

Scientists report finding a gene for speech

New York, October 5

A TEAM of geneticists and linguists say they have found a gene that underlies speech and language, the first to be linked to this uniquely human faculty. The discovery buttresses the idea that language is acquired and generated by specific neural circuitry in the brain, rather than general brain faculties.

The gene, which joins a handful known to affect human behaviour, is of particular interest because it switches on a cascade of other genes in the brain of the foetus. Biologists hope that identifying these "downstream" genes will help unravel the genetic basis of language.

The discovery may also pro-

vide an answer to when language evolved and if the power it gave modern humans was the primary reason they flourished and spread rapidly around the world.

But some scientists believe the gene may be less specific to language than it seems. So the new finding could simply fuel an age-old debate over whether the brain handles language through mechanisms specifically dedicated to the task or through a more general system.

The gene first came to light through the study of a family, half of whose members had trouble pronouncing words properly, speaking grammatically and making fine movements of the lips and the tongue. Some

affected members seemed normal otherwise, suggesting that a specific impairment of speech and language is the root of their problem.

The study shows that all the affected members had inherited a mutation, or variant piece of DNA, in a specific gene. The mutation affects a single unit in the 6,500 units of DNA that make up the gene.

The carriers of the variant gene resemble others with impairments of language. They came to researchers' attention in 1990 only because there were so many of them, all related and living in the same area of London. The family now has 29 members, 14 of whom have the disorder.

The first linguist to study the family, Dr Myrna Gopnik of McGill University in Montreal, noticed that affected members were unable to change the tense of verbs correctly. The finding caused much stir in the linguistic world as it implied the existence of genes for grammar.

Later, Dr Faraneh Vargha-Khadem of the London Institute of Child Health identified a wider range of speech and language deficits, and some effects on general intelligence. He said the variant gene "affects speech, but with knock-on effects in non-verbal ability".

In 1998, Dr Anthony P Monaco of the University of Oxford in England and his colleagues, who describe the gene in today's

issue of Nature, started a search for the variant gene, or for the lack of it. They identified as the likely source of the problem a region on chromosome 7.

Settling down to the long chore of examining each of the 100 genes in the region, the team had a lucky break when Dr Jane A Hurst, the clinician who first examined the London family, came across an unrelated patient with what seemed the same pattern of impairment.

The new patient had a visibly odd version of chromosome 7, enabling Dr Monaco to identify a specific defective gene. The same gene turned out to be the source of the London family's disorder though in the family's case it is sabotaged in a different way.

The newfound gene's product is a protein that binds to different sites along the DNA, signalling the cell to activate the nearby genes. Identifying the set of genes that is switched on by the protein could yield an insight into how a distinctive faculty of the human brain is constructed.

Dr Monaco has started collaboration with Dr Svante Paabo of Leipzig, Germany, who is studying the chimpanzee and other primate genomes. The two will measure the rate of evolutionary change the newfound gene has undergone in the different branches of the primate tree, looking for any recent spurt in the human version of the gene.

The New York Times

Modified mosquitoes to check malaria

Science & Technology

London Xr 10 2/19

SCIENTISTS FIGHTING malaria are preparing the ground for one of the most audacious attempts ever to wipe out disease: genetically modifying an entire animal species in the wild.

In laboratories around the world, there is increasing confidence that scientists will acquire the ability to spread a synthetic gene throughout the populations of dangerous mosquitoes, making it impossible for them to pass malaria on to humans.

Until now, spreading genes throughout a species was something only evolution was capable of, over millions of years of natural selection. But scientists think it might be possible to transform the malaria-carrying mosquito into a subtly different species - still a bloodsucking nuisance, but no longer a killer - within two to 25 years of releasing the first GM insects.

In a sign of how fast research is moving, specialists in the field are gathering in London next week for a conference to discuss the risks and benefits of releasing GM mosquitoes into the wild.

"We're not talking about one to one replacement of lab mosquitoes for wild mosquitoes," said Tony James, of the Univer-

release of GM insects into the wild to combat disease. But he is wary of the idea of genetically modifying an entire species. "I have a rather negative view of this strategy," he said. "One of my concerns is that once you've let such a thing go, you can never recall it."

Supporters of the approach point out that it is not necessary to modify every single dangerous mosquito to stop the disease. But the nature of the technique is such that this could well be the end result. Normally, a new gene will spread to cover an entire species only if it gives animals who have it some survival or reproductive advantage over animals that do not. But scientists have found two ingenious ways to drive a non-advantageous gene through mosquito populations so that eventually all mosquitoes inherit it.

One is to attach the gene to a bacterium called *wolbachia*, which can be made to infect mosquitoes, becoming effectively a part of the insect. When GM females mate with males, they produce GM offspring, whether the males are GM or not. But because of the peculiar properties of *wolbachia*, non-GM females cannot have offspring with GM males. In other words, GM females will always have more children, eventually crowding out their non-GM



sity of California in Irvine, who is attending the conference at Imperial College. "There's no question of competition between transgenic and non-transgenic insects. What we're talking about is actually driving the gene through a population. It's an ambitious idea."

In the lab, Dr James's team has already inserted a gene into mosquitoes which makes it impossible for the parasite that causes malaria to gain a foothold.

Last year, a joint British-Ger-

rivals completely. The other method attaches the gene to a freakish chunk of DNA called a transposable element, which hops between chromosomes during reproduction.

Normally, mating between parents with different genes gives the offspring a 50 per cent chance of inheriting either gene. Because of the transposable elements moving around, however, the GM mosquito will always pass on the added gene to more than 50 per cent of its offspring - again, eventually covering an entire species.

Sixty of the 380 mosquito species can transmit malaria, although one, *Anopheles gambiae*, is responsible for a large part of the 2.7m deaths caused by the disease each year. In order to transform a single species, GM insects would have to be released in many locations to spread the gene through different populations of that species.

Steven Sinkins, of the Liverpool School of Tropical Medicine, who has done extensive research into mosquitoes and *wolbachia*, said tests of a complete system were unlikely in the next two years, but progress had been rapid.

"From the theoretical point of view, there's no reason why either approach should not be successful," he said.

The Guardian

Human embryo cloned in America

Washington, November 25

AN AMERICAN company today said it had cloned a human embryo in a breakthrough aimed not at creating a human being but at mining the embryo for stem cells used to treat disease.

This is the first time anyone has reported successful cloning of a human embryo and biotechnology company Advanced Cell Technology Inc. (ACT), based in Worcester, Massachusetts, hopes the experiment will lead to tailored treatment for diseases ranging from Parkinson's to juvenile diabetes.

"Our intention is not to create cloned human beings, but rather to make lifesaving therapies for human disease conditions, including diabetes, strokes, cancer, AIDS, and neurodegenerative disorders such as Parkinson's and Alzheimer's disease," Dr Robert Lanza, vice-president of medical and scientific development at ACT, said.

The reaction was quick and furious from



REUTERS PHOTO

ACT chief executive officer Michael West.

Congress, which has moved to outlaw all human cloning. A proposed new law is under consideration by the Senate.

Senate Majority Leader Tom Daschle said he did not quite understand what ACT had done. "But it's disconcerting ... I think it's going in the wrong direction," he said.

Science & Technology

"It will be a big debate, but at the end of the day I don't think we're going to let the cloning of human embryos go on," Alabama Senator Richard Shelby, a Republican, said. Vermont Senator Patrick Leahy, a Democrat, agreed. "I find it very troubling and I think most of the Congress would."

ACT used cloning technology to grow a tiny ball of cells that could be used as a source of stem cells.

"Scientifically, biologically, the entities we are creating are not individuals. They're only cellular life, not human life," Michael West, chief executive officer of ACT, said.

Federal law prohibits the use of taxpayer's money for cloning of human beings but ACT is a privately funded company.

The company said it had created only a single six-celled embryo. But West said had the embryo been placed in a woman's womb, it could have possibly grown into a human being.

Reuters

THE HINDUSTAN TIMES

26 AUG 2001

Man may be easier to clone than beast

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 Durham, August 16 1978

HUMANS MAY have a genetic advantage that makes them easier to clone than cows, sheep, pigs and mice, researchers at Duke University Medical Center said in a study published on Wednesday in *Human Molecular Genetics* magazine.

Humans have a genetic benefit that prevents foetal overgrowth — a major obstacle encountered in cloning animals — and cancer susceptibility, the researchers said.

"This is the first concrete genetic data showing that the cloning process could be less complicated in humans than in sheep," said molecular evolutionist and primary author of the study Keith Killian.

The genetic benefit in humans and other primates stems from the presence of two activated copies of a gene called insulin-like growth factor II receptor (IGF2R), the study said.

Virtually all non-primate mammals receive only one functional copy of the gene. The difference makes such animals more prone to developing cancer and suffering from cloning complications like overly large offspring, immature lung development, enlarged hearts and reduced immunity to disease, the researchers said.

The problems in animal cloning occur "when scientists



REUTERS

COPY CATS: Randy Jirtle (left) and Keith Killian in their lab at Duke University Medical Centre in Durham, North Carolina.

manipulate the fledgling embryos in the laboratory.

While the IGF2R gene remains intact, the 'epigenetic' markings — crucial information layered on top of the gene

sequence — are inadvertently damaged and alter the way the gene functions," said Randy Jirtle, professor of radiation oncology at Duke University.

AFP

Brain from skin

FOR THE first time, researchers have captured from the skin of humans and adult mice stem cells capable of growing into brain cells and a range of other tissues.

According to experts, the feat offers hope for treating neurological disorders.

The new research bolsters the view that scientists can find sources of stem cells other than human embryos, which are destroyed when the cells are extracted.

The stem cells harvested at McGill University's Montreal Neurological Institute have grown into smooth muscle cells, fat cells and brain cells, including neurons and glial cells, which produce the fatty white sheaths around nerve fibres in the brain that speed signals between neurons.

PTI, Washington

Human cloning experiments by Nov

S Rajagopalan
Washington

SIX DAYS after the US House of Representatives voted for a blanket ban on human cloning, an Italian and an American researcher were today getting ahead with cloning experiments, possibly by November.

Some 200 couples have reportedly volunteered to participate in the effort. Ahead of a conference at the National Academy of Sciences here, the duo in separate interviews strongly defended their move and brushed aside criticism that science is not yet ready for experiments in human cloning.

Panos Zavos, an American

fertility specialist, told the CNN that he would make an announcement at the conference later today. Zavos, a retired professor of Kentucky University and presently running a private company, said his team has been working with 200 infertile couples wanting to have babies.

His Italian research colleague, Prof Severino Antinori, has already attracted attention with his interview to the *Sunday Times*, London, two days back.

So much so that Italian medical authorities have warned him that he could lose his right to practice if he went ahead with his human cloning experiment. Zavos, indicating that research may have to be con-



AP PHOTO
Yu Changming displays his 'cloned' hand (left), at his 'human cloning' store in Beijing on Wednesday.

ducted outside the US in view of the opposition here, said the first step in the process would be to create cloned embryos for the infertile couples. It will be followed up with implanting an

embryo into a woman's uterus to start a pregnancy.

Antinori, who had helped a 62-year-old woman become pregnant in 1994, criticised the US ban, commenting: "You can't put up barriers on therapeutic cloning." Cloning, he said, would give mankind a chance to put an end to many diseases and enable infertile couples to have children.

Today's conference is also slated to resolve the confusion in certain quarters that regard human cloning and the embryonic stem cell research. Strong support exists in the US for stem cell research, including its federal funding, which is an issue that President Bush has to decide soon.

Scientists to defend human cloning

Washington

SCIENTISTS ARE set to defend their controversial plans for human cloning experiments on Tuesday to a US science panel that is grappling with the safety and ethics of making genetically identical people.

A National Academy of Sciences panel is gathering information in preparation for a report on whether the United States should impose a moratorium on human cloning, which the House of Representatives last week voted to outlaw.

A public meeting of the panel will feature presentations from Italian doctor Severino Antinori and Brigitte Boisselier, a biochemist and member of a UFO group known as the Raelians.

Both have announced plans to create cloned babies for couples.

Other scientists want to use cloning technology to test potential treatments for serious illnesses.

"Cloning will help us put an end to so many diseases, give infertile men the chance to have children. We can't miss this opportunity," Antinori said in an interview on Monday.

After arriving in Washington on Monday night, Antinori told reporters he could not imagine the US Government would close the doors to his scientific research. He said a US ban on cloning would be a "return to the Dark Ages."

"Tomorrow, I want to explain the important possibilities for the future of humanity that come from understanding the genetic possibilities that come with therapeutic cloning," Antinori, said.

Antinori's colleague, Panos Zavos, a fertility specialist also scheduled to speak at the meeting, told CNN on Monday that "we hope that in November we will begin" the process of creating cloned embryos for infertile couples. The next step is implanting an embryo into a woman's uterus to start a pregnancy.

Many scientists warn of horrific consequences if anyone tries to apply the techniques used to create Dolly the sheep to producing cloned people.

Animal cloning yields high failure rates and experts warn that most human attempts would end in miscarriages or births of deformed babies.

The Raelians, who believe in extraterrestrials and promote cloning as a chance for "eternal life," defended human cloning in a statement on Monday touting

Boisselier's appearance before the panel of scientific advisers. The group said in-vitro fertilisation was similarly feared two decades ago but had led to 200,000 births of healthy children.

The National Academy of Sciences panel is charged with examining the science behind current cloning research as well as the ethics of creating a person with the same genetic makeup as another. Some critics say it is wrong to produce a person that is not genetically unique, even though the clone would be younger and would grow up in a different time period from his or her genetic twin.

The House voted for a sweeping ban with violations punishable by fines of \$1 million or more and up to 10 years in prison.

Many scientists, patient

groups and the biotech industry oppose the ban because it would outlaw cloning for reproduction as well as "therapeutic cloning" in which scientists make embryonic clones to get stem cells for potential disease treatments. They plan to fight the legislation, which President Bush supports, in the Senate.

To clone a human, scientists would insert DNA from a person into an egg with its genetic material removed. The egg would be stimulated to divide into an embryo for research or implanting in a woman's uterus.

Separately, Bush is weighing whether to permit federal funding for studies of stem cells, versatile master cells that hold promise for treating serious diseases, from embryos slated for destruction at fertility clinics.

Reuters

200 women to undergo human clone trial

By John Follain Rome and Jonathan Leake

LONDON: A controversial Italian embryologist is preparing to impregnate up to 200 women with cloned embryos in the world's first attempt to produce a human clone. Professor Severino Antinori will tell the National Academy of Sciences in Washington on Thursday that he expects to start his cloning programme in November. The announcement will reignite an explosive debate about the ethics and safety of cloning for infertility treatment.

Antinori, whose Rome clinic enabled a 62-year-old woman to have a baby in 1994, said that up to 200 couples from several countries, including eight from Britain, were being select-

ed for the cloning.

Antinori said the males in most of the couples under consideration were infertile. They have no natural way of becoming fathers. The technique he intends to use is similar to that developed to produce Dolly, the sheep. A nucleus is taken from a cell belonging to the man, it is inserted into a woman's egg cell, from which the nucleus has been removed. The embryo is then implanted in her womb.

However, Antinori acknowledged that international hostility to cloning is such that he may be forced to work in a remote country or even on a boat in international waters.

In Ireland, the Medical Council, the regulato-

ry authority for doctors, would be highly unlikely to sanction any doctor under its jurisdiction joining such research.

In Britain, the Human Fertilisation and Embryology Authority, which has said it will never approve an application to clone a person, warned that any British doctor working on such a project abroad would come under intense scrutiny.

Scientists have expressed concern that cloned babies would be at high risk of miscarriage, stillbirth or disability. Dr Peter Brinsden, medical director of the Bourn Hall Clinic near Cambridge, a leading fertility centre, recently resigned from a group advising Antinori. It is still too early, he said. *(The Sunday Times)*

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- 6 AUG 2001

ORGAN TRANSPLANTS

In another species, a potential source

To counter a chronic shortage from human donors, scientists are looking to pigs as an alternative source of transplantable organs. With some genetic tinkering, pigs could someday provide hearts, kidneys and other organs for the tens of thousands of people who need them. There are several organs that could be compatible.

Heart

Size and plumbing are almost identical. "Lay them on the table" says Dr. David Sachs, "and the two organs would look the same." Heart rates are also compatible — pig hearts beat 95 to 115 times a minute, ours 60 to 100.

Lungs

Similarities in size and respiratory rate are promising but lungs are very susceptible to infections, such as pneumonia.

Liver

Scientists are optimistic about the similarities, but because the liver produces so many proteins and hormones, there's a greater risk of incompatibilities.

Kidney

Size and rate of filtration and blood flow are similar. But human kidneys make a hormone that stimulates red blood cell production — it's unsure whether pig kidneys would do so.

Pancreas

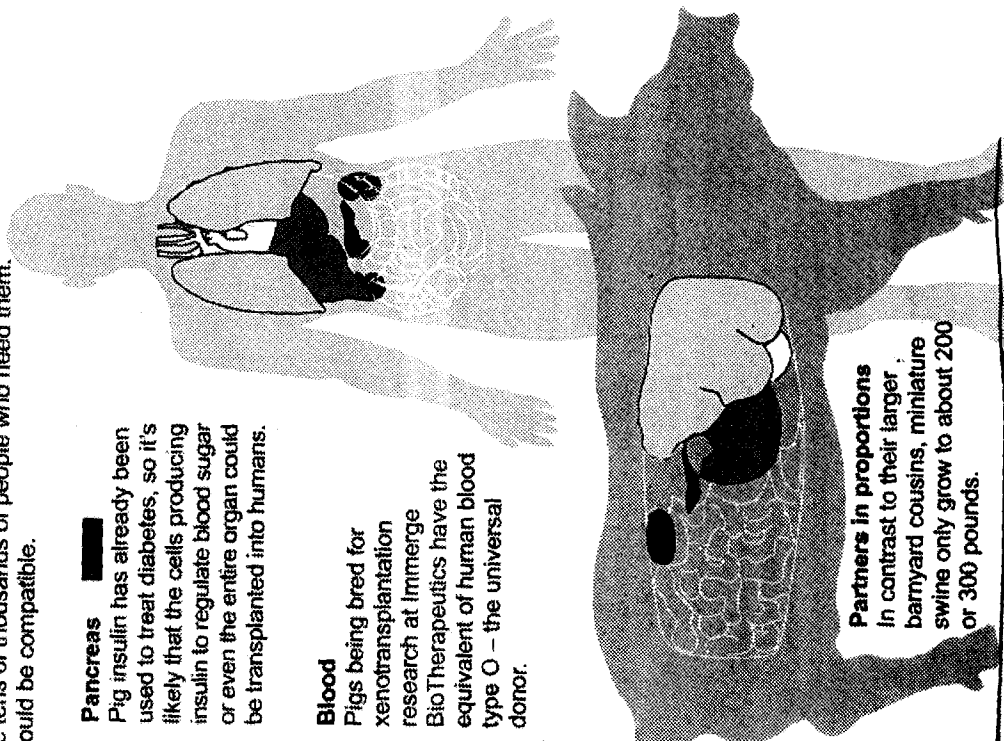
Pig insulin has already been used to treat diabetes, so it's likely that the cells producing insulin to regulate blood sugar or even the entire organ could be transplanted into humans.

Blood

Pigs being bred for xenotransplantation research at ImmERGE BioTherapeutics have the equivalent of human blood type O — the universal donor.

Partners in proportions

In contrast to their larger barnyard cousins, miniature swine only grow to about 200 or 300 pounds.



SOURCES: Dr. David Sachs, ImmERGE BioTherapeutics; General Hospital; Julia Greenstein, ImmERGE BioTherapeutics

US House votes to ban all types of human cloning

By MEGAN GARVEY

WASHINGTON: After contentious debate, members of the House of Representatives on Tuesday approved a sweeping ban on human cloning, a divisive issue that echoes the quandary facing President Bush on stem cell research.

Representatives grappled for more than three hours with the moral and legal thicket of human cloning before voting 265-162 to approve the Human Cloning Prohibition Act of 2001. It would impose steep criminal and civil penalties on any individual violating the ban — even scientists who create cloned human cells solely for research purposes.

