

Feature Science and Technology

The "Weaker" Sex has the Strongest Defences

by Rolf Degen

Although conventional prejudice deems women as less robust and more susceptible to illness than the so-called "stronger" sex, this contention holds little truth in regard to the body's immune system. In fact, women are far better equipped to protect their bodies than men.

According to the results of a comprehensive analysis women are, in fact, less susceptible to most pathogens, be they bacteria, viruses, fungus of single-celled organisms. For example, men not only comprised 75 per cent of "black death" victims in the Middle Ages, but are today more commonly afflicted by meningitis, pneumonia, tuberculosis, measles, mumps, hepatitis B, and diseases of the sexual and digestive organs. 88 per cent of all victims of the notorious disease rabies are men. In contrast, women suffer

more frequently from bowel parasites — although, as the researchers point out, these are not infections in the strictest sense of the word. Women's greater susceptibility to allergies is regarded as evidence of a defensive over-reaction. A further exception is also provided by pregnant women, who are more prone to certain groups of contagious diseases because certain cells in their immune system are neutralised to prevent rejection of the unborn child in their wombs. In a paper published in the book "Adapted Mind" (Oxford University Press), edited by J H Barkow, the American biochemist Margie Profet points out that pregnant women possess a different mechanism to combat germs and toxins, developing heightened senses of smell and taste and a greater propensity to vomit. This bestows upon them a fine "antenna" for spotting toxins and spoiled nutrients which could damage their unborn child and explains the phenomenon of "morning sickness" among pregnant women.

Muller concludes that the differences in immunological efficiency between men and women is probably due to the sexual hormones oestrogen and testosterone, which explains why these differences primarily become noticeable after the onset of puberty. The small white blood corpuscles (lymphocytes) carry many receptors for male and female sexual hormones. B-lymphocytes, which eliminate their adversaries using chemical weapons (antibodies), are activated by the female hormone oestrogen, and prove far less effective when promoted by the male sexual hormone testosterone. This may also account for the higher levels of certain antibodies (immunoglobulins) found in the female organism. Similarly, T-lymphocytes, which dispose of their enemies through direct contact are also "disabled" by the male sexual hormone; whereas with oestrogen they display no reaction.

The male's "secondary sexual

characteristics", and particularly his powerful muscles, are promoted primarily under the influence of testosterone — hence the prevalent tendency of many athletes to illicitly take anabolic preparations. These substances are similar in their

molecular structure to testosterone and produce the same growth-stimulating effect. Yet Muller warns that a muscular physique and a weakened immune system are two sides of the same coin. Citing the many cases of athletes who are incapacitated by some banal infection just prior to an important event, he emphasises that extreme physical stress can also be detrimental to the body's defences. Immunologically speaking, men's predilection for building up their muscles is therefore unhealthy. — GRS



"All humans strive for knowledge by nature," said Aristoteles. Statue outside Freiburg University.

Gene Therapy Works

WHILE "millions" can potentially benefit from gene therapy — the introduction of a normal copy of a gene to alter the course of a disease process — right now two little girls in the United States are the only humans who prove gene therapy works. These girls were born with the genetic defect of adenosine deaminase deficiency (ADA) which causes the T lymphocytes to die off, crippling the immune system and leaving sufferers vulnerable to potentially fatal infections. The first girl was treated in 1990 with autologous T lymphocytes with normal ADA gene inserted and has changed from a quiet, sickly child to one who is outgoing and playful. The second child was first treated in 1991 and is also now acting "like a normal child." This form of therapy leaves gaps in the immune system's repertoire for responding to germs, and the corrected T cells will eventually age and die. The girls have recently undergone a new type of therapy in which the gene is inserted directly into hematopoietic stem cells of the bone marrow. In this way, the investigators hope that the corrected stem cells will populate the marrow and pass the crucial gene along to the population of blood cells they produce. It will take three to six months to know if the treatment has worked. Then the girls will not have to return for periodic retreatment. Courtesy UNICEF

A Happy Blend of Science and Poetry

by Raffat Binte Rashid

OUR minds resemble a kaleidoscope, continuously changing images and forming impressions. It is always at work creating something or the other.

