of December 8, 1989 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>	<u>Net</u> <u>Change</u>
ELBIT COMPUTERS Defense electronics ELBTF OTC	117,200.	8,750.	9.375	+0.875
ECI TELECOM Telecommunications ECILF OTC	38,745.	3,671.	13.25	+0.125
ELSCINT Medical imaging ELT NYSE	108,000.	0,987.	2.25	-0.25
FIBRONICS Fiberoptics FBRX OTC	34,160.	1,450.	6.50	n.c.
INTERPHARM LAB. Biological products for health care IPLF OTC	7,812.*	0,236.	3.25	n.c.
LASER INDUSTRIES Surgical lasers LAS ASE	na	na	2.75	+0.125
OPTROTECH Electro-optical systems OPTKF OTC	52,920.	3,330.	9.375	+1.00
SCITEX LTD. Computer graphics SCIXF OTC	170,550	21,687.	14.875	+2.00
IIS INTELL. Computer peripherals IISLF OTC	8,173.*	2,007.	4.375	-0.125
TEVA PHARMACEUT. Pharmaceuticals TEVYF OTC	191,250	11,980.	12.00	+1.00

* Results for 6 months ended June 30, 1989

Dr. Miller and his team's success rate statistics are impressive indicating 90% of angioplasties are initial successes. rate, (i.e. artery reopened). Mortality is only 0.6%. A year later, follow-up studies of patients' state of health reveal that 80% of the patients are well.

IHTR's editor was invited to observe an angioplasty at Ichilov. The patient was a 71 year old male who had undergone triple-bypass surgery in 1979. He was fine until 1986 when he suffered a heart attack and underwent angioplasty.

In November 1989 the patient was brought into Ichilov in unstable condition, with severe chest pains diagnosed as angina pectoris. Examination revealed that one graft was occluded and another was narrowed at its origin. However, the angioplasty balloon dilation procedure was successful. The patient was released from the hospital and resumed his normal activities.

What's Ahead in Angioplasty?

Current trends are towards the use of advanced imaging modalities, including "digital subtraction angioplasty." This technique converts intense x-ray images into digital forms resulting in better imaging, reduced procedural time and shorter hospitalization period.

Other techniques being researched include laser coronary angioplasty with the use of excimer laser, laser balloon angioplasty and by fluorescent guided dye laser. In the future excimer lasers capable of burning or etching away deposits with the laser's invisible beam will become standard equipment in Ichilov. Researchers are now trying to find ways of delivering the laser to the affected area without accidentally burning a hole in the artery.

Finally researchers are also developing a "Roto-Rooter" to clear out coronary arteries clogged with fatty deposits. This device uses a rotating cylinder shape blade which shaves fatty deposits away.

Summary -

In recent years, progress in the advancement of angioplasty has been nothing short of phenomenal. In spite of these advances the number of patients needing bypasses, is still significant and requires all available surgical backup. But as the techniques of the physician performing angioplasty improve, the number of patients for whom angioplasty becomes available increases.

Increased expertise also results in more doctors in the field performing the procedure. Angioplasty

technology continues to improve rapidly.

(Dr. Hylton Miller serves as an international consultant on angioplasty. His Cath Lab also serves as a staging area and testing ground for Israeli developed medical equipment intended for worldwide export marketing. Mennen Medical Ltd. is one of Israel's leading high-technology companies providing monitoring and imaging equipment for the health care industry. The above report points to the advanced state of medical practice in Israel and to the interaction and close relationship between Israeli producers of technological equipment and practitioners.)

Fax Transmission Technology Improves INTELSAT's Profits

Unlike computers which only transmit files, facsimiles transmit any graphic image. Facsimile transmission works on a single international standard. The economies and user convenience are major factors behind its rapid growth. Japan has the largest installed base of fax users in the world. The Japan of 1990 is an example of a country where it is inconceivable to do business without a fax. By 1991 in the U.S. there will be more than four million fax machines in use. The transmission of facsimile messages is carried out by satellite systems. INTELSAT the INTErnational TELEcommunications SATellite organization is the body responsible for the design, construction, development, operation and maintenance of the world wide satellite communications system. It is owned and managed by government telecommunications authorities who have shares in the organization in proportion to their use of it.

INTELSAT's plans for the large scale conversion of its world wide support network from analog to digital operation did not take into account the explosive growth of facsimile transmissions. At the

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78.77 + 5.45%

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BASE=100 AS OF SEP.30,1984

outset fax transmissions represented less than 10% of the total traffic load. In 1988 the figure for fax transmissions exceeded 50% of the load at peak hours.

The magnitude of this "fax explosion", has had a critical impact on the planning and operation of the INTELSAT system. This is because the economic advantage to the carriers is based on the use of digital circuit multiplication systems (DCMS). These multiply the circuit capacity by a factor of 5, with no increase in Intelsat circuit leasing charges.