The penalties make participation in human cloning in any way — from creating cloned human cells to receiving medicine based on such research done abroad — subject to a felony conviction that could bring a 10-year prison term, and, if done for profit, civil penalties of more than \$1 million. Critics said the penalties could create a brain drain of scientists, departing to work in England or other countries. A similar bill has been introduced in the Senate by Sen Sam Brownback, but it is not clear if Sen Tom Daschle, who has said he opposes cloning "under virtually any circumstances" will bring the measure to the floor. The White House has strongly backed the complete ban.

White House members ex-

pressed universal opposition to reproductive cloning — the actual production of a cloned baby — they were deeply divided on whether human cells should be cloned solely to be used for the research and treatment of disease, a practice called therapeutic cloning.

A narrower, competing amendment that would have allowed cloning for research was defeated, 249 to 178. The heated debate on human cloning was part primer on complicated medical science and part theology seminar. With charts and graphs, House members tackled one of the key issues facing elected officials in a world where the boundaries of science are ever-expanding: When does life begin?

As lawmakers gave their answers, many supporters of a ban on any form of human cloning talked about a vision of the future that not long ago would have seemed like science fiction: farms of human embryos, questions about the rights of cloned embryos, a world where parents can produce designer children.

Rep James R Sensenbrenner, the chairman of the Judiciary Committee, which earlier this year held hearings on cloning, called it a "new brave world of Frankenstein science" and argued allowing even research would be a "slippery slope". Backers of a limited ban rejected that view as an "excessive fear of science and the possibility of scientific research." Instead,

they resented that most new inventions of medicine — from auto-pics to vaccines to X-rays — have been greeted with skepticism and even outrage.

The science involved in cloning is closely related to stem cell research — the subject of much national debate in recent weeks as Bush has mulled his long-awaited decision on federal funding.

Stem cells are considered crucial to future medical breakthroughs. They make up the earliest form of human life and have the power to become nearly any other type of cell or tissue in the body. Scientists hope to learn how to fashion them into everything from replacement organs for Parkinson's patients to new pancreas cells for diabetics.

More than 260 members of Congress — including many staunch opponents of abortion — support federal funding for stem cell research that involves embryos created in fertility treatments that would otherwise be discarded. But cloned cells would be created expressly for research.

Some scientists say stem cell research on cloned cells may offer the best hope for developing successful replacement body parts — in effect replacing a patient's organ with a copy made based on her own genetic code.

But that prospect was rejected as "ghoulish" by some who backed the total ban. (LATWP Svc)

Healthy clones can carry genetic abnormalities

By ROBERT LEE HOTZ
Strengthening the scientific case against human cloning, researchers have discovered that even apparently healthy clones may harbour unpredictable genetic abnormalities.

In experiments with laboratory animals, scientists at the Whitehead Institute at the Massachusetts Institute of Technology and the University of Hawaii discovered that clones created with embryonic stem cells develop apparently capricious errors in when and how their genes become active. Those errors can lead to premature death or serious abnormality in the resulting animals, the researchers said. The research also found that stem cells themselves are surprisingly unstable.

The findings offer new evidence to bolster misgivings about the basic biology of cloning.

"It is a technical tour de force," said developmental biologist Brigid Hogan at Vanderbilt University and the Howard Hughes Medical Institute. "This certainly is raising a flag." The new research, published Friday in *Science*, comes as federal investigators have targeted a U.S. laboratory where members of a religious sect were allegedly experimenting with ways to clone a human being. Two fertility experts have also recently announced their intent to try to clone a human being.

The new research could also influence the debate over a separate use of embryonic stem cells to create tissues for research on diseases and their treatments. The Bush administration is expected to decide soon whether researchers, who take government money, should be allowed to work on tissues derived from embryonic cells.

Medical researchers hope to use stem

cells to produce perfectly matched tissues to replace or repair organs that have stopped functioning, thus treating diseases including diabetes, heart problems, Parkinson's and perhaps allowing the replacement of body parts. The work is controversial because obtaining the stem cells requires the destruction of embryos.

"I am concerned that this (research) may feed those who want to ban the research," said Robert Lanza, vice president of medical and scientific development at Advanced Cell Technology, which is researching human embryonic stem cells for the treatment of several diseases.

The scientists who conducted the new research, however, said their findings should not alter the potential of stem cell technology as a source of disease therapies. The problems discovered in the new research only arose when the cloned embryos were forced to develop into a mature animal, said Rudolf Jaenisch at the Whitehead Institute, the senior scientist on the project. Those who support human cloning say the technique could be used as a means of human reproduction for childless couples unable to conceive with more conventional medical assistance, for those seeking to regenerate a loved one, or for people wanting to copy themselves. The new research calls into serious question the safety of all those ideas, cloning experts said.

"Our findings clearly argue against reproductive cloning," said Dr Jaenisch. "Even apparently normal clones may not be normal. We have the hard evidence now."

The research suggests there can be errors in a cloned embryo that even a conscientious infertility specialist could not detect in a screening procedure. That may be an

insurmountable safety problem for reproductive cloning, said Alexander M. Capron, an expert on biomedical ethics at the University of Southern California Law School who is a member of a national bioethics commission.

"It undermines the claims of those who say that they will be able to select out good cloned embryos from those with abnormalities," Dr Capron said. "This is a false hope."

Since 1997, when the first adult mammal was cloned, researchers around the world have successfully cloned sheep, cattle, mice, goats and pigs. A Korean team even reported cloning a human embryo. But researchers have been unable to clone many other species such as rabbits, rats, cats and dogs.

In all species, success rates are low. To better understand why so many cloned animals either die or are abnormal, Dr Jaenisch and David Humphreys at the Whitehead Institute and their colleagues cloned generations of mice to study the behaviour of six genes responsible for normal fetal growth and development. The activity of these genes normally varies depending on which parent they come from.

The researchers looked at embryonic stem cells, which can on their own give rise to all the tissues an organism requires, because they more readily produce clones that survive pregnancy and birth into adulthood.

To create genetically identical animals by cloning, researchers transfer the nucleus of an adult or embryonic cell into an unfertilised egg from which the nucleus has been removed. The newly constructed embryo cell contains a full set of chromosomes —

much as a normal embryo would — but must revert to a more primal state in which it can recover an embryo's ability to develop into a new organism.

As part of the cloning process, within a few hours of the new cell's creation, its biological clock must be reset. That affects when and how genes turn on and off at critical moments of development.

In the research reported on Friday, the scientists discovered that the genes themselves were normal enough in the cloned animals. But the chemical cues that orchestrate when the genes turn on and off went awry in a variety of almost random ways. The activity of the genes varied significantly in the placentas and kidney, heart, and liver of cloned mice, compared to normal mice and mice created by in vitro fertilisation.

The problems also cropped up when the mice were grown directly from the embryonic stem cells, without the extra step of cloning. The embryonic cells, themselves, seemed extremely unstable when grown in the laboratory, with even sister stem cells showing wide variations in when genes were active, the researchers reported.

The cloning process also appeared to be at fault. "You don't see these huge missing chromosomes or a chunk of DNA missing or a mutation," said cloning expert Mark Westhusin at Texas A&M University. "What you see is abnormal gene expression and there is no way to predict it."

"They are almost like environmental effects, where the environment is the cloning process itself," Dr Westhusin said. Despite the genetic problems, many of the cloned mouse embryos survived into adulthood. That suggests that mammalian development is surprisingly tolerant of genetic mistakes, the researchers said. (LATWP 5/6)

HEALTH & SCIENCE

Mind continues after brain dies: UK scientist

Los Angeles

A BRITISH scientist studying heart attacks says consciousness may continue after the brain has stopped functioning and a patient is clinically dead.

The research, presented to scientists last week at the California Institute of Technology (Caltech), resurrects the debate over whether there is life after death and whether there is such a thing as the human soul.

"The studies are very significant in that we have a group of people with no brain function who have well-structured, lucid thought processes with reasoning and memory formation at a time when their brains are shown not to function," Sam Parnia, one of two doctors from Southampton General Hospital in England who have been studying so-called near-death experiences (NDEs), said.

"We need to do much larger-scale studies, but the possibility is certainly there" to suggest that consciousness, or the soul, keeps thinking and reasoning even if a person's heart has stopped, he is not breathing and his brain activity is nil, Parnia said.

During the initial study, Parnia said, 63 heart attack patients who were deemed clinically dead but were later revived were interviewed within a week of their experiences.

Of those, 56 said they had no recollection of the time they were unconscious and seven reported having memories. Of those, four were labeled NDEs in that they reported lucid memories of thinking, reasoning, moving about and communicating with others after doctors determined their brains were not functioning.

Among other things, the patients reported remembering feelings of peace, joy and harmony. For some, time sped up, senses

heightened and they lost awareness of their bodies.

The patients also reported seeing a bright light, entering another realm and communicating with dead relatives. One, who called himself a lapsed Catholic and Pagan, reported a close encounter with a mystical being.

Near-death experiences have been reported for centuries but in Parnia's study none of the patients were found to have received low oxygen levels, which some skeptics believe may contribute to the phenomenon.

When the brain is deprived of oxygen people become totally confused, thrash around and usually have no memories at all, Parnia said. "Here you have a severe insult to the brain but perfect memory." "With cardiac arrest, the insult to the brain is so severe it stops the brain completely. Therefore, I would expect profound memory loss before and after the incident," he added.

Since the initial experiment, Parnia and his colleagues have found more than 3,500 people with lucid memories that apparently occurred at times they were thought to be clinically dead. One patient was 2-1/2 years old when he had a seizure and his heart stopped. His parents contacted Parnia after the boy "drew a picture of himself as if out of his body looking down at himself. It was drawn like there was a balloon stuck to him. When they asked what the balloon was he said, 'When you die you see a bright light and you are connected to a cord.' He wasn't even 3 when he had the experience," Parnia said.

"What his parents noticed was that after he had been discharged from hospital, six months after the incident, he kept drawing the same scene."

Reuters

Cancer

FROM PAGE 1

Going through the paper, titled Implication of the bioelectronic principle in cancer therapy: treatment of cancer patients by methylglyoxal-based formulation, "I realised that the findings were important and should be published on a priority basis."

Usually, a paper is vetted by the editorial board of the journal for almost six months before it is okayed for publication, he added.

The findings have also been submitted to Nature, the prestigious international journal on scientific issues.

Officials from the department of science and technology in New Delhi have contacted the IACS here. IACS sources said the officials wanted details of the research. The department may offer additional support to the project.

Cancer drug awaits funds, hospital test

BY AMIT UKIL

Calcutta, May 29: Enquiries from relatives of a number of patients suffering from cancer have flooded the offices of the Indian Association for the Cultivation of Science (IACS) after reports of the development of a promising new cancer drug were published today.

The research team, led by Prof. Manju Ray of the biological chemistry department of the IACS, Calcutta, has developed a drug that shows potential of achieving a breakthrough in the treatment of the dreaded disease.

However, though the results on 16 of the 24 patients on whom the drug was tried have shown encouraging results, "it is not a magic bullet". There is no guarantee that all patients suffering from cancer will benefit from the formulation, a doctor associated with the research said.

Contacted in Pune, where she has gone for a meeting, Prof. Ray said she had wanted to avoid reports coming out in the media at this stage as there would be numerous enquiries once people got to know about the drug.

This was more so because the trials in Calcutta were conducted on patients who had reached a terminal stage of the disease, and on most of them the drug had had a positive effect.

"The research is not complete as yet. We require more funds to carry out multicen-

tric trials on more patients in other places of the country. There are several aspects of the study that need to be worked on," she said. "Phase III" hospital trials also need to be conducted.

Phase I trials are conducted in the laboratory, on animals and human cells in test tubes. Phase II trials are conducted on a few isolated patients who volunteer for the treatment and who are usually in home-based care. Phase III trials are conducted on a larger number of patients at different centres throughout the country.

But once a section of the research — a study on 24 patients undergoing home-based care — was complete, she approached the editor of the Indian Journal of Physics, a prestigious science journal brought out by IACS, so that the encouraging results could be announced in the scientific community.

The journal, which was the first to publish C. V. Raman's famous breakthrough (the Raman Effect) in physics, has a special section called "Rapid Communication" in which late-breaking developments and papers are accommodated.

"A day before the April issue was to go to press, Prof. Ray approached me with the paper," said the journal's editor, Prof. S.P. Sengupta. "She wanted the findings published as soon as possible so that they could be announced in the scientific community."

CONTINUED ON PAGE 4

Living with AIDS

To battle the disease you need information and realism

AT an international conference on HIV/AIDS, an Indian delegate had boasted that his country was relatively better protected from the disease because Indians were a moral people who were faithful to their spouses. While it may be tempting to believe him, statistics have a nasty way of puncturing such fantasies. According to the latest surveillance data from NACO, India—despite its moral ethos and marital faithfulness—is home to an estimated 3.86 million people afflicted by this condition. A closer look at data emanating from antenatal clinics in seven major Indian cities indicates that HIV infection has crossed the 2 per cent level in Mumbai, is more than 1 per cent in the cities of Chennai, Bangalore and Hyderabad, and is below 1 per cent in Calcutta, Ahmedabad and Delhi. Given these figures which indicate the increasing spread of HIV/AIDS, it seems there is nothing that is more likely to further the spread of the disease than complacency and self-delusion, both of which we seem to have rich reserves of.

Other nations have been more pragmatic and therefore have better records in addressing the threat. Take Thailand, believed to be the first country in Asia where HIV/AIDS surfaced—its first case was detected in the early 1990s. The initial response of the authorities there was one of alarm, which led in turn to kneejerk responses like the legislating of draconian laws. Slowly, wiser counsel prevailed as HIV/AIDS was perceived, not just as a health issue, but a societal one. A two-pronged approach was adopted. One was about monitoring cases and putting an effective health delivery system in place, the other concen-

trated on educating the public about the dangers of HIV/AIDS and how people can protect themselves against it. Today HIV/AIDS has not disappeared from Thailand. But instead of the projected four million cases by the year 2000, the number of the afflicted is in the region of one million, and fresh cases are also said to be plateauing. A similarly enlightened approach has helped a country like Senegal notch one of the success stories from Africa. Here, even imams did their bit in getting the message of AIDS prevention across through their Friday sermons.

Clearly then, when it comes to HIV/AIDS, the ostrich act does not work. If India had internalised a new pragmatism in its own programmes, it would have made more conspicuous progress. True, in certain aspects of disease management, India has done fairly well, like in the stricter monitoring of the blood used in transfusions and the wider distribution of contraceptives like condoms among high-risk groups. But given the size of the population and the already severe health problems it faces—India has the highest incidence of tuberculosis in the world—there is a great deal more to do, especially in the area of educating people about HIV/AIDS, not just in terms of protecting themselves but in taking care of those unfortunate enough to contract it. Twenty years have gone by since the first official report of a disease—christened Acquired Immunodeficiency Syndrome or AIDS—was published. It is believed to have killed more than 21 million people over the last two decades. Fighting it is really a race against time, not just for the world, not just for Africa, but for India too.

UN asks rich nations to combat AIDS

UNHQ, June 28

THE UN General Assembly has adopted a declaration outlining steps to combat HIV/AIDS pandemic and urged prosperous nations to pay billions of dollars over the next decade to help fight the disease that has so far claimed 22 million lives.

The 16-page declaration, adopted last night at the end of a three-day special session, is not enforceable but sets important benchmarks to determine the progress towards containing the disease.

An important aspect is that the document does not consider the disease only as a medical problem but views it as economic, social and human rights issue. It calls for corrective steps to ensure that women are not exploited and forced into unsafe sex. Under pressure from Islamic

countries and the Vatican, the final document dropped explicit reference to homosexuals, prostitutes and intravenous drug users as vulnerable groups. But it called for special attention to the groups at risk. After days of discussions, proposals and counter-proposals, the West agreed to drop the references to get the declaration through.

But diplomats said the heart of the document remains intact and the discussion on the issue has opened debate on such groups even in most conservative nations.

The document asks Governments to create national policies to reduce infection rates in three to five years and protect those at risk. It seeks cooperation between Governments and the private sector and calls for making drugs affordable.

Under criticism from activist groups and pressure from generic drug manufacturers, who offered to sell drugs at low rates, pharmaceutical companies have reduced prices in recent days but they are still very high and beyond the reach of a majority of individuals and nations.

The document calls for formulation of national policies by 2003 to reduce the infection rates by 25 per cent within two years in the most affected country and by 2010 globally.

Calling for a major effort to save infants from HIV/AIDS, the document sets the target of reducing the infection among them by 50 per cent by 2005 by providing treatment to HIV positive mothers.

The document wants member states to put in place national policies by 2003 to combat the dis-

ease, finance the campaigns including availability of drugs at affordable prices, remove the stigma attached to the disease, break the wall of silence and eliminate discrimination against people HIV/AIDS.

The document wants to eliminate discrimination against women and traditional and customary practices which lead to their abuse. It wants protection for rape victims, specially in cases where the rapist is the husband or the woman's sex partner.

By 2005, it wants countries to show progress in implementing comprehensive healthcare programmes, strengthen response at the workplace to those suffering from the disease and provide supportive environment for those infected with HIV.

Significantly, the document supports UN Secretary General

Kofi Annan's demand for establishment of a global health fund to finance the programmes in developing nations.

The document sets the target of annual expenditure of seven to 10 billion dollars in low income and middle-income countries by 2005 and asked member nations to support the fund.

"After today, we shall have a document setting out a clear battle plan for the war against HIV/AIDS, with clear goals and a clear timeline...It is a blueprint from which the whole of humanity can work in building a global response to a truly global challenge," Annan said.

He iterated that an additional seven to 10 million dollars would be needed annually to implement the targets set in the document and reverse epidemic.

AP/PTI

A SECOND LOOK

19-10

AS A SPECIAL Session of the United Nations General Assembly meets to discuss how to combat the global spread of the Acquired Immune Deficiency Syndrome (AIDS), an important process has begun in the World Trade Organisation whose outcome will have a bearing on how far developing countries can go in providing care for those already afflicted by the Human Immunodeficiency Virus (HIV). Last week, members of the WTO had their first meeting ever about the impact that the current rules on patents have on public health. Of course, drug patents affect the cost of treatment in a number of diseases and not just HIV/AIDS. But it is the extremely high cost of medication with patented drugs in HIV/AIDS care that has brought this issue to the surface again within just a few years of the signing of the agreement on Trade-Related aspects of Intellectual Property Rights (TRIPS).

What is on the agenda at this point is not a modification of TRIPS — though a number of organisations, economists and even Governments have argued in favour of such an eventuality — but explicit clarifications on how much flexibility the WTO agreement provides to Governments to meet public health objectives by over-riding the rights of patent holders. TRIPS makes explicit provision for the grant of compulsory licences to third parties and less explicitly for parallel imports. Both are useful instruments that have been used outside TRIPS but mainly in the developed countries to check anti-competitive behaviour by patent-holders. But because the TRIPS agreement is not exhaustive in its listing of the grounds on which compulsory licences can be issued and because of the ambivalence on parallel imports, the flexibility of TRIPS remains on paper. Over the past year, global drug companies have shown that they are less than open about Governments exercising their options on parallel imports. In a

high-profile case in South Africa, more than three dozen companies filed a petition against new legislation that would have allowed the Government to import drugs — patented and non-patented — at the lowest price from anywhere in the world. The suit was eventually withdrawn, but only because a sustained campaign by global public health groups brought the companies more bad publicity than they could bear. In another case that is now before the WTO's dispute settlement process, the U.S. has contested Brazilian legislation that would allow parallel imports and use of compulsory licences in case the patent holder does not "work" the patent (i.e., produce the product) locally.

There is an expectation among a number of developing countries — including India — that the ongoing discussions will lead up to the issue of a statement at a political level at the WTO's ministerial meeting in November about the priority of public health over intellectual property rights. That is a negotiating battle that is yet to be fought, for, while there is now much greater public concern world-wide about the cost of patented health care, a number of Governments — especially the U.S. and Switzerland — remain insistent about the paramount importance of intellectual property rights. The U.S. has expressed its willingness to be flexible when it comes to HIV/AIDS care and it has pointed to the WTO provisions on the use of compulsory licences when there is "a national emergency" like the current incidence of AIDS in some countries. But the issue now goes much further than HIV/AIDS care. It is also about the future cost of health care in a variety of diseases and illnesses such as tuberculosis and malaria. Public and private health care will become more expensive if Government policy is straitjacketed by the provisions of TRIPS as it is now written.