Sometimes expressing the thoughts with satisfaction can be a quite difficult task. We hear many people complaining, "I cannot exactly find words to describe this feeling." Then again there are also people for whom expressing themselves is not a problem at all.

But not many of us are born with the "lucky star" like Dr Shahjahan Kabir, who is a poet and a scientist at the same time.

Science and literature can be termed as the North and South poles of knowledge but where creation is concerned they definitely do meet.

"Both a poet and a scientist are creative persons. The poet through thoughts and emotions try to depict the truth while the scientist through thoughts and skills try to discover the truth. Although their roads are different, both of them are searchers of the truth," explains Dr Shahjahan Kabir.

Recently Dr Kabir published a book of his verses, *Halud Janalar Dighoshash* (A sigh of a yellow window). This book contains 48 poems of his. "While working I have seen the efforts of a dying laboratory mouse to wipe its last tears. Through the jackfruit I have come across the unique beauty and the organization of nature, he explains.

"Our mother language is very rich. The dream of an independent Bangladesh was materialised through the love for the language. I love my language and often try to depict life's truth through verses. Thus side by side writing scientific articles, I have also composed a few poems," he says.

His poems reflect emotions, problems of inner aspects and alienations. "The way I visualize 'life,' he says. He has been composing poems for the last 25 years and while a student of the intermediate level his teachers and literature of his text influenced him, he feels.

Explaining his poetic character he says "Snow capped mountains — all like it, but how will they all react to it, is the question. How your heart reflects things; you need an innovative and a curious mind."

In the sixties Dr Kabir had been a teacher at the Department of Biochemistry of Dhaka University. He obtained his PhD degree from the University of British Columbia.

He has been carrying out research in immunology, a subject dealing with human body's defence mechanism against infections and diseases. He has worked in a number of leading institutions at the world such as the Max Planck Institute for Immunology, Germany, the National Institutes of Health, USA, the National Institute of Public Health, the Netherlands, and the Karolinska Institute, Sweden. In the seventies his work on the interaction of bacterial cell wall component such as lipopolysaccharides with white blood cells, carried out at the National Institutes of Health, USA, received wide scientific recognition.

From the later part of the seventies until recently Dr Kabir has been engaged in research on problems related to the developing countries. In 1991 the Institute of Scientific Information of the USA has identified Dr Shahjahan Kabir, as an "important researcher in biomedical sciences. Recently Dr Kabir has discovered a novel protein from the jackfruit seeds, which has important biomedical applications.

Jackfruits are cultivated in tropical and semi-tropical countries. Its seeds contain approximately 40 per cent carbohydrates, 6 per cent protein, the rest being fat, fibre and water. Dr Kabir investigated the protein component of the seeds and demonstrated that it is possible to isolate a small protein from jackfruit seeds.

Human bodies contain materials known as antibodies or immunoglobulins, which have the property of combating disease and infection. These immunoglobulins are present in the blood as well as in various body fluids and secretions. There are five types of immunoglobulins known by the alphabets A, G, M, D, and E.

In combating diarrhoeal diseases such as cholera, the body uses its IgA molecules to arrest the infecting organisms, and the isolated small protein from jackfruit seeds selectively binds this important IgA.

Proteins are polymers of

small molecules known as amino acids. It is the order of the amino acids in a protein that dictates its properties. Using a sophisticated instrument for "protein sequencing", Dr Kabir has identified the region of the jackfruit seed's protein which binds IgA. Such a small IgA-binding protein has not been described previously in the scientific literature.

Apart from being used in studies related to IgA, the protein can have applications in cancer research. It binds with certain sugar molecules on IgA, which are found in certain types of tumours. Besides the protein can be used in various areas of biomedical research.

Besides this he performed research on diarrhoeal diseases and on cholera.

"It goes beyond recognition that we live in an age of science. By applying science properly we may be able to solve a lot of our problems and develop the country. Despite our independence for over 20 years the social position of scientists has not received adequate importance. Scientists should take active role in the process of nation building and make sure that the politicians are made aware of this," Dr Kabir strongly emphasises.

He advises the private sectors of Bangladesh to come forward in sharing responsibility with the government as scientific research involves funding.