However, Digital Circuit Multipliers that multiply voice traffic by five are limited to a factor of only 2 when handling fax traffic. On congested routes such as the Pacific and the North Atlantic, the circuits are now operating at a multiplication rate of 4:1. This could drop to 3:1 as the use of facsimiles continues to expand rapidly.

The facsimile explosion is deteriorating the profitability of the Intelsat System. It also leads to a shortage of satellite capacity. The planning and implementation cycle of a new generation of Intelsat satellites takes about 10 years. The cost of putting one Intelsat VI satellite into orbit is over \$270 million. One cost effective solution is to supply circuit multiplication systems that do not lose their effectiveness when facsimiles are being transmitted.

ECI Telecom holds 80% of the world market for Digital Circuit Multipliers. The balance is controlled by the French Alcatel and the Japanese Mitsubishi. ECI Telecom has already supplied over 600 terminals of its DTX-240D Digital Circuit Multipliers to 34 international telecommunications carriers, including AT&T International, British Telecom International, KDD Japan, and the Deutsche Bundespost.

ECI's engineers have designed a system that can handle up to 30% fax traffic, and this has been an important factor that has helped the company to capture 80% of the world circuit multiplication market. However, since peak fax traffic has grown to well over 30% on international lines, development is underway on improving a new facsimile compression unit which can be either retrofitted to existing DTX-240D terminals in the field or supplied as an option for new orders.

The facsimile compression unit operates by demodulating the fax signal to its original digital form, multiplexing up to 5 fax signals into a single 64Kbit/s channel, and transmitting to the far end DTX-240 terminal where the reverse process is performed. By this means, a multiplication factor of 5:1 is achieved for the fax as well as the voice traffic.

Significant orders for the modified system, named the DTX-240F, are expected from the leading international telecommunications carriers, all of whom are already operating a great number of DTX-240D systems.

The \$11 million to be realized from the Claridge-Bronfman investment (see section - Israeli Companies on Wall Street) should allow the company to strengthen its leading position as a supplier of high-technology systems which provides cost effective solutions for the efficient transmission of speech and facsimile.

ISRAELI COMPANIES ON WALL STREET

InterPharm Managerial Changes

Dr. Yoram Karmon assumes the top position of president and managing director the company. He replaces Dr. Ehud Geller, who resigned from the position but continues in an advisory capacity.

IHTR Interview Interrupted to Conclude \$11 million Investment

As part of its policy of interviewing top executives of Israeli companies on Wall Street, IHTR was at the new corporate headquarters of ECI Telecom on Wednesday, November 29, 1989. At exactly 10.30 a.m. Mair Laiser and Manny Olswang excused themselves that they must break off the meeting to attend to urgent corporate matters. Later in the day we learned that ECI Telecom, as part of an agreement with Claridge Israel Inc., an investment firm owned primarily by Charles R. Bronfman, will become the beneficiary of an \$11 million investment. ECI will issue one million new shares. Mr. Charles Bronfman is co-chairman of the Seagram Company and a director of E.I. du Pont De Nemours & Co. ECI has very little debt outstanding and the monies resulted from the investment will offer ECI's management great flexibility in expanding its marketing efforts and R&D.

Lab Scale Immunization Achieved Against the Spread of Lung Cancer

Professor Michael Feldman, Weizmann Institute biologist, internationally known for his work on metastasis, has developed a new technique which already has achieved successful immunization against the spread of lung cancer in laboratory animals. Professor Feldman and his team have adopted a new

approach to cancer therapy. The main clinical problem of cancer is metastasis, a process whereby malignant cells detach themselves from local tumors, penetrate into blood vessels, travel through the bloodstream to the site of other organs, emerge from the blood vessels, lodge in the surrounding tissue, and finally induce the growth of new blood vessels to nurture the nascent tumor. By the time a "primary tumor" has been detected, cells have already escaped from it and settled elsewhere. Some tumors migrate more than others and cells in any given tumor differ in their ability to migrate or metastasize. The research at the Weizmann Institute has focused on the characteristics that distinguish the highly metastatic cells from those with little or no ability to travel.

One body's immune system, which identifies and attacks foreign substances bearing distinctive surface markers called antigens, also attacks "tumor antigens" generated by cells that have become cancerous. The two Weizmann Institute scientists tested the hypothesis that the difference between metastasizing cells and non-metastasizing ones hinges on the ability of the former to evade the immune system. Professor Feldman's work is advanced to the point whereby he has confirmed that metastatic properties of tumor cells could nearly be abolished by gene transfer.

Professor Feldman previously had developed a highly metastatic clone called D122 and a virtually non-metastatic one called A9.

New Technology Unveiled for "Fancy-Cut" Diamonds

A recent issue of Israel Diamonds, described new automated system now coming on stream, for bruting fancy-cut diamonds. Bruting is one of the important steps in the production of diamonds for jewelry. The system appears on Moach I automatic bruting machines developed by Joe Diamond and the Israel Diamond Institute.