THE HINDU

19-10

Fact and fiction about AIDS

By Siddharth Dube

Across India, we are in a vicious cycle of doing far too little too late to combat AIDS.

TO HEAR the fiction about India's AIDS epidemic, speak to our politicians, bureaucrats, and journalists. The vast majority will assure you: "There is simply no disease called AIDS. It's a myth! Anyway, even if it exists, it's not a problem in India, unlike Africa or the West. And if there are so many thousands dying in India of this disease, where are they, why don't we notice? AIDS gets so much attention only because of those U.N. agencies and foreign donors — and those socialites looking for a fashionable cause. Anyway, why worry, no respectable, useful people are getting infected — only prostitutes, homosexuals and the poor."

To hear another variant of this fiction, speak to the bureaucrats who head the National AIDS Control Organisation and its State-level equivalents. They will assure you: "Yes, AIDS is a problem, but we have it firmly under control. So you don't need to worry. The U.N. agencies are absolutely incorrect to say that lakhs of Indians are dying each year of AIDS. We are the only source for statistics! No, the U.N. is also wrong to say that five lakh Indians are contracting HIV every year — only 1.6 lakh Indians got infected in 2000."

If only fiction were fact. Unfortunately, the facts are many orders more harrowing. Here are the facts, as I understand them based on over a decade of working on AIDS, access to restricted documents at the World Bank and other agencies I have worked for, and conversations with impartial experts.

AIDS now kills about three lakh Indian adults each year. This is roughly 15 times the number of people killed in the Gujarat earthquake. And in the past 15 years, since HIV first surfaced in India, some 20 lakh to 25 lakh Indians have died of AIDS, that's a 100 or more Gujarat earthquakes.

AIDS is already the second largest killer of Indian adults, second only to TB. But in a couple of years, AIDS-caused deaths will outstrip TB. At that point, just from the numbers of Indians currently infected — even if not one more Indian is infected from today onwards — well over 10 lakh adults will be dying each year from AIDS, that's about 50 Gujarat earthquakes each year! AIDS will then be in-

dia's foremost killer disease. At a minimum, between 40 lakh to 50 lakh Indians are currently infected, not including the 20 lakhs to 25 lakhs who have already died. Another five lakh Indian adults are getting infected every year — one new adult every minute!

Three States — Maharashtra, Andhra Pradesh and Karnataka — are in the midst of full-blown epidemics, with well over two per cent of all adults infected. Another three States follow just behind — Tamil Nadu, Manipur and Nagaland. In about eight to ten urban areas of these six States, three to five per cent of adults are infected. These include such major cities as Pune, Kolhapur and Hyderabad. These are among the most severely affected areas outside Africa, on a par with Thailand, which has been battling a severe epidemic for a decade. And every year, the number of States with worsening epidemics swells — Kerala just crossed the one per cent infection level amongst adults, and even remote Orissa is nearly there.

It is not just the poor who are contracting HIV. For proof, look at the members of the "Positive People's Groups" that are mushrooming in every major urban area, from Delhi to Bangalore to Vijayawada — they are middle and upper income, not blue-collar, not poor.

India's epidemic is running far, far ahead of the Government's response. Even in our six worst-hit States, we are not doing one-tenth of what Thailand did before it could curb its epidemic — and spending only 1/15th of what that country invested in AIDS prevention. Across India, we are in a vicious cycle of doing far too little far too late: to date, only a tiny fraction of prostitutes — or for that matter, injecting drug users, homosexuals, migrants or young people — are getting the information and support they need to protect themselves and others. And another vicious cycle of overwhelming financial needs that continue to skyrocket — witness the Government's argument that it simply cannot afford to

We then need to insist that our health care system is improved, right-away. The Government simply has to find the money and commitment to ensure that every Indian has access to decent health services, including prevention and care for sexually-transmitted diseases and TB. HIV/AIDS cannot be fought where health services barely exist.

We also need to insist that NACO is moved from the Health Ministry to an inter-ministerial council chaired by the Prime Minister, with the Health Minister as deputy. (In parallel, at the State level, Chief Ministers have to make the state AIDS agencies report directly to them.) And that NACO be run in a committed, transparent and participatory fashion, serving the needs of all Indians, not as the high-handed, secretive, stonewalling bureaucracy that it is now.

We need a NACO that is dedicated to ensuring that no more Indians get infected, and that no more die because they cannot afford treatment with anti-retrovirals and other medicines.

We also need to insist that all Indians be given comprehensive sex education that will dispel the confusion about HIV/AIDS and enable them to protect themselves. In addition, young people everywhere must have regular face-to-face counselling on safe sex. (Politicians who believe that they are our moral police should be told firmly that we value lives, not misplaced prudery.)

And we also need to insist that laws and policies are changed to empower and protect people already infected or those from especially vulnerable groups. No more police raids on prostitutes, no more forced testing on the orders of feudal-minded judges, bureaucrats and politicians! Commercial sex work needs to be decriminalised. So does homosexuality. The Supreme Court ruling suspending the right of marriage of infected people must be repudiated. Discrimination in the private sector against infected people must be made illegal. Does our AIDS epidemic warrant such far-reaching changes? Absolutely yes.

(The writer is a health policy expert.)

LANDMARKS IN AIDS

JUNE 2001 IS a landmark in the history of the pandemic that is HIV/AIDS. It marks the 20th anniversary since an unknown virus was first identified by clinical medicine in the U.S. The virus is of course much older, but it was only in 1981 that the world was alerted to what has become a global scourge rivalling the medieval plague. Over the past two decades AIDS has taken the lives of some 21 million people and it is now a disease overwhelmingly of poverty that is currently concentrated in the developing countries. Today 36 million people world-wide are believed to be infected with HIV, with India home to the second-largest HIV population. Tens of millions more may die, an entire generation may be wiped out in some countries and societies and economies severely disrupted before the pandemic falls off, as projected, in the third decade of this century. But this devastation is not inevitable. One country, Brazil, has already shown that even a relatively poor society can, with government-citizens' group co-operation, dramatically lower the rate of new infections, reduce mortality and provide free treatment for all HIV patients. Governments of the world have an opportunity to make June 2001 the second landmark in the history of the pandemic if they use a special meeting convened at the U.N. to make a commitment to contain the global spread of HIV and provide medication to those already afflicted by the virus.

While researchers continue to investigate the possibility of a vaccine against HIV, the only cure in the foreseeable future is prevention. But success in prevention requires extensive and intensive education and persuasion on safe sex practices, monitoring of blood transfusion and an end to sharing of needles among intravenous drug users. Simple these measures may be but they require the expenditure of considerable sums of money on innovative programmes. That condom use in sub-Saharan Africa, the region most afflicted by the pandemic, remains at under 10 per cent shows just how far HIV/AIDS

prevention programmes need to travel. Funds are also required for providing highly active anti-retroviral therapy (HAART), medication which replaces inevitable death for the HIV-infected with an opportunity to lead a useful life. This medication which with patented medicines typically costs over \$10,000 a year in the U.S. is now available at \$350 or less with the use of generic medicines, produced largely by Indian companies. Academics at Harvard University estimate that it will require no more than \$1.4 billion a year to provide HAART globally, a sum that would rise to \$4.2 billion by the fifth year of a programme. This means treatment is eminently affordable for the world, even if the poor countries cannot on their own finance even a generic drug programme.

The U.N. Secretary-General, Mr. Kofi Annan, has proposed an annual \$7-10 billion Global AIDS and Health Fund to fight AIDS, malaria and tuberculosis, with the larger share earmarked for HIV/AIDS. Unfortunately, in the two months since this fund was proposed the global response has been less than enthusiastic. Financial commitments so far have totalled a measly \$350 million. Donors have discouraged any talk of using the funds to buy generic drugs and have instead spoken of using it solely for prevention. It would be a crime of a different kind if the availability of affordable treatment is not taken advantage of on the ground that patents on medicines need to be protected. A sustained global campaign by citizens' groups and a string of bad publicity events have forced patent holders to drop their prices for anti-retroviral drugs. But these are still far too expensive for a global treatment programme. It would be a scandal if the U.N. General Assembly Special Session at the end of the month is not used by the world community to make the funding of the Global AIDS and Health Fund a reality and to agree on a programme that gives equal importance to prevention and treatment.

Horrifying possibilities of genomic revolution

By JUSTIN DAVIDSON

Don't look now, but the Genomic Era has arrived, bearing a warning label for our times: Being More Healthy May Be Harmful to Your Health. A news ticker at the entrance of a new exhibit at the American Museum of Natural History, "The Genomic Revolution," predicts that we may routinely live to 130, cancer may become extinct and surgery may vanish into the barbaric past. But all these shiny maybes come bundled with caveats.

Step into the show and you confront some other, more horrifying possibilities: affluent parents could order their babies out of a genetic catalog, creating a race of uber-yuppies; corporate behemoths such as Monsanto could blanket the planet with uniformly engineered corn that would feed the starving for a while and then all fall victim to a mutant pest, creating a global famine; insurance companies could demand newborns' genetic records, then refuse to cover those with expensive diseases in their futures; individuals could face the devastating certainty of developing untreatable diseases.

"The Genomic Revolution" is an eminently responsible exhibit, balanced to a fault. No rah-rah scientist is permitted to speak without equal time being given to a corresponding Cassandra. And so, in the video loop that runs on screens posted throughout the galleries, the iconic cheerleader of genetic research (and Nobel laureate) James Watson must yield to the anti-scientist Jeremy Rifkin's doom-filled hyperbole. (Designing one's children, he warns, will be "the ultimate shopping

experience.") This small, excited and fearful show captures something crucial about this country's ambivalence toward progress and technology. Gone is the expansive, even loopy optimism about the future embodied in the World's Fairs of 1939 and 1964. Gone is the pride of a virile nation thrusting into outer space. The technician-superheroes of half a century ago — square-jawed men such as John Glenn, Buzz Aldrin and Chuck Yeager — have no successors.

Computer pioneers such as Bill Gates and Steve Jobs have earned unthinkable fortunes but never much popular affection. Perhaps the most visible genomic revolutionary is Craig Venter, the Celera CEO who achieved simultaneous fame and notoriety by squabbling with government scientists over the right to make money by sequencing genes.

All of us have lived with the consequences of scientific arrogance — the frenzied arms race of the Cold War, the vast tundras of industrial pollution, the nuclear leaks, the vanishing ozone — and society is surely right to raise an eyebrow at new claims and demand that some thought be given to consequences. The genetic frontier is also different in that every discovery opens up great tracts of uncertainty, and we have not yet come to a consensus about how much we really want to know. We are looking into our genomic future like children at a scary movie, through fingers parted but ready to snap closed.

At the top of our list of terrors is that the ability to read and understand our genes could lead us to give up cherished mythologies. After all, the statement "all men are created equal" is, by the lights of evolutionary bi-

ology, patently absurd. People are born endlessly variable, and genetic research could, in principle, allow us to describe those differences minutely and predict who will make a better swimmer, a finer musician. The exhibit takes pains to point out that success is mostly a matter of hard labor. But it does leave us with the possibility that society might lavish training, education and money on the genetically well-equipped and neglect the less promising, thus transforming the genome into a self-fulfilling prophecy.

The notion that the West could research itself into becoming a more repressive society amounts to an epic lack of faith in ourselves. At every step, the science of genetics will offer each of us new choices and the option of making mistakes we had never dreamed of. In several videos, the exhibit documents the values that individual families must cross — for example, the couple who selected the specific embryo that could supply a debilitated first-born child with the bone marrow she needed. The genomic revolution is different because we fear what we will do to ourselves, not what will be done to us.

"The Genomic Revolution" trails off into a darkened, empty gallery, waiting to see what miracles take place in the six months before the show closes. Genetics is a science of fantasy, a body of knowledge still in its earliest phase. And yet, despite the immensity of truths we can't yet know, one thing seems certain: We will someday look back on "The Genomic Revolution" and smile — not because the science was still so primitive in the early days of the 21st century, but because we feared all the wrong things. (LATWP SVG)

THE TIMES OF INDIA

THE TIMES OF INDIA

18 JUN 2000

G-8 may finance

509 AIDS battle 4/6

YOMIURI SHIMBUN
ASIA NEWS NETWORK

TOKYO, June 3. - The Group of Eight major industrial nations are expected to announce a plan to establish a fund to finance a global war on AIDS and other infectious diseases at the upcoming G-8 summit in Genoa, Italy, according to government sources.

A G-8 declaration to be issued at the three-day summit in July will call for global efforts to combat three major infectious diseases that afflict many parts of the world - AIDS, malaria and tuberculosis, sources said.

Earlier, US President Mr George W Bush, UN Secretary General Mr Kofi Annan and Nigerian President Mr Olusegun Obasanjo jointly announced plans to set up a fund to battle infectious diseases. The G-8 initiative is part of an effort to back up that plan.

Summit host Italy has insisted \$1 billion should be raised for the G-8 fund - to be made up of \$500 million in donations from the G-8 and other nations, and another \$500 million from the private sector.

The Japanese government, however, remains cautious about a proposal that the G-8 declaration include a fixed amount to be raised for the fund.

Japan's attitude reflects a widespread view that its budgets for fiscal 2002 and later years are certain to reduce official development assistance. It is also unclear how much each government will be able to obtain in private-sector donations, according to the sources.

In addition, the G-8 countries will discuss other important issues related to the fund after mulling the results of discussions at a special UN Assembly meeting on AIDS in late June.

Topics will include whether the G-8 fund will come under the control of the United Nations or the World Bank, and whether the fund's resources should be directed more toward treatment of infectious diseases or their prevention.

THE STATESMAN

Govt. emulates Thai model to check AIDS

By Radhika D. Srivastava
The Times of India News Service

NEW DELHI: The government has set up about six centres across the country to administer a drug called AZT or zidovudine to pregnant women to reduce the vertical transmission of AIDS from mother to child.

This follows Thailand's success story, which saw vertical transmission being brought down drastically in the last five years.

Vertical transmission takes place in about 30 to 40 per cent of the cases.

Head of the gynaecology and obstetrics department of New Delhi's Safdarjung hospital, which is also a surveillance centre of the National AIDS Control Organisation (NACO), Dr Sudha Salhan said, "So far, we may have administered AZT to about 10 pregnant HIV-positive women. But the problem is that most of the women come to us for delivery at the last moment."

The hospital handles over 20,000 deliveries a year.

She said, "AZT is required to be given everyday after the pregnancy is 36 weeks old. But since women do not come to us for antenatal checks, they are unable to get the entire dose." After a child is born, it is also required to be given the drug as a syrup.

"The syrup is not available in India. So, mothers usually grind the tablets, mix it with water and give it to the child," Dr Salhan said.

The efficacy of AZT had been proven in many other countries, she said. "We ba-

sically follow the Thailand model. But the difference is that Thailand has made the HIV test mandatory for all pregnant women and we have not done so. As a result, perhaps, many HIV-positive women deliver and we do not come to know about it," she said.

Government hospitals come to know of the HIV status of women only when private hospitals refuse to entertain such patients. "Women in the pre-labour stage come to us with discharge papers from private hospitals stating that the patient is HIV positive," Dr Salhan said.

Asked about the possible long-term effects of AZT on both mother and child, she said, "We are yet to understand the effects. Only if we keep a tab on the growth of children born after the AZT therapy, will we come to know about it. At the moment, after the delivery, women hardly ever come back to us."

Having worked with AIDS patients for over a decade now, Dr Chinkholal Thangsing, who is also the medical director Naaz Foundation, an NGO, says AZT, though controversial, does more good than harm.

"I have given this medicine to about 10 pregnant women. Only a couple of their babies have been found to be carrying the virus. The rest are too small for the HIV test," he said, adding that a child had to be at least 18 months old before the Elisa test could give a proper result. "Before 18 months, only a PCR test can pick up the virus but this test is very expensive," he said.

Drug dilemma:

■ A study carried out on 437 pregnant HIV-positive women, who were administered AZT and Lamivudine (another anti-HIV drug) in the last trimester, in France showed an apparent reduction in the risk of transmission. But, the study showed, resistance to the drug developed.

More than half the children born during the 19-month study suffered adverse effects — most of them suffered either a potentially dangerous decline in white blood cells or anaemia, a decrease in haemoglobin. Two of the uninfected infants died from neurological complications.

■ The Federal Drug Authority in the U.S. issued a warning in January 2001 to health care workers who take anti-HIV drugs. The warning was specifically to those who took nevirapine after possible occupational exposure to the AIDS virus as there could be life-threatening side-effects of the drug.

The Centers for Disease Control and Prevention said it found 22 reported cases of serious side-effects in those who took the drug fearing exposure to HIV.

South Africa loses icon of struggle against AIDS

REUTERS

JOHANNESBURG, JUNE 1

NKOSI Johnson, the 12-year-old South African boy who became an icon in Africa's struggle against HIV/AIDS, died on Friday after a desperate final battle against the disease, a spokesman for the family said.

Nkosi, who became a leading figure in the fight against the AIDS pandemic that has devastated huge swathes of Africa, had suffered brain damage earlier this year as AIDS spread further through his frail body.

Nkosi gained world attention when he stood up at a major AIDS conference in South Africa last year to denounce his government's controversial stance on the disease which has been marked by a reluctance to provide anti-AIDS drugs and President Thabo Mbeki's questioning of the link between HIV and AIDS.

Nkosi gave hope to millions of Africans with HIV/AIDS that they could live an open life with dignity, AIDS activists said. Nkosi was only 12 when he died but he had helped to remove some of the stigmas and fear associated with the disease that affects more than 25 million Africans.

His outspoken defence of HIV-positive people, especially children, and his

plea for humanity in treating sufferers made him a rare but powerful voice in the fight against the disease ravaging Africa's social fabric.

Unlike any other figure in South Africa, he aroused public sympathy for the condition and put a human face on an epidemic whose true extent is staggering and sometimes beyond proper comprehension.

He was one of the estimated 70,000 babies born with the disease each year in South Africa, and on Friday he became one of 25 million Africans who will die this year from HIV-related causes.

The boy, whose natural mother was ostracised by her community once her HIV-positive status became known, urged teenagers and adults to practice safe sex and not be scared to hug children who were given the disease by their mothers.

His admission to a local primary school despite objections from some parents because of his HIV-status led to a new national educational policy that banned discrimination on the grounds of HIV-status.

He became the unofficial spokesman for AIDS in a country where one in nine of the population live with the disease. Former President Nelson Mandela praised the boy as an icon of the struggle against the epidemic.

INDIAN EXPRESS

2001

Looking at biology through the lens of genetics

By ROBERT COOKE

Results from the Human Genome Project are coming in at such a furious pace, in such astounding detail, that gene scientists can't scramble fast enough to keep up. Research reports from laboratories around the world about 300 were presented recently during a major genome conference at the Cold Spring Harbor Laboratory - show clearly that an exciting, worldwide enterprise has been born. Based on the map of human DNA provided by the project, genome science is already changing our view of life.

"It's been a very exciting year for all of us in all of biology," said biologist Aravinda Chakravarti, a leading gene researcher from Case Western University in Ohio. "This is like coming to the New World, and it's a one-way trip."

What genome science offers, he added, "is a new way of thinking, a new way of looking at biology through the lens of genetics." Knowing the genome, the chemical "spelling" and location of all our genes, biologists are now focusing this powerful "lens of genetics" at life from the bottom side up - learning how genes create an organism, rather than how an organism

exploits the genes it gets.

"Many times, people were saying it couldn't be done, yet the whole human genome is now in hand," said mathematician and geneticist Eric Lander. "By combining inspiration with perspiration we've shown that nothing is impossible. And we've learned there is nothing boring about the human genome."

Lander, who leads a major genome laboratory at the Whitehead Institute in Cambridge, Mass., said the new data are so powerful that scientists can compare the genes in other animals to ours, can see signs of humanity's prehistoric wanderings, can spot the genes that cause disease, and are beginning to understand the nature of genetic variation.

The genome was deciphered by two competing groups of scientists. The larger, called the Human Genome Project, is composed of the US Department of Energy and the National Institutes of Health, the Wellcome Trust in England, and universities in the United States, the United Kingdom and other nations.

The second group is privately funded Celera Genomics, a gene-discovery firm in Rockville, Md., founded several

years ago by biologist Craig Venter. The difference between the two groups involves money, a lot of money. For commercial reasons, Venter and Celera are keeping their genome data private so it can be sold exclusively to biotechnology companies, pharmaceutical companies and other users.