Research usually attracts creative minds, he says. "We may be citizens of the Third World but we are not third-rate scientists," he believes. The path of science which leads to discovery of truth is not easy, one should have courage and determination to proceed, he says.

"This is not an easy task, it requires enormous hard work. In my childhood I read a verse in Bengali which when translated is something like this:

"Why are you afraid to pluck a lotus?"

Can you get pleasure without pain in this world?"

This is true for scientific research also," Dr Kabir describes his profession to the next generation, through his passion — poems.

New Thin-Film Solar Cell, A Breakthrough in Technology

A new thin-film cell that can convert sunlight into electricity has been hailed by the US Department of Energy as breakthrough technology that will halve the cost of solar energy, reports USIS.

The new type of photovoltaic cell was developed by United Solar Systems Corporation in a three-year, cost-sharing \$6.26-million programme with the Energy Department, officials announced at a news conference January 18.

The thin-film technology could be used in glass panels on a commercial building's exterior walls or in the roofing singles of a south-facing home. When used in a home, the cells are expected to be able to supply all of the electricity used during daylight hours.

Photovoltaic cells now produce electricity at a cost of 25 to 50 cents a kilowatt hour, based on a calculation of investment and maintenance costs over a 20-year period. Christine Ervin, assistant secretary of energy for efficiency and renewable energy, said the new cells should decrease the price to 16 cents a kilowatt hour and in several years to 12 cents.

The costs of electricity from the more traditional sources of coal-fired or hydroelectric plants, taking into account both investment and operating costs, averaged about 8.4 cents a kilowatt hour in 1993 for residential customers, with the range being from 4 cents to about 12 cents a kilowatt hour.

Ervin said a major reason for encouraging development of solar electricity technology is that it releases no pollution. In particular, she said, wide application of the technology would help reduce US emissions of the greenhouse gases that may warm earth and drastically change its climate.

Subhendu Guha, vice president of research at United Solar Systems Corporation, said in an interview January 19 that the breakthrough consisted in making a cell that converted 10.2 per cent of sunlight to electricity. The efficiency of solar panels has not been high and breaking the 10-per cent mark is to the industry like runners first breaking the four-minute mile was to sports, he said.

The manufacturing needed to form the silicon based cells has been expensive but he believes costs will dramatically drop because his company's cells are ultra thin.

The corporation is a joint venture between Energy Conversion Devices, Inc of the state of Michigan and Canon, Inc. of Japan.

Star Special

New Software Association Formed

by Staff Correspondent

A new software association by the software developers and data processing promoters of the country was formed under the banner Software Association of Bangladesh (SAB) on January 15, at a local hotel.

The aims and objectives of the association are to identify the people who are directly involved in the software fields, and endeavouring to utilise them properly. The association will also organise seminar, publish magazines, newsletters on software information and current software trend of the world.

A 25-member committee has been formed with Dr Md Abdul Mottalib of Dhaka University, President, Dr Mohammad Kaykobad of BUET, Dr Lutfur Rahman of BANSDOC, Jahangir Alam of BCC, Mdulid Haque of Softline, Vice Presidents, Munir-Uz-Zaman Chowdhury of CNS was made General Secretary.

Other office-bearer are: Sheikh Khaled Ghafoor of DU,

Md Abdul Mottalib of Management Consultant Group, Joint Secretaries, Engr Abdus Salam of Housing and Building Research Institute, Organizing Secretary, Monir Uddin Ahmed of CNS Ltd, Treasurer, Mominul Islam Bhuiyan of International Food Policy Research Institute, Information Secretary, Shahidul Islam Sohel of Safeworks, Publication Secretary, Atiqul Haque Mozumder of National Minor Irrigation Dev Project, Seminar Secretary, Zahid Ferdous Rumi of Q-Soft, Research Secretary, Jowad H Kazi of Onirbaan Group, Library Secretary, Golam Jillani, of ATOBI, Office Secretary.

Members of the committee are: Dr M Lutfur Rahman, Dr M Eusuf, Dr M Nazrul Islam, Engr Ahmed Sultan Uddin Babla, Engr Iqbal Mohmood, Md Sabur Khan, Salah Uddin, Ashrafur Haque, A H M Mahfuzul Arif.