With a special head, the machine automatically cuts marquises, ovals and pear shapes. Currently the system can girdle stones up to 0.85 of a carat, which is an advanced technology in the "fancy" industry. The automated system improves quality and yield while saving the cost of much painstaking manual labor.

Charles Clore Award to Prof. S. Edelstein

That science and industry can work in hand is evidenced by a Weizmann Institute corporate liaison

with Teva Pharmaceuticals Tenured Professor Shmuel Edelstein took a two year leave from the Weizmann Institute to help Israel's leading pharmaceutical company to apply for the U.S. Federal Drug Administration's approval for a drug which he developed. He stayed on to take charge of Teva's research and development. While there he invites scientists to visit the Teva manufacturing plants. Teva's strategy is to back scientists in the areas of research which they feel may have application to pharmaceuticals.

Professor Edelstein's work has resulted in the development two medications for treating bone disease sufferers. Alpha D3 and Osteo D are now produced by Teva which markets them in Israel and in overseas. The drugs enhance the metabolism of calcium in patients suffering from renal insufficiency and those undergoing kidney dialysis.

For his scientific research and for the subsequent development and application of that work in industry Professor Edelstein was awarded the Charles Clore Prize.

Elbit Closer to Acquiring 70% of Elscint

Elbit Computers Ltd. has announced that it will be acquiring 70% of the outstanding share capital of Elscint Ltd, the medical imaging company. In a complicated transaction Elbit is buying 40 million

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shares held by Israeli banks and Elron Electronics Industries' 25% share holding. Elbit is undertaking to guarantee Elscint's outstanding debt to the Israeli banks and to invest \$ 11 million in Elscint.

Initially the transaction should prove beneficial to Elscint but the question many are asking is how much management attention can Elscint expect from Elbit, Israel's successful defense producer. Another question being raised is how will the new constellation assist Elscint with its efforts to market internationally and compete against major vendors such as Philips, General Electric and Siemens.

Israeli Scientists Take Part in World's Largest Atom Smashing Project

A particle accelerator creates tiny particles of matter from great amounts of energy. The L.E.P. uses enough energy to power Jerusalem, in pushing electrons and positrons into racing around a water-cooled aluminum vacuum chamber. When these particles collide, they create subatomic "fire balls" as intense as 400 million suns. The kinetic energy released is transformed into new kinds of matter -- the same particles which are thought to have been created after the occurrence of the "big bang", the creation of the universe. It is this matter which interests the world of science.

Among the array of computers being used to crunch numbers are two Cray X-NP supercomputers. One trillion bytes are expected to issue monthly from computers employed in the various scientific experiments. The key aim is to detect the "top quark," a massive piece of matter, as such particles go.

The L.E.P. is the world's largest and most expensive atom-smasher. It is the centerpiece of a subterranean laboratory which is nearly 17 miles in circumference, buried 330 feet underground in the Swiss town Marin near Geneva. Construction took eight years and cost \$740 million. The facility was constructed by the European Organization for Nuclear Research (C.E.R.N.) to reestablish Europe's one-time supremacy in particle physics. Scientists carrying out experiments at the L.E.P.

come from 25 countries.

Four separate Israeli groups are working on the L.E.P.: Specific areas of activity include: particle detector investigation, methods of measuring the trajectory of momentum-charged particles, and the construction of a particle detector using a massive 17 foot superconducting magnet, the world's most powerful electromagnet.

Israeli scientists have developed equipment which identifies rebounding particles and measures ionization cells. The technology used in building the equipment is connected with that used in printed circuits. Among the Israelis are scientists from the Weizmann Institute, the Hebrew University and Tel Aviv University.

The Weizmann Institute team, comprising Prof. Giora Mikenberg, Prof. Gideon Yekutieli, Prof. Arieh Shapira, Dr. Ehud Duchovni, Dr. Daniel Lellouch, Dr. Lorne Lévinson, Dr. Raphael Yaari, and Dr. Donald Hochman of the Department of Nuclear Physics, is responsible for several key components of the collaborative station, developed and run by scientists from nine countries.

The Israeli physicists, working with Tel Aviv University and Haifa Technion experts, built the Pole-Tip Hadron Calorimeter, a compound detector delivering data on particles traversing it. Some 500 innovative superthin detectors were developed and built over three years at a small factory set up on the Institute campus, the first time such a large state-of-the-art detector project was carried out in this country.

From the Laboratory to the Market Place
Joseph Morgenstern, Israel Publications Inc. 150pp.
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see address details on page 7.

Positive comments are reaching us from those who have received their copies of the book.

Uzia Galil, chairman of Elron Electronic Industries, has written stating that in his opinion "the book will certainly contribute to more understanding of high-tech in Israel".