In contrast, the public consortium vowed from day one that all of its data, all of the genes it found, would be made public immediately, via the Internet, for scientists to use worldwide. One goal was to share the results as widely as possible - a practice that would interfere with some scientists' plans to patent gene discoveries.

Thus two almost-identical versions of the human genome are now available, one for free and the other for sale. How they compare is not yet clear, but it is certainly clear that the data are very useful. Looking ahead, Dr. Francis Collins, the molecular geneticist who is director of the Human Genome

Project, said benefits of genetic discoveries will not be evenly available to people worldwide. "Inequities will remain, contributing to international tensions," he said.

At the same time, Collins expects serious debate concerning the idea that humans will "take charge" of our own species' evolution.

Even now, challenging ideas are emerging. For example, a California team reported at the Cold Spring Harbor meeting that by looking at "conserved" sequences" in various animals' genes, they find that humans are more closely related to dogs than to mice. Such work gets them right into the history of life on Earth, following the paths of evolution.

These so-called "conserved sequences" are vital to life itself. They represent genes, or lengths of the DNA chain, which are so important to fundamental processes that they must be preserved in every organism. Creatures as

varied as yeast cells, fruit flies, roundworms, mice and humans all have these conserved sequences governing their biological processes. Without these active chunks of DNA, vital activities such as DNA copying, gene repair, reproduction and response to stress are impossible. And without such functions, life at any level is impossible. What has been found, however, is that in and around these conserved sequences there can be variation; one set of DNA links sometimes works as well as another, so a small amount of variation is allowed. And by counting the differences, how subtle mutations have changed a vital gene over time, it's possible to measure how closely - or distantly - two organisms are related. The greater the degree of "sequence similarity," the more closely they're related.

Now, the race is on to sort out those relationships, chasing the genetic details that speak of evolution.

Also, a team in Boston recently found that by using computer listings of all the human gene sequences, it's possible to electronically filter or erase all the human DNA from a given part of the genome, plus any contaminants and errors, in order to spot residue of genes left there by disease-causing

micro-organisms, such as viruses.

Such work is exciting, because it offers a way to find unknown infectious agents that may be causing disease. In fact, said Matthew Meyerson of the Dana-Farber Cancer Institute in Boston, "undiscovered infectious agents are believed to cause a wide variety of human diseases," including some forms of cancer, auto-immune diseases such as diabetes and multiple sclerosis, and inflammatory ailments such as arthritis. The problem lies in finding these infecting organisms, if they exist.

In their first test of the filtering idea, using gene data from a well-established sample of cancer cells, Meyerson and his colleagues discovered the genes from a known cancer virus hiding in the human DNA. Next, he said, they will extend the method to other DNA "libraries," seeking other, even unknown, disease agents.

This is all part of a new branch of biology based on the power of computers. Genetic experiments are now being done without even going to a living creature. And with the human genome now available online, genetic analysis is rapidly advancing as a worldwide enterprise. (LATWP SVJ)

GENOME REVOLUTION

- Genome changing our view of life
- One can see signs of humanity's prehistoric wanderings
- One can spot the genes that cause disease
- Challenging ideas emerging. For example, humans are more closely related to dogs than to mice.

Fat chance, you will have cancer

DAVID CHARTER
THE TIMES, LONDON

LONDON, May 17. - Obesity is the main avoidable cause of cancer among non-smokers in the West, according to an overview of global cancer trends published today.

Ten per cent of cancers in non-smoking Americans can be attributed to being overweight and about 7 per cent in Europeans, concludes the study of 50 years of research.

While the link between obesity and some cancers is clear, such as with breast cancer in postmenopausal women, in others the relationship remains obscure.

The benefits of dieting are also unknown because of difficulties in studying long-term weight loss, though scientists believe losing weight can reduce the cancer risk.

About half of cancers in non-smokers and three quarters in smokers are avoidable through lifestyle changes, Mr Julian Peto of the Institute of Cancer Research reports in *Nature* today.

Smoking remains by far the biggest health risk, causing cancer in 60 per cent smokers. Other factors include alcohol, sunlight and air pollution, each causing about 1 per cent

of cancers.

Viruses account for as many cancers as obesity in the West and more in the developing world. About 5 per cent of all cancers in Europe would be prevented if nobody's body mass index (weight in kg divided by square of height in metres) exceeded 25.

Being overweight is strongly associated with cancers of the breast, endometrium, gall bladder and kidney, and heart disease, Professor Peto said.

He added: "I really hadn't appreciated that the influence of being overweight was

so strong. It isn't clear what you can do if you are too fat because it is very hard to study the impact of losing weight when one of the main reasons for losing weight is becoming very ill.

"We are sure that being overweight is bad for you but, whereas we are certain about the benefits of giving up smoking, we are not sure what the impact of losing weight is." He said: "If you are a smoker, nothing else matters two hoots in relation to smoking but if you are a non-smoker, the two things that really matter are being overweight and the viruses that cause stomach cervical cancer.

THE TIMES

18 MAY 1987



GLOBESCAN



The first space tourist, Mr. Dennis Tito (centre), talking with journalists over television link-up from inside the ISS on Saturday. The other cosmonauts are also seen. — AP

Tito prepares to return home

MOSCOW: The world's first-ever space tourist, the U.S. millionaire, Mr. Dennis Tito, spent his last day on the International Space Station on Saturday preparing to return to earth after his controversial \$ 20-million adventure. Mr. Tito, whose historic space trip sparked a row between NASA and the Russian space agency, is set to return to earth at 11.11 a.m. IST on Sunday, eight days after achieving a lifetime's ambition of blasting into orbit. NASA has repeatedly criticised Russia for selling Mr. Tito his \$ 20-million ticket, arguing that he would not be able to handle an emergency in space. But Mr. Tito himself told journalists by video link he believed the Russians had done the ISS a great service by helping "to publicise the station to the world." American space officials are seeking compensation for the extra costs and stress incurred by the effort to guarantee the amateur astronaut's safety. — AFP

THE HINDU

6 MAY 2001

World gets first genetically altered babies

H.R. 10
6/5

Washington

THE WORLD'S first genetically modified babies have been born, after women unable to conceive naturally underwent a revolutionary new fertility treatment used by scientists at a New Jersey medical facility, a researcher said on Friday.

The Institute for Reproductive Medicine and Science of St Barnabas Medical Centre in West Orange, New Jersey, has used the technique to produce 15 healthy babies, the oldest of whom turns four years old in a month, said Dr Jacques Cohen, scientific director of assisted reproduction at the institute.

He said his institute was the first to use the technique called ooplasmic transfer, but other fertility specialists had followed. He said another 15 babies had been born following the use of the technique at different facilities.

Cohen dismissed criticism by some scientists who labeled as unethical a technique that in a sense leaves children genetically with two mothers.

"I don't think this is wrong at all," Cohen said. "And I think we have to look at the positive part here. I think this did work. These babies wouldn't have been born if we wouldn't have done this."

In the technique, doctors take

an egg from an infertile woman, the egg from a donor woman and the sperm from the infertile woman's mate. The doctors then suck out a little bit of the contents of the donor egg — the cytoplasm — using a microscopic needle manipulated by tiny robotic arms. The cytoplasm is then injected into the infertile woman's egg along with the sperm to fertilize it. The researchers believe the technique helps women conceive who had been unable to do so because of defects in their eggs.

But the method can introduce genetic material — mitochondrial DNA — from the female donor's egg into the mix of genetic material from the mother and father. Tests confirmed that two of the 15 babies produced by the technique at the institute were carrying genetic material from the birth mother, the father and the woman who donated an egg, Cohen said.

The procedure, described in the British medical journal *Human Reproduction*, has raised ethics questions among some critics in the scientific community. Cohen and his colleagues wrote in the journal that this was "the first case of human germline genetic modification resulting in normal health children."

Reuters

THE HINDUSTAN TIMES

6 MAY 2001

Small step for man, big leap for tourist

28/4
Sivers & Technology



Dennis Tito waves as he prepares to board Soyuz-TM in Baikonur. (Reuters)

FROM KARLEMERICK
HANUSKA

Baikonur Cosmodrome (Kazakhstan), April 28 (Reuters): The world's first space tourist, Dennis Tito, blasted off on a \$20-million joyride to the International Space Station (ISS) on Saturday aboard a Russian rocket, marking a small step for man, but a giant leap for tourism.

The 60-year-old Los Angeles millionaire and two Russian cosmonauts lifted off from the Baikonur cosmodrome at 0737 GMT after a row between Russian and US space officials was settled just hours earlier.

The supply run to the ISS had been in doubt as NASA requested a delay to give it more time to tackle computer failures on the space station. A deal to proceed was announced by NASA late on Friday.

Tito paid \$20 million to the cash-starved Russian space programme to be taken along on the trip. His relatives watched nervously as the Soyuz booster took the space capsule skywards.

"I am thrilled, I am ecstatic! He's really gone ahead and done it!" exclaimed Tito's son Mike. As the rocket disappeared from view, Tito's step-sister, Joan, cried out: "He made it!"

Russian space officials said the Soyuz-TM capsule, which was also carrying cosmonauts Talgat Musabayev and Yuri Baturin, had separated from the booster nine minutes after launch and entered orbit.

As the launch was under way, Kazakh television showed a calm Tito in the capsule next to mission

commander Musabayev. Tito started his journey by exclaiming "Khorosho!" (Good! in Russian).

On the eve of his take-off, the first space tourist received a talisman of the native American Hopi tribe — six pieces of coloured cloth tied in knots and joined in a chain — from his adult son Brad. While black, white, yellow and red symbolised the four races of humanity, green and blue stood for the earth and sky.

TOURIST TITO

Name: Dennis Tito

Age: 60

Height: 6 ft, 4 inches

Weight: 63 kg

Personal fortune: \$200 million

Space fare: \$20 million

Baggage: Video camera, opera CDs, family snaps

Talisman: Knotted fabric from an American tribe

His hotel: The half-built International Space Station

Cheers: I am thrilled — son Mike

Jeers: Tito's going to throw up for three days, spend three days looking out of the window and bore people to tears for decades to come — a space analyst

"The Hopis believe that the prayer knots are a powerful thing. They spread them all over the Earth with the prayers that they carry, and now they are sending them into space. It was my mission to bring them to my Dad before he left on his mission," Brad said.

Soyuz will dock with the ISS on Monday. The crew will return on May 6 aboard a similar craft

currently docked with the station. Yuri Koptev, head of the Russian space agency, said the flight opened a new era "when not only professional cosmonauts but amateurs can fly into space". In fact, *USA Today* quoted a Russian space official as saying that Canadian-born film director James Cameron, maker of the all-time box-office record hit *Titanic*, was to sign a deal for a trip into space in two or three weeks.

The row between Russia and NASA was not the first hurdle that Tito, a former NASA engineer, has had to overcome since he first approached Moscow a decade ago about a trip to the Mir station.

NASA said there was no place for amateurs aboard the \$95-billion ISS, being completed by the US and Russia along with Canada, Japan and European countries. But Russian space officials retorted that they are full partners in the ISS and had the right to send whoever they wished on their quota of flights.

Tito's fare is a huge sum for Russia's space programme, amounting to more than a sixth of its annual budget and enough to cover the cost of Saturday's flight.

One of NASA's earliest attempts to put a non-professional in orbit ended in tragedy, when schoolteacher Christa McAuliffe and the crew were killed in the explosion of space shuttle *Challenger* in 1986.

Other civilians in space have included a Briton, a Japanese journalist and a member of the Saudi royal family, all on Mir. But they were not tourists.

■ See Page 5

Russia wins fight to lift off first space tourist

Warren E Leary
Washington, April 25

THE PARTNERS building the International Space Station agreed today to allow an American millionaire to visit the station as the first space tourist, but only if his activities and those of the resident crew were restricted.

The 18 nations building the station, represented by the space agencies of the United States, Russia, Europe, Canada and Japan, signed an agreement exempting the American, Dennis Tito, from current guidelines that do not allow for non-astronauts to visit the station.

The agreement, reached after weeks of negotiations between Russia, which had unilaterally approved Tito's trip, and the rest of the partners, ends an often-acrimonious debate over who controls access to the station.

Tito, 60, a former NASA engineer who is now chief executive of WILshire Associates, a financial consulting firm based in Santa Monica, California, has agreed to pay the financially

pressed Russian Aviation and Space Agency up to \$20 million to fulfill a lifelong dream of going into space.

A Soyuz spacecraft carrying Tito and two Russian astronauts is scheduled to lift off on Saturday from the Baikonur Cosmodrome in Kazakhstan on the 10-day flight. The mission is to replace a Soyuz lifeboat craft on the station with a fresh ship, which will have the visitors staying aboard the station for six days before returning to Earth in the old craft.

To be approved for the flight, Tito signed an agreement last week to pay for anything he might damage or break during the mission, and agreed to legal provisions that he and his heirs would "hold harmless" the space station partners for anything that happens during the flight, including his injury or death.

In agreeing to allow Tito's visit, managers of the \$60 billion space station project adopted many of the restrictions recommended by the NASA task force headed by Lt. Gen. Thomas P Stafford, a former astronaut who

is retired from the Air Force.

Concerns about safety and the possibility that Tito's presence will distract the three-member station crew require special restrictions during the visit, General Stafford said in a conference call with his panel today.

"There is no doubt that this will have an impact on the activities up there," he said.

General Stafford's group recommended that Tito receive a special, detailed safety briefing upon arrival on the station and that he not be allowed in the American portions of the research outpost without being escorted by one of the crew.

The panel also called for Tito to sleep in or near the Soyuz spacecraft in case an emergency arose when the crew was asleep.

"It should be made clear to Tito that his activities are limited to the Russian modules, due to his lack of adequate training on the US modules," General Stafford said.

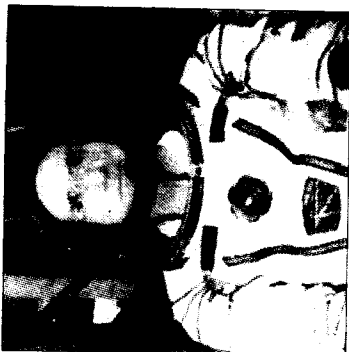
Tito has trained in Russia for about eight months for his flight, originally planned for the ageing

Mir space station, which was deliberately destroyed last month to prevent an uncontrolled crash to earth. Russian experts certified that their paying crewman was well trained on the Soyuz and the Russian hardware that makes up about half of the existing station.

But when the Soyuz crew went to the Johnson Space Centre in Houston last month for training on American equipment, NASA officials refused to let Tito participate after he declined to agree to many of the conditions approved in today's agreement. His Russian crewmates, the mission commander Taiga Musabayev and the flight engineer Yuri Baturin, boycotted the training for one day as a protest but returned and completed the course without Tito.

General Stafford said the Russian space agency must guarantee to all of the partners "that it is fully liable for the flying of Tito and that in the future this type of unilateral decision will never happen again."

In response to the visit, the



AP PHOTO
Dennis Tito during a practice in a Soyuz training capsule at cosmonaut training centre in Star City outside Moscow.

panel recommended that the station crew restrict many of its scheduled activities, including shakedown exercises of the giant robotic arm being installed this week by the crew of the shuttle Endeavour.

The space station crew, which has served one month of a planned four-month tour, comprises Yuri V Usachev, the Russian comman-

A first for space tourism

Glenn & Deborah
BAIKONUR (Kazakhstan), APRIL 28. American businessman, Mr. Dennis Tito, blasted off into space aboard a Russian rocket at 1.07 p.m. on Saturday, heading for the International Space Station and becoming the world's first space tourist. The Itar-Tass news agency reported that the Soyuz-TM capsule separated from the booster nine minutes after blast-off and that the capsule had entered into its orbit.

The launch took place uneventfully after Russian and U.S. space officials agreed hours earlier to iron out technical difficulties arising from a computer glitch aboard the ISS.

Live pictures broadcast by CNN television showed Mr. Tito in his space-suit talking calmly with the Russian crew members, Commander Talgat Musabayev and engineer, Mr. Yuri Baturin. The flight is scheduled to last 10 days. The Soyuz is expected to dock with the ISS on Monday, and Mr. Tito will return to earth on May 6.

Hours earlier, the U.S. National Aeronautics and Space Administration (NASA) withdrew a demand for a postponement after Russian officials agreed that the docking of the Soyuz rocket with the ISS could be delayed if necessary. Mr. Tito, a Californian multi-millionaire and former NASA engineer, agreed to pay Russia \$20 million for the flight which makes him the first space tourist.

The NASA reluctantly agreed to allow him to fly to the ISS on Tuesday, having objected on safety grounds for several months previously.

Speaking to Kazakh television later, Mr. Yuri Koptev, head of the Russian space agency, expressed satisfaction over the progress of the mission. "All problems were on the political level. But we finally found consensus with all our partners. This flight opens a new era in the



Russian cosmonauts, Mr. Talgat Musabayev (top), Mr. Yuri Baturin (bottom) and U.S. space tourist, Mr. Dennis Tito, just before the launch of the Soyuz TM32 spaceship at the Baikonur cosmodrome in Kazakhstan on Saturday. — AP

history of space exploration when not only professional cosmonauts but amateurs can fly into space." — AFP, Reuters

Another report on Page 12

How merciful is the killing? ✓

LAST TUESDAY, the Netherlands became the first nation in the world to legalise euthanasia, often called mercy killing. The Dutch decision to allow doctors to kill patients who are undergoing "unbearable suffering" from terminal illnesses gave rise to angry protests from the pro-life lobby across the world. But the move was also welcomed by several human rights activists and patients' organisations who said that a long-accepted practice in the Netherlands had finally been given legal sanction. Doctors in Holland regularly perform mercy killing in consultation with patients and their families.

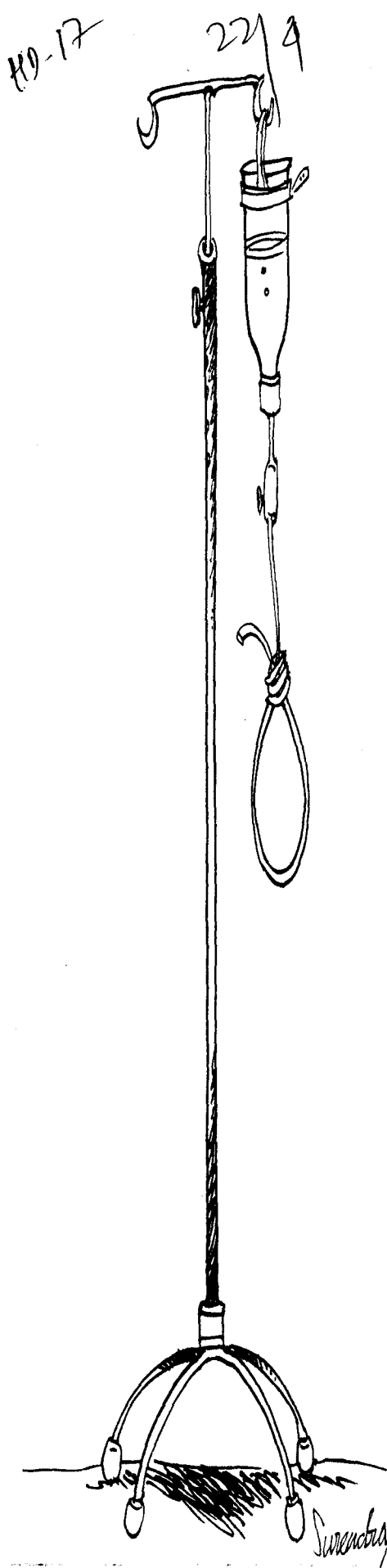
"I hope other Governments will find the courage to follow suit," the Dutch Health Minister, Ms. Els Borst, said. Under section 293(2) of the Dutch Criminal Code, doctors involved in voluntary euthanasia or medically assisted suicide must observe the following rules: 1. They must be convinced that the patient's request was voluntary, well-considered and lasting. 2. They must be convinced that the patient's suffering was unremitting and unbearable. 3. They must have informed the patient of the situation and prospects. 4. They must have reached the conclusion with the patient that there was no reasonable alternative. 5. They must have consulted at least one other physician. 6. They must have carried out the procedure in a medically appropriate fashion.