Mozart's Computer Would Run Encore for Windows 3.0

PASSPORT Designs has taken the ability to compose music on the PC to a higher level with Version 3.0 of Encore for Windows. The user interface

including correct fingerings, when you enter music on a MIDI keyboard. Now that Encore 3.0 supports EPS, you can export complete or partial scores to desktop publishing

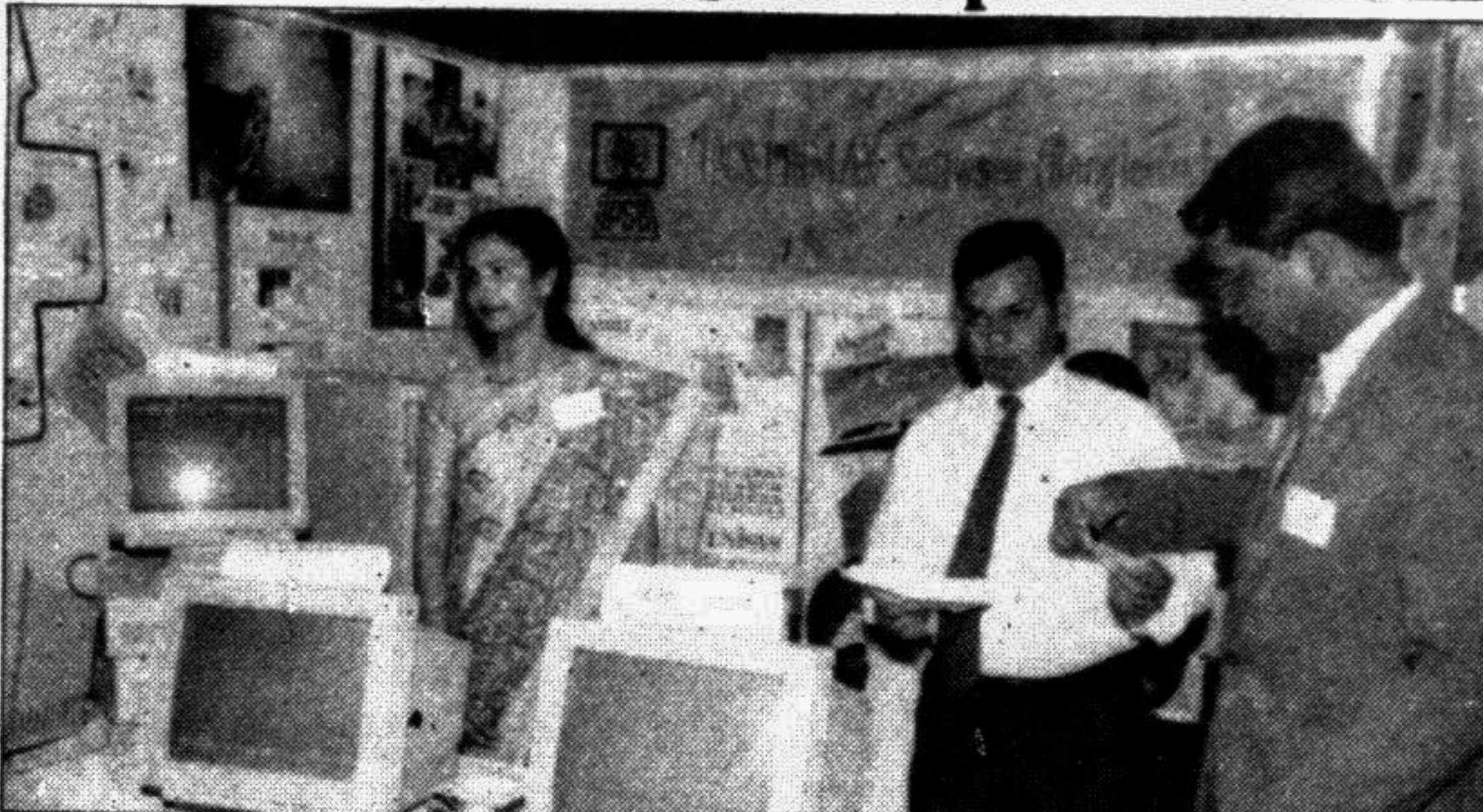


With Encore for Windows 3.0, the music you compose on your PC is better than ever.

has new menus, tools, and palettes, plus a new array of musical symbols. If you prefer Bob Dylan to Mozart, Encore 3.0 can automatically convert notes to guitar tablature, in-

or word processing programs. Version 3.0 retains click-and-drag editing and real-time transcription of input from MIDI instruments.