The Dutch Parliament's nod for euthanasia re-kindles the debate about how far individuals should be allowed to control life and death. Vaiju Naravane reports.

Last Wednesday the Vatican denounced the Dutch Parliament's approval of the law as "an aberrant and macabre" decision. "We find it hard to believe that such a macabre choice can be seen as a 'civil and humanitarian' one. Killing a patient is a criminal act and doctors conducting mercy killings are similar to executioners", the Vatican's newspaper, *L'Osservatore Romano*, wrote in a scathing editorial.

Across the world, pro-life groups are beginning to organise to demonstrate against the Dutch Government's decision which could have a domino effect, sweeping across other countries in Europe. Belgium could become the next country to change its laws on mercy killing. Brussels already has a Bill before Parliament that would partially decriminalise euthanasia. Opinion polls indicate that 72 per cent of Belgium's population supports mercy killing. While in France, where the subject still remain publicly taboo, the percentage of those in favour of euthanasia is believed to be as high as 84 per cent.

"The Netherlands acts as an example. Its experience illuminates our debate, even if differences exist, said Ms. Jacqueline Herrenmans, president of Belgium's Association for the Right to Die in Dignity. Euthanasia is not an easy choice for anyone involved. "My brother was suffering terribly. His pain scarred us all. We finally understood that we had to welcome and



respect his choice. Lars our family doctor was instrumental in helping us make the decision. But in the absence of this law Lars could technically have been taken to court and charged with murder. The law now protects him from fanatics. It is not true that this will lead to carelessness, callousness or to a rise in the number of suicides. I was with our family doctor Lars as we discussed the pros and cons with Erik my brother through several months. There was nothing frivolous or casual and it was very, very hard for him to administer the medication that took Erik away. He suffered, perhaps much more, in a sense, than members of the family did, because it is he who bears the consequences of this act," said schoolteacher Maya whose brother opted for euthanasia last year.

"Most doctors hope, some of them pray, that they will never have another euthanasia case. I am a doctor and I know all doctors have an in-built resistance to giving help", said Dr. Rob Jonquiere managing director of the Dutch Voluntary Euthanasia Society, DVES.

But the decision of the Dutch Parliament did not win across-the-board approval from the Dutch themselves. Tens of thousands of people demonstrated outside the Parliament building as the Senate debated the issue before its landmark vote on April 10.

Their sense of malaise over an issue as fundamental as the right to live and die was summed up by Dr. Jeffrey Kahn, Director of the Centre for Bioethics at the University of Minnesota. "Though the law outlines strict criteria that must be followed before the request for euthanasia is granted, many critics voiced their concerns about allowing one person to kill another, the role of physicians, and how the policy might be abused. It re-kindles the debate about how far individuals should be allowed to control life and death, and who, if anyone, should be allowed to help them. Should the Dutch be proud or ashamed of their historic first and what will it mean for the rest of Europe and the world?"

"The Dutch policy is intended to make sure patients have their wishes honoured about when to perform death. Requiring two physicians to decide offers some safeguard, but removing the final decision from patients opens the door for potential missteps, especially since legalising of euthanasia may lead to an expectation that patients will use it. Perhaps the most confusing aspect of legalised euthanasia is the confusion of roles it will create for physicians. Some critics claim that doctors acting as agents of death and health at the same time can only undermine trust in the medical profession. Should doctors be healers as well as killers?"

Ms. Borst risks further fuelling the controversy with her remarks last Saturday about another plan to allow elderly people "tired of life" to do away with themselves; She said a suicide pill should be made available to "very old people who have had enough of living".

Her remarks have sparked outrage in Germany where critics likened them to the policies of Nazi Germany which systematically killed handicapped adults and children besides targeting Jews, Gypsies, communists and other political opponents.

Dutch legalise euthanasia

FROM KAREN ILEY

Sina
rebr

The Hague, April 10 (Reuters): The Dutch Senate today voted to legalise euthanasia even as thousands of people demonstrated against making the Netherlands the only country in the world to permit mercy killing.

Demonstrators turned out in force outside the upper house to register their opposition while 46 members of the 75-seat chamber voted for the bill and 28 voted against. One member was not present. Once Queen Beatrix signs the law and the details are published in official legal media, the legislation will go into force. This process is expected to take about two weeks.

The vote, recognising a practice that has already been tolerated in the Netherlands for over two decades, was seen as a formality after the lower house of parliament overwhelmingly approved the bill last November. Near the Senate one balaclava-clad man bore a placard saying: "Euthanasia is still murder".

"We believe in the Lord, and he is the only one who can decide on taking life," said 18-year-old

11/4

Henriett Schutta, who had travelled from her home in the northeastern city of Zwolle. Many young people took part in the protest packing a central Hague square. Some held up pictures of Jesus, others had their faces painted with crosses, but most were soberly dressed. They listened to speeches punctuated by periods of silence when many bowed their heads in prayer.

Kars Veling, Senate member for the Christian Union party, stressed the need to preserve trust between doctor and patient and improve palliative care. "It is dangerous and unworthy for a civilised society if doctors are allowed to kill. It could put people under pressure to choose death....," he said.

Once the law comes into effect, the Netherlands will be the only country to make mercy killing legal. The US state of Oregon allows physician-assisted suicide. Australia's Northern Territory legalised medically assisted suicide for terminally ill patients in 1996, although that law was later repealed.

Belgium has agreed on a draft euthanasia law, subject to approval by parliament, to legalise the practice.

THE TELEGRAPH

7 9 APR 2001

Ninety hours of surgery separate Ganga and Jamuna

FROM AMY TAN

Singapore, April 10 (Reuters): After more than 90 hours of painstaking surgery, doctors in Singapore today successfully separated Nepali twins once joined at the head — but they said it was too early to say if the girls were out of danger.

"We are cautiously optimistic," Keith Goh, the paediatric neurosurgeon heading the team, told a news conference at the Singapore General Hospital. As of this point there were no adverse events that will affect their brains from the surgery ...

(but) it's too early to say. Something could happen unrelated to the surgery," he said.

Doctors said the next few days will be critical for 11-month-old Ganga and Jamuna Shrestha after the marathon operation that was deemed essential for them to survive and have a chance at normal lives.

The complex procedure to separate the twins — who had two brains intertwined in one skull — began on Friday afternoon and was originally expected to last 36 hours. But it took far longer to unravel the myriad veins they shared, and teams of

surgeons worked around the clock for nearly four days to get the job done. Plastic surgeons spent another day closing up the girls' skulls. The twins are now in the hospital's intensive care unit and doctors will be watching closely for signs of infection. Conjoined twins fused at the head are rare, occurring only once in about two million live births. Successful surgery to separate them is even rarer.

Twins still sedated

The girls have been sedated since Friday morning and will remain so for the next few days to allow

their vital signs to stabilise, Goh said. Doctors could tell how well the girls' brains were working only after they regained consciousness, he added.

Jamuna was wheeled from the operating theatre at 11 am (4 am GMT) this morning and Ganga, who required more complex plastic surgery to close her skull, left about five hours later.

The girls were likely to remain in Singapore for at least another three months until their skin wounds had healed and will need more operations in the future as they grow, Goh said. But for now the girls' father, K.C.

Bushan, looked visibly relieved. "I'm happy so long as the babies are okay," he said. Teams of specialists, relying on a battery of high-tech tools to guide them, took short breaks and worked in shifts to separate the girls before plastic surgeons moved in to seal their skulls. Chumpon Chan, another leading neurosurgeon involved, said the operation was the longest held in Singapore.

The Singapore team believe that Ganga and Jamuna's operation was one of the most complex and difficult ever attempted as the twins' brains were twisted into a helix and the left sides

pulled into a horn shape. "It was almost like a yin and yang the way the brains were interlocked," Lee Seng Teik, the head plastic surgeon said.

Man-made materials

The surgical team used a waterproof sheet similar to the those used in ski jackets to "shrink-wrap" the girl's brains and implanted more man-made materials to act as the skull.

Doctors had to graft extra skin from Ganga's thighs and Jamuna's back to cover their heads. The twins, along with their impoverished grandfather and par-

ents, have been in Singapore since October. Doctors have volunteered their services and hospital costs are being covered by a flood of public donations.

Last October, Australian doctors split twins Tay-lah and Monique Armstrong who were joined at the back of the head. The Royal Women's Hospital in Brisbane is preparing for the birth of a second pair of conjoined twins and will assess the chances of separating them once they are born. The girls, joined at the side of the head and facing the same direction, are due in May.

THE TELEGRAPH

11 APR 2001

48-12

EXPANDING UNIVERSE

9/9

THE INFERENCE — ONE could not be quite sure whether it amounts to a discovery which would require irrefutable proof — drawn from the “spying” by the Hubble telescope of the most distant Supernova, the eleven-billion-year-old exploding star, that a “repulsive” dark energy is spurring the expansion of the universe throws up quite a few questions. Mr. Michael Turner of the University of Chicago has said that astronomers who had believed for seventy years that the universe would be slowing down have now found that the “darn thing” is actually speeding up. It seems that the assumption about the slowing down of the universe to which our attention is now being drawn, was actually a reversal of what had earlier been stated by Arthur Eddington (1882-1944), a close associate of Albert Einstein.

In his *Expanding Universe*, published in 1933, Eddington had stated with certainty that the universe was expanding at a gallop and many galaxies were fast disappearing from the view of the Milky Way planetary system to which the sun belongs and we would never know what was happening to them. Sir James Jeans (1877 — 1946) and other astronomers of the time fully shared Eddington’s belief. If, as it now appears, there were subsequently reasons to believe that the universe was slowing down and not expanding as Eddington had written, it looks very unlikely that this was widely known. The dizzy pace of advance of science and technology, however, seems to have confirmed Eddington’s theory that the universe is actually expanding though one could never be sure that the astronomers who positioned themselves later to study the universe had really thought that he was wrong.

The possibility of the universe having slowed down from a cosmic explosion, resulting in the weakening of mutual gravitational pull later coming to light, could blaze a new trail for astronomers. The message from this celestial blow-

up, which could make itself known to astronomers only a few billion years after it had taken place and tracked by the Hubble telescope, could be very unsettling. Hypotheses based on what is actually known at a point of time would have to be given up when startling new facts emerge as it now seems to have happened. The revelations about the mysterious “dark energy” give a further push to what is already known about the collapsing stars which sink into black holes in space from which even light cannot escape. The likeness suggested by dark energy and blackness would, however, appear to be nothing more than semantic. Unlike the stars drawn into an inescapable captivity in the cosmic black holes, the dark energy pushes things away from each other to make itself an anti-gravity presence.

cosmic force

This is a startling piece of news picked up by the Hubble telescope. The discoveries which space science has so far made do not seem to have revealed anything even remotely suggestive of such anti-gravity which has now come to light. Knowledge of anti-gravity has so far been limited to the absence of the gravitational pull in the void of space. If it could also push matter away as magnetic like-poles do, it is an illustration of the strange happenings in space. The striking fact about something sounding similar is anti-matter which is said to have been blown up in the same quantities as matter immediately after the Big Bang which had created the universe fifteen billion years ago. If this baffles imagination, the latest word is about the U.S. Stanford Accelerator Centre trying to capture anti-matter by colliding a hair-thin beam of electrons into an opposing stream of positrons. This could create an electronic counterpart of anti-matter and throw some light on the mystery of there being “nothing at all” — perhaps not even space — in the universe.

THE HINDU

EM...

NASA set for new Mars mission to find water

REUTERS

(CAPE CANAVERAL), FLA, APRIL 7

NASA is set to launch its latest Mars mission on Saturday following the failure of two previous missions to the red planet, the US Space Agency said on Friday.

After disastrous ends to the Mars Climate Orbiter and Mars Polar Lander missions in 1999, Odyssey will search Mars for water with the goal of determining if life ever existed there, NASA officials said.

"As you can imagine, this mission has been quite a priority in the agency," NASA launch director Chuck Doveale said.

The lift-off was scheduled for 11:02 a.m. on Saturday from the Cape Canaveral Air Force Station on Florida's Atlantic coast.

Anyone able to watch the televised launch will get a view from the Delta II rocket itself as it leaves the launch pad looking back at Earth as it quickly recedes, then goes forward as the third and final stage separates.

About the size of a compact car and

96-4

named after the movie 2001: A Space Odyssey, the spacecraft will travel millions of miles to Mars, arriving in October. There it will begin an extensive mapping mission that might reveal past or present water deposits that could be examined on future missions.

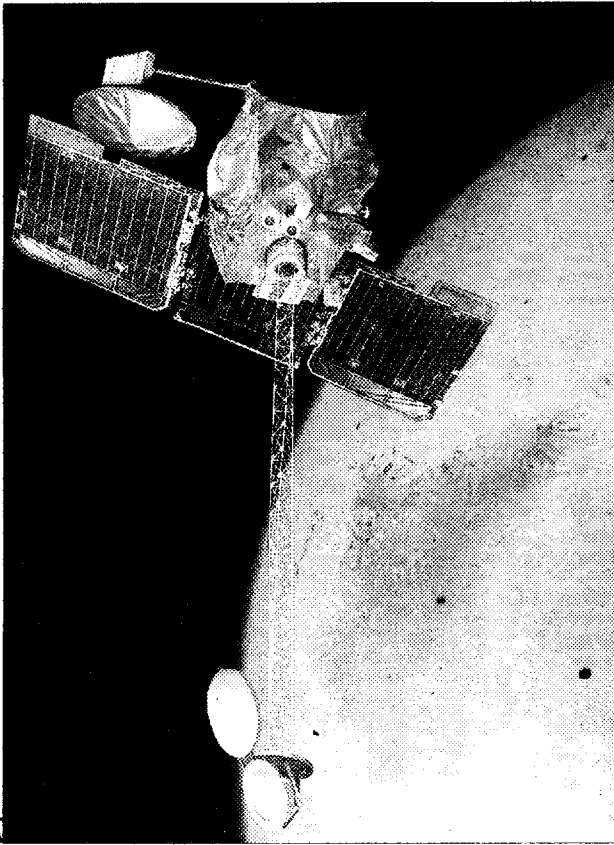
The cost of the project is estimated at \$297 million.

Using an array of infrared, visible-light and gamma ray spectrometers, Odyssey will take closer looks at areas of interest identified by the Mars Global Surveyor, which is still mapping the planet's surface today.

"We'll be seeing most of Mars, if not all of Mars, with the same scale we first saw Earth some 28 years ago with the first Landsat satellites," Jim Garvin, the NASA Mars program manager, said.

The instruments will be looking for the kind of differences in terrain and chemical composition that on Earth proved critical in the planet's development and in the development of life.

The compositional differences between continents and ocean basins on this



NASA is set to launch the Odyssey craft, shown in this artist's rendition, on Saturday 2001. This is the latest Mars mission following the failure of two previous missions to the red planet. Odyssey will search Mars for water with the goal of determining if life ever existed there - Reuters

planet may also exist on Mars, although most or all of whatever surface water once existed is believed to have vanished eons ago.

Evidence of past volcanic activity will also be explored, Garvin said.

The search for water and volcanoes goes far beyond the comfort and safety of future astronauts. Scientists believe water, heat and organic materials such as carbon are the conditions necessary for life to evolve.

"This is not just another Mars mission," said Ed Weiler, NASA's deputy administrator for science. "If there was life on Mars or if there is life on Mars today, I think we'll know that in the next 10 to 15 years."

Mixed with this excitement, though, is the space agency's dread of another catastrophic failure. Only about one in three Mars missions succeeds. Odyssey's success depends on some 22,000 separate operations and measurements.

"Going to Mars is a tough job," Weiler said. "It's not like going to Grandma's house. We've done all we can do."

INDIAN EXPRESS
8 APR 2001

Nasa gears up for third shot at Mars

DAMIAN WHITWORTH
THE TIMES, LONDON

WASHINGTON, April 7. - Nasa heads back to the Red Planet today hoping to put recent farcical disasters behind it and to restore its reputation with a successful voyage of exploration.

The Mars Odyssey spacecraft is embarking on a mission that could make or break Nasa's Mars project after elementary mathematical error led to the loss of the Climate Orbiter and the Polar Lander crashed, rather than landed, on the planet.

The Odyssey, so named be-

cause this is 2001 (as in the Stanley Kubrick film, 2001: A Space Odyssey) is scheduled to lift off from Cape Canaveral today. If all goes well, it will go into orbit around Mars in October for a two-and-a-half-year geological survey.

The spacecraft will map the chemicals and minerals in the Martian surface, with a search for frozen water as top priority. "Everyone has goose bumps right now," Mr George Pace, the project's manager, said. "But no stressed nerves. Anxiety's fine." If true, that would be remarkable considering the history of Mars exploration and how much is

riding on this \$300million expedition.

This flight is the first since the Mars programme was reorganised after the humiliating demise of the past two probes in 1999.

Nasa may employ some of the most brilliant scientists on this planet, but they were guilty of a schoolboy error when programming the Mars Climate Orbiter: one set of engineers used imperial units for navigation, while another assumed that the numbers were metric. Nobody thought to check what the other was doing and instead of safely orbiting the planet, the probe

disappeared into its atmosphere.

Then the Mars Polar Lander crash-landed, probably because of premature engine shutdown caused when a rogue signal misled the craft into thinking it had already alighted.

Nasa has spent more on the probe this time, employed a bigger staff and conducted exhaustive tests. Mr Pace said that he had not been satisfied with just fixing the problems of last time but had focused on "trying to anticipate and prevent other things that could jeopardise the success of the mission." He added:

"The question on everyone's mind now is 'Is it going to work?' It's got to work."

However many tests are conducted, every planetary scientist knows that Mars has shown itself to be extraordinarily elusive. Ever since the Soviet Union launched the first probe in 1960, most missions have failed. Mariner 4, launched by Nasa in 1964, was the first probe to fly past Mars a year later. There have been plenty of other failures and the agency's success rate is 60 per cent. Because of the alignment of the planets, this is the first opportunity in two

years to send a spacecraft to Mars. The launch window lasts only until April end. Otherwise, there could be another two-year wait. The one-way trip will cover 286 million miles. If this trip is successful Nasa's next Martian rovers will be sent up in 2003. The first soil-return mission is pencilled in for '11.

Scientists suspect they will have to wait until then to determine, beyond doubt, if life ever existed on Mars. One of Odyssey's instruments will measure radiation around Mars so astronauts can be protected if they ever visit. But Nasa has no firm plans for sending humans.

THE STATESMAN

Children with higher IQ likely to live longer

FROM MIKE COLLETT-WHITE

London, April 6 (Reuters): The higher your IQ as a child, the longer you are likely to live.

That was the conclusion of a study published today in the *British Medical Journal*.

"This is the first time that IQ records have been linked to mortality. Previously, a link has been suspected but never proven," Professor Lawrence Whalley of the University of Aberdeen, one of the report's authors, said.

The conclusion was based on results from a nationwide intelligence test given to Scottish children aged 11 in 1932. Two scientists traced 2,230 of the 2,792 people tested in schools in Aberdeen and analysed the relative intelligence

of those who survived until January 1, 1997, and those who did not.

They found that someone with an IQ equivalent of 85 was only 63 per cent as likely to be alive on the given date as somebody with an IQ of 115.

"It is remarkable that these scores should have a relation to how long they lived," said Professor Ian Deary of Edinburgh, the second author.

The influence of childhood IQ was also significantly weaker in men than in women, possibly because of the impact of World War II on death rates in males.

The study offered a number of possible explanations for the link between intelligence and longevity, including genetic factors, environment before and after birth,

childhood illness and nutrition.

"In our analysis, social factors are related to IQ and together they partly predict age at death," Whalley said. "But they are only part of the prediction. It is not unreasonable to suggest that a child's performance on mental ability tests aged 11 reflects what has happened to that child over the previous 11 years including genetic contributions of both parents."

The report said IQ in children could reflect the development of a child's brain, including the quality of care before and after birth and the disabling effects of childhood illnesses. "As such, childhood IQ might be seen partly as a mediator between physical and social disadvantage and survival."

THE TELEGRAPH

MIR CHRONOLOGY

A month after celebrating its 15th birthday, Russia's veteran space station *Mir* was brought back to earth with a splash in the South Pacific on Friday, in theory well away from inhabited areas. Russia has taken out a \$200 million insurance policy against accidents caused by the remains of the 136-tonne vessel. The following is a chronology of major events in *Mir*'s history:

- **Feb. 20, 1986:** The first part of the *Mir* space station is launched into orbit.
- **March 13, 1986:** Leonid Kizim and Vladimir Solovyov become the first crew on *Mir*.
- **April 11, 1987:** Cosmonauts Yuri Romanenko and Alexander Laveikin take the first space walk to see why the *Kvant 1* scientific module cannot dock.
- **1991:** Sergei Krikalyov goes into space as a Soviet officer. By the time he lands, the Soviet Union has fallen apart.
- **March 1994:** US astronaut Norman Thagard becomes the first American to stay on board *Mir*.
- **June 29, 1995:** A US shuttle docks with *Mir* and commander Robert 'Hoot' Gibson opens the hatch and floats into *Mir* to shake hands with Russian commander Vladimir Dezhurov. It is the first docking of international spacecraft since July 1975 when the US *Apollo* and Soviet *Soyuz* crews joined hands in orbit.
- **Aug 19, 1996:** Six cosmonauts from Russia, France and the United States meet aboard *Mir*. A Russian *Soyuz-U* rocket takes France's first woman into space, Claudie Andre-Deshays.
- **Feb. 24, 1997:** Fire breaks out when cosmonauts try to change an air filter. The multinational crew wears gas masks for a time.
- **June 25, 1997:** A Progress cargo craft hits *Mir* during docking, puncturing *Spektr* modules and damaging solar batteries. Energy supply falls dramatically.
- **Sept. 22, 1997:** Computer crashes and sends *Mir* spinning, out of orientation from sun. A day is required to restore normal flight. The station suffered similar mishaps on Sept 8 and 14.
- **June 9, 1998:** The last US astronaut leaves *Mir*, ending US-Russian cooperation on the orbiting outpost.
- **Feb. 22, 1999:** The remaining two members of what appears to be *Mir*'s last crew, Viktor Afanasyev and Frenchman Jean-Pierre Haignere, join engineer Sergei Avdeyev on board.
- **Aug. 28, 1999:** Three cosmonauts safely return to earth, leaving *Mir* unmanned.
- **Sept. 8, 1999:** *Mir* goes into hibernation after Mission Control shuts down its main computer, while private investors are sought to fund a new manned flight.
- **Jan. 10, 2000:** US investors pledge to pay \$20 million to continue the *Mir* programme.
- **Feb. 1, 2000:** Russia launches a cargo spacecraft to *Mir* with fuel and supplies to restart the space laboratory.
- **Feb. 20, 2001:** A month before its scheduled funeral, *Mir* celebrates its 15th birthday in space, the longest serving space station in the history of manned space flight. (Reuters)

THE ASIAN AGE

24 MAR 2001

Mir makes a big splash

Nadi (Fiji), March 23

THE MIR space station finished its 15-year voyage on Friday in a shower of fireballs, its wreckage streaking through the atmosphere and plunging into a watery grave in the South Pacific.

Russian and Australian officials said the controlled downing of the aging space station went perfectly, hitting within an ocean target area hundreds of miles from any land mass.

On the other side of the globe from the site, Russian controllers took pride in the manner of the demise of the station that had been the glory of their space programme. "The event is over and no one is crying," said Yuri Koptev at Russian Mission Control outside Moscow.

Four capsules from the disintegrating station flashed above the palm trees and beaches of Fiji like white balls of fire with a swarm of smaller debris at their tail, lighting up the early evening sky for about eight seconds. Four thunderous sonic booms shook the island about three minutes later. "It was like someone shining a spotlight in your eyes, it was really intense," said photographer Rob Griffith, who watched the Mir roar overhead. "It was blinding bright."

Stunned and thrilled residents watched, with adults and children running along beaches, trying to keep the cosmic fireworks in sight. Some families had camped out on beaches, hoping for a glimpse of Mir.

Neli Vuatalevu (29), a pilot flying alone above Nadi, said he watched as the station disintegrated in a shower of fireballs. "It was spectacular. The best fireworks I've ever seen. It was amazing to see it disintegrate in mid air."

Mir was set onto its fiery downfall, when Mission Control fired engines on a cargo ship docked to Mir to brake the station's orbit and send it hurtling into the atmosphere. Most of the 143-tonne station disintegrated. The remains slammed into the Pacific about 30 minutes later, raining down over an area called the "cosmic graveyard" where Russia dumps derelict space-



Guests watch the Mir's final plunge at the Russian Mission Control in Korolyov near Moscow on Friday.

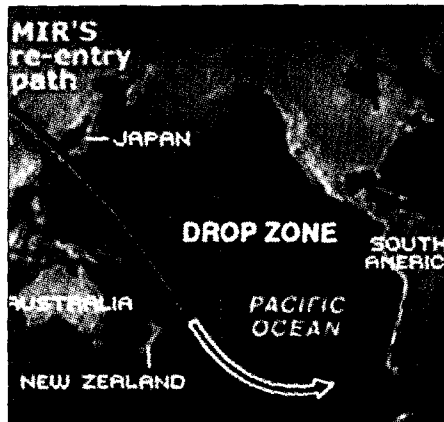
craft and satellites. Russian authorities said it hit an area centred at 40° south latitude and 160° west longitude, within a target zone 190 km wide by 5,800 km long between New Zealand and Chile. That's about 2,900 km east of Wellington.

Uncertainty prevailed until the very end about just where heavy chunks of metal from Mir, some weighing up to 850 kg, would fall. Russian officials had insisted

they could carry out a safe descent. But the station was by far the heaviest spacecraft ever dumped, and its size and shape made it difficult to exactly predict the re-entry.

The safe downing was a relief to nations that had been in its flight path — like Japan, where many worried that a mishap could bring wreckage plummeting into populated areas. By its final day, the Mir had circled the earth 86,331 times. The station was launched in 1986 by the USSR, and became a mark of immense pride for the country. But in its latter years, it came to symbolise Russia's fading technological prowess. The space programme's funding experienced drastic cuts, and the orbiter saw a long series of accidents including a near-fatal collision with a cargo ship.

In Moscow, the argument over whether the Mir should have been dumped continued even after the station was history. "Every serious project has its life cycle. This is a logical end of a very long and complex project," Koptev said. But Yuri Semyonov, head of the company that constructed the Mir, said it could have been kept going. "But we lack the funds," he said.



AP PHOTO

AP

THE HINDUSTAN TIMES

24 MAR 2001

Experiment with indigenous technology

By R.K. Radhakrishnan

SRIHARIKOTA, APRIL 18. The Geosynchronous Satellite Launch Vehicle (GSLV), successfully launched from the Sriharikota range (SHAR) today, was tracked by four ground stations from as far as Indonesia to Brunei right from lift-off. A C-band transponder on the vehicle helped ground-based radars track it.

The complete telemetry and tracking coverage from lift-off to satellite injection was provided by four ground stations at the SHAR and "down range stations" at Port Blair, Brunei and Biak in Indonesia. These stations were networked with the Sriharikota centre for the launch, to provide 'real-time' data.

In the next few weeks, the performance of the major new elements of the GSLV — the cryogenic stage, the liquid strap-on stages, the larger heat shield and the vented inter-stage — will come under close scrutiny. The cryogenic upper stage forms the critical technology.

Also watched closely will be the performance propulsion systems, making up as much as 80 per cent of the launch vehicle's weight. Because of their sheer size, the systems exert a huge influence on the vehicle's design.

The three-stage, "complex" GSLV, which "enhances our capability in launch vehicles," took 10 years to build. The project faced quite a few hurdles ranging from U.S. technology sanctions and cost overruns to Russian ambivalence over the supply of the appropriate cryogenic engine technology.

The Rs. 1,400-crore project, which includes financial provisions for two more flights, is expected to enable India place its INSAT class of satellites in orbit.

Taking advantage of the experimental nature of the flight and its payload, the GSAT-1, built at the ISRO Satellite Centre, Bangalore, also tries out a few indigenously developed technologies, for the first time. "We are trying out quite a few unique, cost-effective new technologies in GSAT such as ten Newton Reaction Control Thrusters, Fast Recovery Star Sensors and Heat Pipe Radiator Panels," says Dr.P.S.Nair, project director, GSAT.

The satellite will be used to demonstrate added capabilities in

digital audio broadcast, internet services, compressed digital TV experiments and developmental communication.

Once the performance of these systems are validated on the flight, they will be used in the ISRO operational satellites, the one-tonne Indian Remote Sensing (IRS) satellites and the two-tonne multi-purpose Indian National Satellites (INSAT) series.

It will be ready for operations within a week, the ISRO chairman, Dr. K. Kasturirangan said. Telemetry confirmation had been received from Biak station (Indonesia) that the spacecraft's health was normal and all systems were functioning well.

Dr. P.S. Goel, Director, ISRO Satellite Centre, Bangalore, said the apogee firing to set the satellite in the desired orbit would begin at 7.31 a.m. from the Master Control Facility, Hassan, in Karnataka, on Thursday. The satellite will have a life of about three years.



The ISRO Chairman, Dr. Kasturirangan (second from right) and Mission Director, Dr. R.V. Perumal, proudly holding aloft the model of the GSLV-D1 launch vehicle signalling the success of the mission at Sriharikota. Also seen are Dr. Madhavan Nair, Director, Vikram Sarabhai Space Centre, (left) and Dr. K. Narayana, Director, SHAR. — Photo: S. Mahinsha.

ISRO's longest 17 minutes

By Our Staff Reporter

SRIHARIKOTA, APRIL 18. "This was the longest seventeen minutes in our lives. It was also the most challenging and exciting. Words cannot describe our feelings," Dr. K. Kasturirangan, chairman, ISRO, said moments after the launch, telecast for the ISRO community at SHAR (Sriharikota Range).

There was tension in the air at SHAR, and in the faces of engineers, scientists, technicians and former space managers who came to watch the launch. The aborted March 28 launch was in the back of their minds. ISRO staff climbed onto rooftops while local people watched from all vantage points, including palm-tree tops, as second-zero approached.

At 4.6 seconds to count zero, as ISRO personnel waited with bated breath, eyes glued to the computers in front of them, each of the four liquid strap-on stages carrying 40 tonnes of propellants, were ignited. This time there was no thrust problem. The personnel in the Mission Control heaved a collective sigh of relief after confirming the normal performance of the liquid stages. The Automatic Launch Sequence had given the go-ahead.

The hold system was released one second before lift-off and at zero count, the mammoth 125-tonne solid stage was ignited. Cheers and claps drowned the voices at Mission Control and throughout the centre as the GSLV blazed into the afternoon sky. More tension; the ASLV

experience is still fresh in the minds of many old-timers (The flight of ASLV-D2 launched on July 13, 1988 was normal only up to 46 seconds after lift-off).

This time the machine held on; the first stage burned a full 100 seconds while the liquid propulsion strap-on stages continued their thrust up to 162 seconds.

Altitude 75 km. Velocity 2.63 km per second. The first stage separated, bringing in more cheers. The second stage ignited as planned, 1.6 seconds before the first stage burn-out. More anxious faces and after 147 very long seconds, the vehicle kept course and reached 126 km, at 5.18 km per second.

Then came the most crucial phase — ignition of the untested cryogenic stage. But telemetry data from Port Blair and Indonesia indicated that all was well — after separation of the second stage at 314 seconds from lift-off, the Russian cryogenic stage was ignited.

Carrying 12.5 tonnes of liquid hydrogen and liquid oxygen, the stage burned for 693 seconds taking the satellite and vehicle equipment bay to an altitude of 181 km. It was separated some 5,000 km from the launchpad, Sriharikota, and re-oriented to avoid any collision with the satellite. Seventeen minutes after lift-off, GSAT-1 was successfully placed in an orbit of 181 km perigee and an apogee of 32,051 km, with an orbit inclination of 19.2 degrees with respect to the equator.

Natural anti-cancer system found

REUTERS
WASHINGTON, MARCH 13

RESEARCHERS said on Monday they have confirmed the existence of a natural system used by the body to defend against the cancer-causing effects of toxic chemicals in food and the environment.

Scientists had long suspected that such a system existed, but researchers at Johns Hopkins University in Baltimore and Tsukuba University in Japan said they used tests involving genetically engineered mice to confirm it after 20 years of research.

The system appears to be a common one in many animals, the researchers said, adding that they were seeking ways to use the corresponding system in the human body to help protect people from cancer. The body's protective system hinges on a sharp boost in protective enzymes — called phase II enzymes — that can dispose of toxic chemicals. The enzymes effectively neutralise toxins' ability to damage DNA and trigger cancer, the

researchers said.

Scientists already knew that natural substances in plants, such as the sulforaphane in broccoli, as well as some synthetic chemicals, could tap into this system to provide a protective effect.

In two studies appearing in the Proceedings of the National Academy of Sciences, the researchers said they not only demonstrated the basic workings of the system in mice, but also found a "switch" that regulates it. "We've gained long-awaited proof of a basic mechanism that can reduce the risk of cancer," Dr Paul Talalay, a Johns Hopkins molecular pharmacologist who participated in the research, said in a statement.

He said that raising the levels of phase II enzymes can provide a "highly effective way" to guard against cancer.

"Our precise understanding of this system should make it fairly easy to design drugs that can fine-tune it," added Johns Hopkins researcher Thomas Kensler, a toxicologist who is overseeing early clinical trials of one such drug in China.

Common blood thinner to curb cancer spread

REUTERS
LOS ANGELES, MARCH 13

A 50-year-old drug given by injection to prevent blood clots may help the body fight the spread of cancerous tumors, according to researchers.

Scientists at the University of California at San Diego said on Monday they have evidence that the blood thinning drug heparin limits the ability of certain cancers in mice to metastasise, or spread, by interfering with the ability of cancer cells to travel through the bloodstream.

"These days the primary tumor rarely kills the cancer patient — it is removed by surgery or radiation. It's the spread that kills them," said Dr. Ajit Varki, senior author of the study, which is published in the March 13 issue of the Proceedings of the National Academy of Sciences.

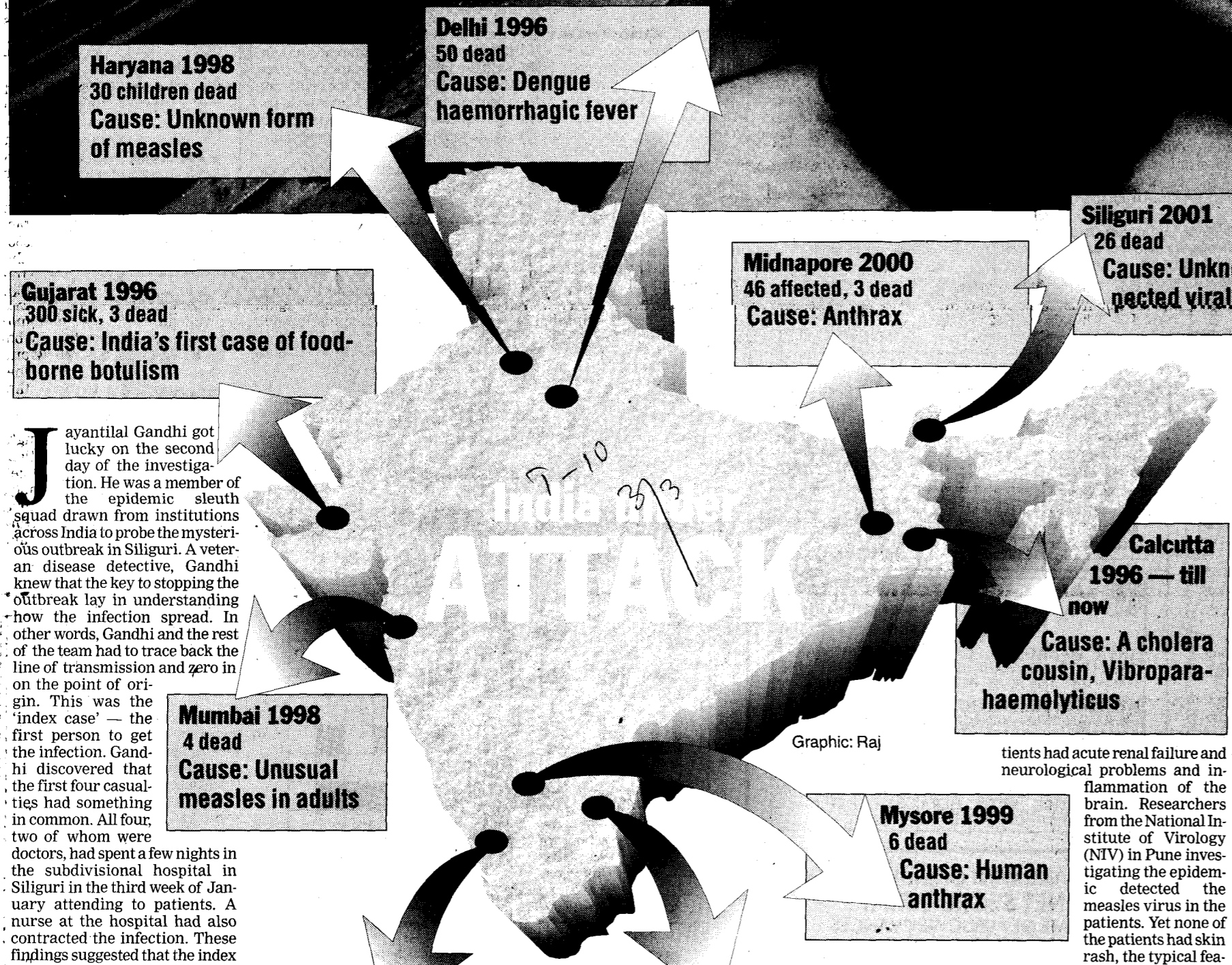
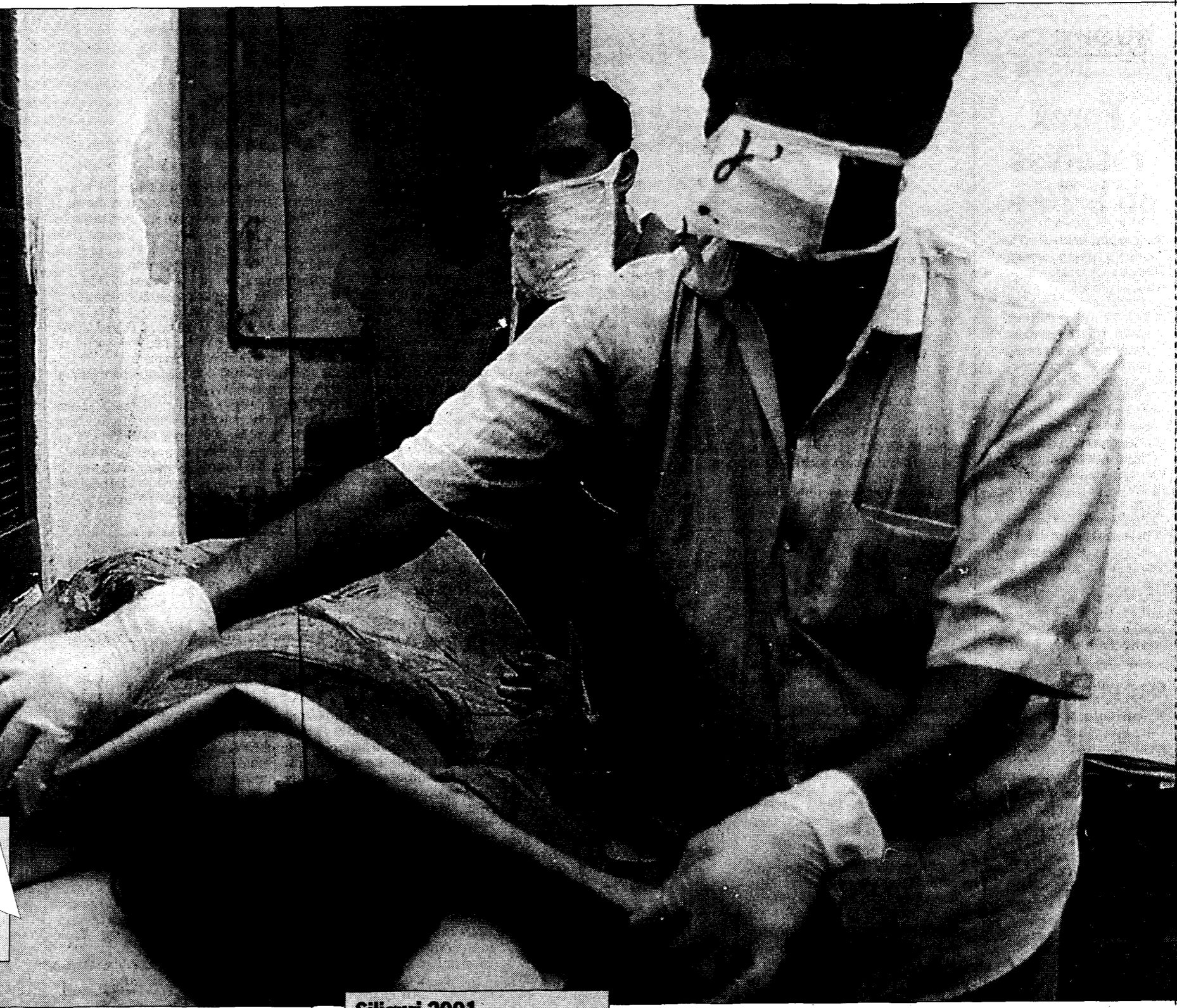
"Heparin has been around for a long time. We were studying heparin's ability to prevent certain cell interactions, which we discovered are involved in the spread of cancer cells," he said.