Computer



A local software company is displaying locally developed software in the US trade show '94 held at Dhaka Sheraton Hotel on Jan 22-24.

Raising An Einstein

NOW THAT SCHOOL IS BACK in full swing, kids may be geared up to explore the latest in educational software.

Today's computer-based educational software lets kids learn at their own pace, and the game-like quality can make even rudimentary multiplication tables fun. It's a far cry from the way most of us learned our letters and numbers — with books and blackboards, unaccompanied by multimedia games, colorful graphics, and lively sound.

The next generation of children's games goes even further and teaches very complex concepts once taught in only in high schools and colleges. One such programme, Kid CAD, from Davidson and Associates teaches children ages seven and up the art of computer-aided design.

Kid CAD is a \$49.95 Windows game that lets you construct a building brick by brick as a wireframe drawing. You can add furniture, people, animals, and plants. Then, using tools from easily identifiable icons, you can render the objects into distinct 3-D models, zoom in and out, pan, and change the viewing perspective.

Without knowing it, they learn about texture mapping and 3-D views. But kid CAD is a game after all, and a child can choose from a number of fun implements to destroy his creation.

For those children who can't seem to remember their times tables, Compton's NewMedia is releasing The Human Calculator.

During the 1980s, US service firms such as banks, airlines and retail operations bought more than 750,000 dhrs million worth of computers and related communications equipment plus additional thousands of millions worth of related software.

Yet despite this investment, officially measured service-sector productivity growth is averaging only 0.7 per cent per year.

This is the "computer productivity paradox" that confounds economists, many of whom claim that the current productivity measures produce misleading results. The paradox also confuses managers, who see no alternative to investing millions more in the so-called information technology (IT). And

Computers' "Productivity Paradox" Vexes Experts

it delights skeptics who never quite believed all the claims made for the IT revolution.

"Computers have made inefficiency more efficient than ever," says one skeptic, writer James Krohe, Jr.

Because computers "have made the tedious pleasurable and the trivial perfectible, jobs whose tedium was the surest spur to quick completion now take longer on the machines that were purchased in order to do them quicker," says Krohe in an article, "The Productivity Pit."

US business users of personal computers spend an average of 50 minutes a week installing and learning software programs and another 5.1

hours per week practicing, waiting for their computers to work and checking what they do, says Krohe, citing a recent estimate by Software Business Technology Corp (SBT), a Sausalito, California, consulting firm. SBT claims this wastes 5,000 million hours of company time a year at a cost of nearly \$100,000 million.

As companies increasingly move from mainframes to networks of personal computers, Krohe says employees will have to devote more and more time to learning new operating systems and software. "SBT holds out the ominous possibility that personal computer consultants will outnumber lawyers by the year 2000," he says.

Defenders of IT — which in-

cludes not only computers but also the data communications systems and automated customer service equipment associated with them — see things quite differently. They believe this technology has been a revolutionary force for positive change, especially in service industries.

This is the view expressed in "Information Technology in the Service Society: A Twenty-First Century Lever," a detailed analysis prepared by a special committee of experts for the National Research Council, an affiliate of the US National Academy of Sciences, which advises the US government on scientific and technical issues. —USIS

Japan's Personalized 3-D Interface

AS US SOFTWARE DEVELOPERS duke it out in the never-ending battle of the operating systems, researchers at Sony's Computer Science Laboratory (CSL) in Tokyo have quietly launched a major initiative to develop advanced software. If successful, it could reshape the way you interact with your computer.

In Sony's vision, future computers will recognize and respond naturally to your voice and image, much like a child does. Imagine turning on your PC and being greeted by a life-like digitized face (of your choosing) that would carry out your spoken commands. That's quite a leap from today's graphical interfaces, but that's the point.

Sony is scrapping the tradi-

tional desktop metaphor/graphical user interface that we're all becoming used to.