Heparin is not, however, risk-free.

INDIAN EXPRESS

The mystery illness in Siliguri is just the tip of the iceberg. There are many new and lethal diseases waiting to strike. G.S. Mudur reports

Many new ways to die



Jayantilal Gandhi got lucky on the second day of the investigation. He was a member of the epidemic sleuth squad drawn from institutions across India to probe the mysterious outbreak in Siliguri. A veteran disease detective, Gandhi knew that the key to stopping the outbreak lay in understanding how the infection spread. In other words, Gandhi and the rest of the team had to trace back the line of transmission and zero in on the point of origin. This was the 'index case' — the first person to get the infection. Gandhi discovered that the first four casualties had something in common. All four, two of whom were doctors, had spent a few nights in the subdivisional hospital in Siliguri in the third week of January attending to patients. A nurse at the hospital had also contracted the infection. These findings suggested that the index case was someone who had been admitted to the hospital in January. All other cases involved people who had come in close contact with the first four patients.

"The infection had spread through air droplets, exhaled by the patients. It affected only those who came very close to them, such as nurses or doctors," says Dr Gandhi.

With no fresh cases reported from Siliguri, the outbreak may have faded away almost as abruptly as it appeared. But the investigation isn't over. The cause and origin of the epidemic remains shrouded in mystery. "There's now reason to suspect that a new life-threatening virus may have surfaced in India," says Dr Pradeep Seth, head of the department of microbiology at the All India Institute of Medical Sciences in New Delhi. "We need to identify it and understand how it infected humans," Seth told *The Telegraph*.

Fatal infections are commonplace events in India, but the Siliguri outbreak has baffled scientists and public health experts. Infectious disease researchers across the country are particularly alarmed by the high fatality rate — nearly 50 per cent of those infected have died. "A 50 per cent fatality rate is extremely worrisome," says Dr T. Jacob John, a leading virologist, formerly at the Christian Medical College in Vellore and now advisor to the Kerala Institute of Virology and

Infectious Diseases. "It doesn't seem to fit in with anything we've seen here before," says Jacob John. In fact, experts say the mortality rate of the Siliguri epidemic puts it in the class of highly lethal viruses like Ebola and the Hanta virus.

The recent outbreak is just another signal of the changing patterns of infectious diseases in recent years in India and elsewhere. Across continents, one has witnessed the emergence of new infectious agents and the re-emergence of old ones in more vicious avatars. Life-threatening diseases like typhoid, cholera, and malaria, are now much harder to treat than they were just a few years ago. New and previously unknown viruses have migrated across continents, propagated by animals and birds, by infected people, or through as yet unknown routes: HIV, West Nile Virus, Marburg and Ebola are all cases in point.

Globalisation is among the factors fuelling the new epidemics. People now travel between countries as they would

between villages. This increased contact can expose a person to infectious agents they have not encountered before. The other factors contributing to the emergence of new diseases are the evolution of microbes that allows them to develop resistance to drugs, a burgeoning human population and an increasing contact between humans and other species that serve as carriers or reservoirs.

At least two deadly viruses have made trans-continental migrations in the past two years. In September 1999, the West Nile virus made its appearance, causing 62 infections and seven deaths in the US. And between September and November 2000, the Rift Valley virus, previously known only in Africa, surfaced in Yemen where it caused fever, brain inflammation, and bleeding in 1,080 people and killed 121.

Microbiologists say the appearance of the Rift Valley Fever virus close to India should be of some concern here. A high population density and close contact between people and animals tend to increase the vulnerability of Indians to infections. The 1990s

ing district level public health staff, setting up diagnostic laboratories and buying equipment. "We won't be able to have a full-fledged national surveillance network for at least another eight years."

Indian virologists have long complained about the lack of laboratories with high bio-safety levels that allow them to handle dangerous viruses. "I'm eager to work on the Siliguri samples," says Dr Seth. "But my existing laboratory infrastructure doesn't permit to work on such lethal viruses."

The Indian Council of Med-

ical Research (ICMR) had during the mid-1980s proposed to set up such a bio-safety facility called the Microbial Containment Complex (MCC) at the National Institute of Virology. Although the building has come up, it is not yet operational.

It may take a few more epidemics before the government and the various medical institutions wake up to the crying need for such facilities in India. Meanwhile, the Siliguri investigations are now continuing at the NICD and the NIV. Stored in deep freezers are two dozen samples of human blood and spinal fluid from the Siliguri patients that may hold clues to the epidemic. Scientists are trying to pry loose the secrets locked in those samples.

The investigations so far indicate that the infectious agent was a virus that causes encephalitis. Through a series of tests, the NICD and NIV scientists have ruled out a range of infections including Japanese encephalitis, West Nile Fever, and Hanta virus. "None of the patients had bleeding so it is unlikely to be haemorrhagic viral fever caused by viruses like Ebola or dengue," says a disease investigator.

What brought about the outbreak in Siliguri? What is the original host of the virus? How did it spread? These are all big questions. And as of now, with no answers. But as the Siliguri, and various other incidents show, an epidemic is literally in the air just a sneeze or a cough away.

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Rules & Regulations: The offer is valid only till April 10, 2001. Any consumer buying a pack of Close-Up toothpaste during the offer period is eligible for the offer. The consumer has to write his/her name and complete postal address on the inner side of the cartoon in a legible manner. This cartoon can either be sent to Percap D'Mark Pvt. Ltd., P.O. Box No. 16339, Dellese Road, Mumbai - 400 013 or put in one of the drop boxes, which will be made available in select outlets in select cities. Entries sent by post have to reach us latest by April 15, 2001. The winners will be decided on basis of a draw of lots. However, authority for the final decision rests with HLL. There will be 30 winners, who will be brought in to Mumbai to attend a party with Hrithik Roshan. Arrangements will also be made to send them back. Cost of airfare, boarding and lodging will be borne, subject to certain limitations. All 30 winners will accompany Hrithik Roshan on the aircraft, which will fly from Mumbai, and be on the aircraft for 3 hours. Winners will be announced by post, based on the address mentioned on the empty carton. HLL, however, will not be responsible for any postal delays or failures. There will be 1,000 consolation prizes, which will be based on a draw of lots. However, authority for the final decision rests with HLL. Early bird winners will be announced latest by 15th March, 2001. No cash will be given in lieu of prizes. Applicable only to residents of India currently residing in India.

Genome book opens new chapter on life

Does size matter?

Not any longer

New Delhi, February 12

ONCE UPON a time, there was a pretty convincing theory that once the human genome was mapped out, it would be relatively easy to identify each gene that is responsible for each human function. There was a gene whose sole responsibility was to manufacture, say, insulin, and in case a person was diabetic, all that needed to be done was to 'tweak' that particular gene and everything would be all right.

Similarly, there was a gene for alcoholism, asthma, depression...

Well, that theory has just been shown the way out. There have been quite a number of findings of the Human Genome Project that has got the scientists sitting up. But none of them has changed perceptions as much as the discovery that genes function more like networks - rather than single entities producing specific proteins.

This could explain why despite the relatively low gene-count in humans (about 31,000), they end up being a much more sophisticated life form with many more functions than the lowly roundworm (about 18,000 genes).

There are genes which carry out sophisticated managerial tasks like

setting other genes into action. What makes humans different (superior than?) from a fruit-fly or the roundworm is that through evolution they have added on more 'control genes' - in effect, increasing the variety of genes that control other genes.

The one gene-one function picture now lies in tatters. Instead, there's a whole genetic community 'down there', working in different ways - forming various 'architectures' to produce proteins.

Added to this new and more complex picture of the genome is the cropping up of things that don't fit the jigsaw. For instance, genes only 1.1 per cent of chromosomal space. The rest had been written off as 'junk' - only useful for genetic fingerprinting and little else. Scientists are showing more interest in this 'junk' now and think that it too could have a role in telling the great story of evolution.

Now it's up to researchers to understand this complex set of instructions and the relationships between individual genes and finally come up with the way humans actually work - and, of course, to design drugs that will keep the body shipshape -- from the gene level up.

(HTC)



Graphics by ASHUTOSH SAPPRI

Genetically, race is over

APART FROM stumbling on to new insights about what we humans are made of (and what gives us that much needed edge over God's other creatures like the yeast, the worm and the fruit-fly), the latest findings on the nature of the human genome have thrown a few old ideas out of the window:

• **The genetic make-up of humans differs according to race:** If there's a difference between white rapper Eminem and Bhangra pop star Daler Mehndi, it's now proved to be only in the lyrics. The human genome shows that humans all over the world share more than 99.9 per cent of their DNA, the molecule that is the building block of life. In effect, racism has no scientific basis.

• The for-profit Celera Genomics and the public Human Genome Project cracked the human genome last year. Today, in five cities around the world, they read out the genetic text deciphered from this raw DNA mass.

• Science had the gene thing wrong. There are genes, control genes, and proteins working together in a complex network. Biology is postmodern, genes function in a context. This maketh the man. It's also why worms have more genes than us.

• Forget about blond and brunette, dark and pale. Mankind is one big happy DNA family. Forget about genetic determinism. The environment, prehistoric bacteria all have their say in shaping us.

• An official: biology is an information technology. Medicine will never be any same. Watch out for a deluge of new drugs. Watch out for the end of disease. India should not be caught on the wrong side of a genetic divide.

More diversity could be found between two individuals in the same population than between two different groups. Dr Craig Venter of Celera Genomics, selected DNA from five individuals from different racial backgrounds — one Asian-American, one African-American, one Hispanic-American and two others from two different racial backgrounds - and found that there was no way of telling them apart. So, it's now science's turn to say: "Eat your heart out Herr Fuehrer!"

• **Genetic modification is unnatural and tampering with nature will unleash untold dangers:** If that was the case, humans are already what could be colourfully termed as 'mutant ninja turtles'. Many human functions (like our ability to metabolise alcohol) can't be explained by human evolution. Unfurling the human genome shows that hundreds of genes have been directly imported from bacteria to make such functions possible. Which just goes to show that elementary cellular functions have stayed more or less the same since the evolution of single-celled yeast and bacteria. (In the words of Sir John Sulston, one of the leaders of the Human Genome Project: "You convert your Austin 7 into a Mercedes, but basically it is the same underneath.") So those opposing genetically-modified food and agro-products should have started picketing a long, long, long time ago.

(HTC)

India's stake

INDIA STAYED out of the human genome project last year. It was a historic blunder. Why we need to play catchup: • **Bioinformatics.** The real genomics problem is how to crunch the deluge of numbers that labs are producing. Indians software firms need to be offering database solutions. • **Healthcare.** India has a competitive pharmaceutical industry, good biotech centres and there are plenty of NRI biologists. Genomics will dwarf infotech in 20 years. • **The digital divide is small** try compared to the coming genetic divide. Indians need to ride the bio-revolution - or lose a coming Darwinian battle between nations.

The Hindustan Times

The map of mankind

THE COMPLETION of the human genome ^{5 by few} — a map of man's genetic constitution — marks a scientific milestone which will transform biology from being a descriptive science to a predictive one. In a sense, biology is at a point where chemistry was at the end of the 19th century. The recent rapid strides in genetic engineering and biosciences have always suggested that the day was not far off when biologists would start enumerating the genetic alphabets. And now that day is finally here with scientists putting together a sort of 'periodic table' of life from which one can look up the complete list and structure of all genes. No longer is it necessary for a biology student or a post-doctoral fellow to toil for months, trying to isolate genes: one can now easily look up the information on the web. ^{KR-10 1307}

Currently the complete genome sequences of over 60 species are available. Each cell contains the genetic code in bundles called chromosomes. The letters of the code, As, Cs, Gs, and Ts — representing the nucleotides adenine, cytosine, guanine and thymine — spell out genes, the instructions required to make the proteins in an organism. In other words, genes are just information encoded along a string of the chemical DNA. They cannot do anything by themselves. They merely encode the structure of the proteins which are the working machinery of humans. It is not surprising that the latest findings indicate a far fewer number of genes in the human genome than was previously thought. This has apparently even spawned asides about how much closer man actually is to the fruitfly and earthworm with their modest genetic complements. The fact, of course, is that genes which encode the *basic* functions of life are not many compared to the other genes which elaborate the *specific characteristics* of particular organisms. Thus, a single gene can be responsible for a great complexity of functions. This applies to all organisms — whether people, flies, worms or even bacteria — and is the reason why the difference of so few genes engender so much more complexity, as has happened in man.

Now that the full complement of the human genes is known, scientists should soon be able to identify all metabolic pathways in the human body. Proteins perform their functions by interacting with each other in coordinated networks, only some of which are familiar to classical biochemistry at the moment. Armed with the genome map, however, researchers can drastically cut the time needed to connect a gene with a disease and develop drugs for every malfunctioning protein. Indeed, completing the human genome marks only the beginning in terms of understanding disease and the effort to develop drugs to prevent and treat illness, or to use gene transplants. Thus developing drugs to target specific gene products such as receptors on the surface of cells, for example, may take a lot more research. This week's finding, however, is the most momentous achievement since Watson and Crick first identified the structure of DNA in 1955.

THE HINDUSTAN TIMES

13 FEB 2001

Celera: The Microsoft of the genome mapping world

SCOTT HENSLEY

FOR more than a year, J Craig Venter has boasted that his upstart company, Celera Genomics Group, would produce a better, more user-friendly map of the human genome than legions of taxpayer-funded academics. It turns out Dr Venter was right. Three-year-old Celera has produced a map that drug and biotech companies are plunking down millions of dollars a year for the rights to sift through. With the formal public release of two versions of the so-called book of life, one by Celera and another by an international consortium of academics called the Human Genome Project, it looks to many gene-hunting scientists that Celera's book is going to be a best-seller.

Both Celera and the public genome project are publishing their findings in separate journals this week, eight months after announcing last year that they had largely completed the mapping. The map of the human genome comprises 3.1 billion chemical letters of DNA deciphered and arranged in order across all 23 chromosomes. Celera's paying subscribers have been using the company's version of the book of human heredity for months. Many agree that the Celera genome is more accurate, easier to read and more complete than the rival version produced so far by the 10-year-old, public Human Genome Project.

Scientists who already have begun using the Celera map say it is fast becoming the preferred way to search for genes, making Celera as much a biotech-industry standard as Microsoft is to computer software.

Faster, Better, Beefier

The difference in the two maps' quality is important for several reasons. Celera's operating system helps address one of the biggest challenges presented by the genomic revolution: navigating a flood of data that scientists must sort through to find the genes they need to develop new medical treatments. Celera is betting scientists and companies will be willing to pay for access to that system.

"Anyone who can afford to buy Celera should buy Celera," says Nathan Goodman, who works at 3rd Millennium, a consulting firm catering to research laboratories. He says any gene-sleuthing scientist looking at the two maps would be able to see the discrepancies. The release this week revealed something that astonished both sets of scientific groups. Ever since biologists first dreamed several decades ago of ordering the precise sequence of all 3.1 billion chemical units that make up the human DNA instruction kit, scientists have been predicting that the miracle of being human is probably dictated by the actions of about 100,000 or so genes.

In fact, it takes only 30,000 or so genes to control human biology. "It's a major surprise to all of us," said Dr. Venter. "It's stunning that the human genome is only twice the size of the fruit-fly genome." But, in the weeks and months to come, the commercial usefulness of Celera's map is likely to overtake the scientific news. The public project's DNA-sequencing data is free and available to all on the Internet. Last week, Celera

agreed to dump its sequence on a free website too. But what differentiates the two is that those willing to pay for Celera's service get regular data updates, the genomes of other species and sophisticated software tools that allows scientists to easily find the genes they are looking for.

By offering university researchers access to the service at a minimal price of about \$10,000 a year, Celera's map is expected to become widely used. But Celera expects to make its most money through a tiered pricing system that charges giant drug makers such as Pfizer Inc about \$15 million a year, while charging smaller biotech firms less cash up front, though requiring them to share future revenue from any drug discovery they make using the company's proprietary map and browser.

'A Few Interesting Genes'

SEVERAL drug and biotech companies that have been buying access to the map since last year say they already have made important discoveries they couldn't have made if they had access to only the public sequence.

"We've found a few interesting genes in there already," says Steven Clark, a senior vice president for drug research with Wyeth-Ayerst Laboratories, a division of American Home Products in New Jersey, referring to Celera's map. While declining to provide details for competitive reasons, Clark adds: "We're convinced that at least as of today the sequence that is available from the public databases isn't as complete as Celera's."

Independent scientists who've worked with both maps defend the project by saying Celera had a leg up from the beginning because it was

American Home gene hunters to some unique discoveries.

Pfizer became Celera's fourth subscriber in late 1999, agreeing to terms just as the first bits of the human sequence were beginning to trickle in. "We were at a critical time," recalls Alan Proctor, vice president in charge of the company's high-technology drug-discovery centre in Massachusetts. The accelerating pace of genome sequencing by public and private researchers had turned the hunt for genes that could lead to new drugs "into a bit of a land rush," he says.

Now, Pfizer has begun picking the ones that look the most promising for laboratory experiments and staking intellectual-property claims. "The proof," he says, "is in the patent office."

Indeed, competing genetic-information companies, including Incyte Genomics and CuraGen Corp. have been selling drug companies proprietary databases of key genes for years. Others that started as gene prospectors for hire, such as Human Genome Sciences Inc and Millennium Pharmaceuticals Inc, have transformed themselves into fledgling drug companies.

'Where Would Celera Be Without Us'

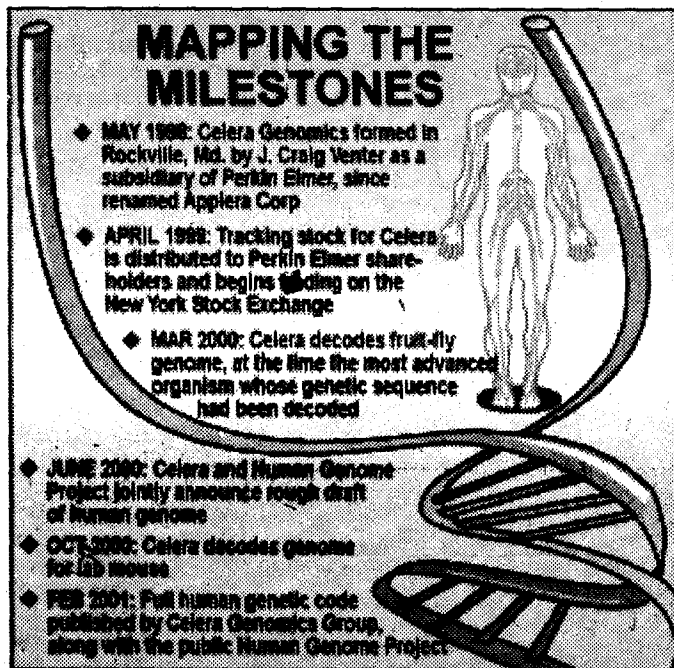
THE public-project leaders say Celera's genome could never exist without theirs. Considering that Dr. Venter could use both copies, says Dr. Robert Waterston, of Washington University in St. Louis: "It is remarkable that having the full data set hasn't made more of a difference in his hand." Elbert Branscomb, former head of the Department of Energy's sequencing operation, concedes those parts of the public map that are still early drafts are "not very usable for many things that (scientists) would like to do." He says, though, that the public map will improve quickly.