Instead, it's turning the personal computer into a "personalized" computer that displays a speaking face, one with expression, personality, and communication skills.

To construct the 3-D interface, CSL researchers first built a face-modeling system that aligns and warps a polygon mesh on a series of video still photographs. An interface builder then renders the model by adding a texture map based on facial qualities and simulates the addition of animation information. Technically speaking, the software mathematically spline-deforms the facial surface to simulate the actions of facial

muscles, jaw rotation, and eye movement. A control editing system sets combinations of movements in blocks to match emotional states, even generating wrinkles automatically. Once it's fine tuned, the system will depict a range of expressions.

Sony has coupled its head animation system with a speech dialogue system that listens to your commands, decodes the meaning, and chooses an appropriate audible and visual response.

If all goes according to plan, Sony will roll out computer products based on its face-to-face communications model in five to ten years. In the meantime, it will incorporate aspects of the model in consumer products such as VCRs and camcorders.

Russian Software Heads West

ENTREPRENEURS FROM THE US and abroad are pitching their business and marketing expertise to computer scientists in the former Soviet Union with the hopes of turning swords into plowshares, or in this case, into snazzy software.

When the Soviet government fell, research funds dried up, and foreign entrepreneurs such as Interactive Products Inc of Eugene, Oregon, sensed an opportunity. IPI funded a group of scientists in Moscow who were working on voice recognition technology. IPI shipped in Western hardware to replace antiquated equipment and a year later is selling the groups first commercial voice recognition software — VoiceMouse — and VoiceSqueeze. IRI president Mark Stewart claims that superior algorithms account for 98 per cent accuracy rates.

The suggestion that Russia holds advantages over the US in certain technologies may be more a matter of perception than reality. "The smartest Americans are distributed in a wide variety of fields, while the Russians are concentrated in the sciences," says Stepan Pachikov, founder of Paragraph International, a Russian-American partnership that developed the handwriting recognition software in the Apple Newton.

Some things are more certain. For one, Russian education in the physical sciences is superior to that in the US, says Esther Dyson, publisher of RE-EAST, the New York based

newsletter that covers technology in Eastern Europe and the former Soviet Union. No doubt there's a pool of highly talented scientists who've developed some nifty algorithms. Excalibur Technologies, for instance, hired a Russian programmer who developed an advanced pattern-recognition programme.

Excalibur's Electronic Filing Software (EFS) takes anything that can be broken into a binary format (text, voice, full-motion video), analyzes the bit-streams for patterns, and indexes them for content-based retrieval. The multimedia imaging and retrieval system does true

fuzzy searches and handles Russian Cyrillic as easily as Japanese Kanji or English.

Foreign businesses are also flocking east for the money. Many of them agree that you can fund a research project in Russia at a fraction of the cost it would take to develop the technology stateside.

Economics aside, it's clear that the creative juices are now flowing into the consumer market. Paragraph International's Pachikov, for instance, is no less ambitious today than when he began research in handwriting recognition four years ago.

New Technology Digital Compression

WASHINGTON, Jan 25: Tired of surfing all those channels on cable TV? Wait until you see what's just ahead: Hundreds of new channels on a slew of wannabe networks, from TV Car Showroom to the Therapy Channel, reports AFP.

Plus the Baseball Network, Booknet, Arts and Antiques Network, Cable Health Club, Planet Central TV and Spice 2, just to name a few more.

It's made possible by a bit of engineering legerdemain known as digital compression. This new technology, which should roll out sometime in 1994, squeezes more information into a smaller amount of space on the cable. More information means more channels.

It could increase the number of available channels to 400 — and about 70 new networks are gearing up to join the more

than 80 already out there.

"More than ever it is a niche game," said Bob Stoddard of the Cable Telecommunications Association. A list of channels just out or in the planning stages is heavy on shopping, health and movies. But instead of video department stores, the shopping channels are more like boutiques — offering just clothes, music or cars, for example.

Movies are being grouped to specific tastes and demographics. International programming rarely seen on American TV could soon be on several channels.

There is tremendous opportunity for independent producers," said Colleen Harkins of Vision Group Inc, a subsidiary of Telecommunications Inc, the giant cable company that helps new networks get going.