Celera scientists acknowledge that the public sequence data helped them. Even so, Celera says its product is superior. Part of the reason is deep in the two groups' sequencing strategies. To sequence human DNA, scientists must first shatter it into pieces small enough to be read by machine. Unfortunately, the information about where the segments belong is lost in the process. Even the best machines can't read the entire length of even the smallest pieces. This means that scientists must sequence the DNA many times over to ensure they have enough deciphered bits that overlap to cover the genome.

The challenge is in putting these pieces together in the right order. From the start, Celera read both ends of each segment, which eased

the sorting and assembly task for its supercomputer. The public researchers, until late in the game, read only from one end of each DNA fragment. That plan called for building a rough map of genome landmarks and then methodically sequencing the stretches in between. But they dropped that approach to keep pace with Celera and were left with a very difficult problem to solve: Their guiding map was incomplete and much of their sequence data was rough.

(By arrangement with The Wall Street Journal)



IE Graphics: H.K. SHARMA

able to use public researchers' freely available data to build its own. Bert Vogelstein, a cancer gene researcher at Johns Hopkins University, says that partly explains Celera's quality. But he too says: what Celera has produced "as of now" is a better tool for finding previously hidden genes.

Celera, says Dr Clark, makes it easy for researchers to find hidden gems by highlighting stretches of DNA sequence, as well as genes that the company says haven't yet been uncovered. These "nuggets," Dr. Clark says, already have led

HO-1
12/2

New 'evidence' about human genes

Science & Tech

By Hasan Suroor

LONDON, FEB. 11. In what is claimed to be a "radical" breakthrough which contradicts the conventional understanding of human genes and their influence on behaviour, two teams of British and American scientists have found that there are no more than 30,000 to 40,000 genes — nearly a quarter less than what was believed at the time of gene mapping last year.

The genome project, hailed worldwide as a definitive map of the human gene sequence, had anticipated anything between 100,000 and 150,000 genes and it was believed that there were individual genes influencing human behaviour.

This does not appear to have been borne out by an analysis of the genome — the first human genetic map — by research sponsored by the U.S.'s Celera company and the U.K. Wellcome Trust. The findings are to be published in *Nature* this week.

The new evidence is said to "demolish" claims that human beings are prisoners of their genes, and show instead that there are powerful environmental influences "vastly" more crucial in determining human behaviour. The view that all human behaviour — sexuality, criminal tendencies, emotional patterns — is determined by genes has been "dramatically undermined" by these findings, according to *The Observer*, which spoke to a leading member of the team.

"We simply do not have enough genes for this idea of biological determinism to be right," Dr. Craig Venter, the U.S. scientist associated with Celera said.

While the American scientists placed the total number of genes at between 26,000 and 38,000, the British team's findings range from 30,000 to 40,000. In both cases, it is far less than the expectations raised by claims following gene mapping in June last year.

"The crucial point about the low figure is that it raises serious problems for scientists trying to explain the complexity of the human species," according to *The Observer's* science editor, Mr. Robin McKie.

When the first genome of a living creature — fruitfly — was sequenced it was found to have 13,000 genes leading to the belief that since human beings are much bigger and more complicated they must have many times more number of genes.

"Now we find we only have about twice what they have. It makes it a bit difficult to explain the human constitution," Dr. Venter pointed out adding in many cases human beings have exactly the same genes as rats, cats and dogs.

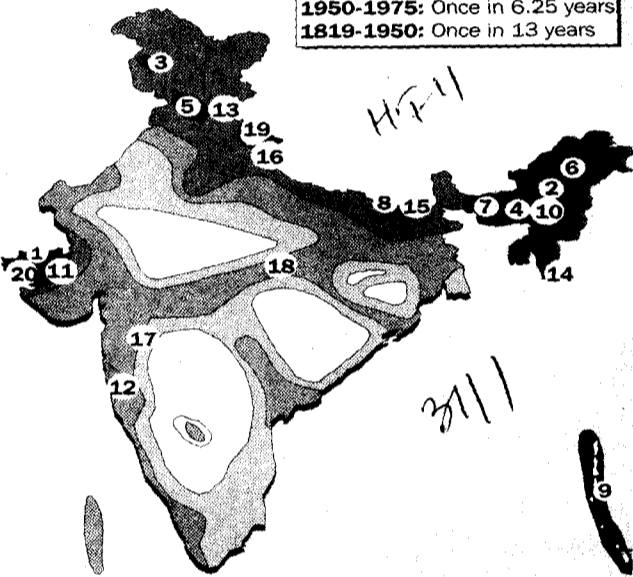
The new "evidence" has caused ripples in scientific circles and is expected to trigger a debate on the ways of looking at genes and their influence on human behaviour.

THE HINDU

12 FEB 2001

AVERAGE RISE IN QUAKE GRAPH

1988-2001: Once in 2 years
 1950-1975: Once in 6.25 years
 1819-1950: Once in 13 years



Year	Location	Magnitude	
1	1819	Kutch, Gujarat	8.0
2	1869	Cachar, Assam	7.5
3	1885	Srinagar	7.0
4	1897	Shillong Plateau	8.7
5	1905	Kangra, H.P.	8.0
6	1918	Assam	7.6
7	1930	Dhubri, Assam	7.1
8	1934	Bihar-Nepal Border	8.3
9	1941	Andaman Islands	8.1
10	1950	Assam	8.5
11	1956	Anjar, Gujarat	7.0
12	1967	Koyna, Mah'stra	6.5
13	1975	Kinnaur, H.P.	6.2
14	1988	Indo-Burma Border	7.2
15	1988	Bihar-Nepal Border	6.5
16	1991	Uttarkashi	6.6
17	1993	Latur, Maha'stra	6.3
18	1997	Jabalpur, M.P.	6.0
19	1999	Chamoli	6.8
20	2001	Bhuj, Gujarat	6.9

Graphic: SANJAY

THE INDUSTRIAL TIME

31 JAN 2001

'Killer quake overdue in Himalayan region'

By N. Gopal Raj

BANGALORE, JAN. 30. This time it was Bhuj. But a killer quake is "overdue" in the Himalayan region. With the highly-populated Gangetic plain right below, such an earthquake would have devastating effects.

Studies have shown that 50 to 70 per cent of the Himalayan range was overdue for a great earthquake, said Dr. Roger Bilham, Professor of Geological Sciences at the University of Colorado and an expert on seismology of the region. The magnitude of the quake would be between 7.8 and 8.3 on the Richter scale, he told *The Hindu*.

It was not possible to predict when or where the earthquake would occur. However, the regions with the highest probability of undergoing a powerful earthquake were western Nepal, Kumaon and western Bhutan, Dr. Bilham said. "Although it is speculative to conclude so, it is possible to argue that we are seeing stresses tightening in the Indian plate, leading to one or more of these great earthquakes occurring in the next decade."

A paper published in the journal *Current Science* in 1998 by Dr. Bilham, Dr. Vinod Gaur (now at the Indian Institute of Astrophysics here) and others pointed out that Himalayan earthquakes tended to focus energy towards the northern plains where shaking was amplified by the soft alluvial soil.

In the past 100 years, population in northern India has qua-

It came with a warning

By Arunkumar Bhatt

BHUJ, JAN. 30. The earthquake that rocked Kutch and several other parts of Gujarat, did not come without a warning.

On December 24, the Rann of Kutch was rocked by a quake that measured 4.2 on the Richter scale. Its epicentre was Allah Bandh, about 90 km north of Bhuj. A few weeks ago, Bhavnagar district of Saurashtra had experienced a series of tremors.

These prompted, Mr. P.N. Nair, a geologist based at Gandhi Nagar, to demand an immediate geological survey of Kutch. But his suggestion fell on deaf ears, regrets Mr. Kirti Khatri, editor of *Kachchh Mitra*, a Gujarati daily.

Mr. Khatri told *The Hindu* that Kutch was classified long ago as Zone V — highly prone to earthquakes — and yet nobody took any cognisance. He pointed out how repeatedly the media and others warned about the seismic profile of Kutch.

He said that in 1996, Dr. S. Shringarpura, Head of the Department of Geology of the M.S. University, Vadodara, said at a press conference that the Kutch region had four fault areas which made it quake-prone.

Mr. Khatri said construction norms in Bhuj were frequently flouted. Building of high-rise structures was allowed though the rules permitted only two-storey ones. He said most of the casualties were in multi-storey buildings.

"We in Kutch know that a quake cannot be predicted but the Government can take precautionary administrative measures to reduce its impact, Mr. Khatri said.

drupled in villages and increased by an order of magnitude in the cities. Some changes in construction practices had not improved the earthquake resistance of buildings. The presence of several large dams in the southern Himalayas posed an additional risk to the people. "There is thus a substantial increase in earthquake risk from the recurrence of great

and moderate Himalayan earthquakes," the article observed.

When in 1992 *Current Science* brought out a special issue devoted to seismology in India, it pointed out that several earthquake-free decades in the Himalayan region had created a sense of complacency and a lack of public concern about their destructive potential. "Prudence re-

quires that we should be prepared to meet such hazards and take effective measures to reduce their ill-effects," it pointed out.

The magnificent Himalayan range, stretching for about 2,400 km in an arc from Nanga Parbat in the west to Namcha Barwa in the east, was created when the Indian plate collided with Eurasia. Since the Indian plate continues to push into Eurasia, it creates stresses which are periodically released in the form of earthquakes. As a result, the Himalayan belt is seismically highly active. Dr. Bilham, Dr. Gaur and others have been using GPS receivers, which can accurately compute the position of any place based on satellite signals, to study the movement of the Indian plate. The GPS measurements showed that sufficient stress had accumulated to drive a magnitude-eight earthquake along at least 50 per cent of the Himalayas, said Dr. Bilham. It took about 15 magnitude-eight earthquakes to rupture the entire length of the Himalayas, according to him.

The renewal time in the Himalayas for great quakes was 300 to 500 years. If it took 300 years to develop enough stress to drive one such quake, there should be one of them happening every 20 years. But no great earthquake had occurred in the Himalayas for 50 years, he pointed out. Obviously the earthquakes must cluster in time. "Are we approaching one of these clusters," he asked, adding, "Everything seems to point to a disastrous century."

THE HINDU

31 JAN 2001

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THE KILLER PLATES

EARTHQUAKES CAN BE EXPLAINED BUT NOT PREDICTED, WRITES ANITA KANUNGO

THE FRIDAY fury that the people of Gujarat faced is only a chapter in the bulky volume of Nature's anomalies. Consider these statistics: Every day, there are about 1,000 very small earthquakes in various parts of the world. That roughly translates to one every 87 seconds. And every year there are 800 moderate earthquakes, capable of causing damage, and some 18 high-intensity ones that can wreak the sort of havoc witnessed in Gujarat.

What causes an earthquake?

Simply put, earthquakes are caused by 'faulting' — a sudden lateral or vertical movement of rock along a ruptured (broken) surface. Dr Harsh Gupta of the National Geophysical Research Institute, Hyderabad explains: "The surface of the Earth is in continuous slow motion. This is plate tectonics — the motion of the seven massive rigid plates forming the surface of the Earth.

Each of these plates is about 100-150 kms thick. The Indian plate extends from the Himalayas beyond the Andamans and Java Sumatra to Australia, where it touches the Pacific plate. The rate of movement of the plates varies from 2 to 12 cm per year. So slow, you really cannot be blamed for not noticing it.

Since all the plates are moving, they meet up occasionally, rubbing, colliding or sliding against each other (technically called "strain"). As the motion continues, the strain builds to the point where the rocks cannot withstand any more and, with a lurch, they give in breaking up. An earthquake follows, the grinding rippling up through the earth's crust to the surface.

Light brush — small quake. A real collision — Bhuj happens.

Motion effect

Any of the following three things can happen when the plates come up against each other, says Gupta. Scenario A: one of the plates sinks under the other. Million of years ago, the Indian plate, which was initially attached to the South Pole, started moving towards Eurasia: this resulted in the Tethys sea — north of the plate — getting subducted or sinking beneath the Eurasian plate.

Scenario B: collision. The Indian plate collided against the Eurasian

plate, giving birth to the Himalayas some 40 or 50 million years ago. Incidentally, the Indian plate continues to push against the Eurasian plate, which is the reason for most of the seismic activity in this region.

Scenario C: the two plates slide past each other. There is no sinking but the sliding itself causes a lot of strain. The most notable example of this is the San Andreas fault in the USA, which has caused most of the quakes there.

Intra-plate stress

The above were examples of inter-plates stress. Intra-plate stress too can cause massive earthquakes.

Intra-plate stress is due to the fact that not every part of the plate is similar and there are weak zones and faults, this leads to stress.

This is known as stable continental region earthquake. This type of earthquakes is rare — Latur belonged to this category. Preliminary findings are that Bhuj too is of this type.

Gupta says, "Paleo-seismological studies at

Latur revealed that such an earthquake had occurred 2000 years ago. Studies of the 1897 Shillong

plateau earthquake showed that three such earthquakes had occurred in the last 1500 years."

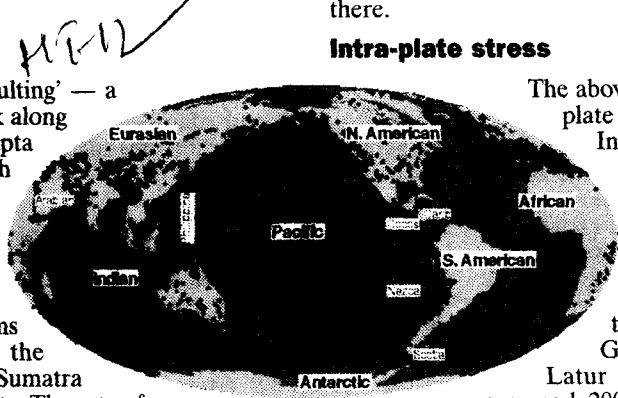
Vulnerable near the faults

Experts say earthquakes are common near faults. The Bhuj earthquake is very near the Allabund fault, which was caused by the 1819 earthquake which rocked Kutch. It is a scarp (a steep slope) about 100 km long and 6 metres high; it's visible in satellite pictures.

The Geological Survey of India has divided the country into different seismic zones, but, experts say, it should not be taken as the Bible because both Koyna and Latur were mapped in zones of negligible probability of occurrence of earthquakes, yet both were rocked badly; Koyna in 1967 and Latur in 1993.

The main problem is that with the present state of scientific knowledge, it is not possible to predict earthquakes and certainly not possible to specify in advance their exact date, time or location.

In short, you never know if it can hit you — and when it will — till it does.



Sliver of India

THE HINDUSTAN TIMES

28 JAN 2001

Civilisations were 'destroyed by climate change'

140-17
LONDON, JAN. 26. American scientists warned on Friday of 'unprecedented social disruptions' that could result from global warming, after linking the collapse of societies throughout history to climate change.

There is 'mounting evidence' that the demise of some civilisations was climate-driven, report Prof. Harvey Weiss of Yale University and Prof. Raymond Bradley of the University of Massachusetts, Amherst.

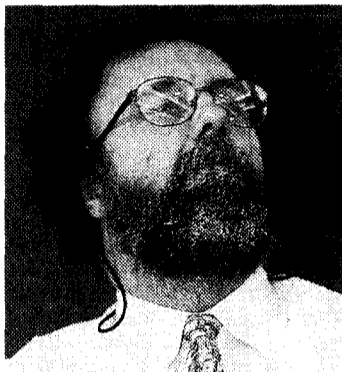
Scientists are now able to link the rise and fall of societies recorded in the archaeological record with evidence of the timing and magnitude of climate change held in ice cores, corals and sediments.

"We find a very precise coincidence between the abrupt climate changes and the archaeological record of collapse," says Prof. Weiss.

Sediments from Lake Titicaca, which straddles the border between Bolivia and Peru, reveal that South America has endured alternating periods of heavy rainfall and severe drought over the past 25,000 years.

Studies of ancient coral reefs in New Guinea show that the climate phenomenon El Nino, which disrupts rainfall patterns worldwide, is more intense these days than at any time in the past 130,000 years — possibly as a result of global warming.

Societies from the Classic



Mr. Robert Watson, chairman of the Intergovernmental Panel on Climate Change, at a press conference on Jan. 22. Scientists from around the world have completed a report confirming that the evidence for humanity's influence on the global climate is now stronger than ever. — AP

Maya of the New World to the prehistoric hunting and gathering Natufians of south-west Asia were drastically affected by sudden, prolonged and intense temperature and rainfall changes which disrupted agriculture.

"These events were abrupt, involved conditions unfamiliar to the inhabitants of the time, and persisted for decades to centuries," say the professors in the journal *Science*. "They were therefore highly disruptive, leading to societal collapse."

The demise of the Classic Maya society in the 9th century AD coincided with the most prolonged and severe drought of the millennium.

The pyramid-constructing Old Kingdom of Egypt, the Akkadian empire of Mesopotamia, and Early Bronze civilisations of Palestine, Greece and Crete all peaked in 2300 BC, then declined when catastrophic drought and cooling struck a decade or so later.

The Late Uruk society that flourished in southern Mesopotamia in 3500 BC collapsed between 3200 and 3000 BC, again due to drought.

The professors suggest that modern societies, faced with prospects of global warming, may not be immune to social disruptions triggered by abrupt climate change.

In spite of technological change, most of the world's people will continue to be subsistence or small-scale market farmers, vulnerable to climate fluctuations.

But unlike ancient societies, who could migrate to where cultivation of crops was possible, the world is now too crowded for 'habitat tracking'.

"We do, however, have distinct advantages over societies in the past because we can anticipate the future using computers," say the authors. — © Telegraph Group Limited, London, 2001

THE HINDU

27 JAN 2001

Fresh probe raises fears over milk safety

By JONATHAN LEAKE

A NATIONWIDE investigation into the risk that milk could transmit BSE between cows and humans is being launched by the Food Standards Agency (FSA). The move follows private warnings from scientists that the original experiment used to declare milk safe was flawed. This weekend Professor Malcolm Ferguson-Smith, the Cambridge University geneticist who sat on the two-year BSE inquiry, criticised the agriculture ministry for not doing the necessary work. "It is astonishing that this research has not been done," he said.

The new investigation coincides with fresh figures on the spread of variant CJD (vCJD), the human equivalent of BSE, showing that the number dead or dying from the disease has risen to 90. It has also emerged that the number of people aged over 50 dying from the disease has risen to six. It had been thought that it was mainly a disease of the young. The main research used to declare milk safe was published in 1995. It was based on giving milk from cows with BSE to mice, orally and by direct injection into the brain. None of the 275 mice in the research developed any sign of the disease.

Although scientists say there is no evidence at present to



TASTES ALL RIGHT: 11-year-old Victoria Robinson, from Halifax, enjoys a glass of milk.

Q: ... & feel
suggest that milk is unsafe, Ferguson-Smith believes the experiment was flawed because of the species barrier that prevents BSE passing from cows to mice. This, he said, made it highly unlikely that any of the mice would have fallen ill. He said the work should also have been done in calves, adding: "This would have been a thousand times more sensitive."

He warned that milk should be assumed to have the potential to carry infection. Pointing out that BSE spreads via the lymphoreticular system, a loose network of organs involved in the immune system, he said: "Milk contains mammary cells, cell organelles and cells from the lymphoreticular system. It therefore has the potential to transmit prion diseases."

Britain consumes about 14 billion litres of milk a year, of which half is as milk or cream and the rest cheese, yoghurt and other dairy products. Tests suggest none

of the processing methods could kill prions, the deformed proteins thought to cause BSE and CJD. The majority of the 1 million or so animals thought to have entered the human food chain while infected with BSE were dairy cows, whose milk would have been consumed for years before they died. *(The Sunday Times)*

THE TIMES OF INDIA

18 JAN 2001

Genetic green light

THE GREEN light the 88th Indian Science Congress gave to genetically modified food represents a voice for reason in a debate all too often coloured by emotion. The five-day meeting of India's best and brightest concluded that public fears about such food "have not been substantiated through experimental evidence." The scientists could have also added that a steady stream of recent studies — by governments, laboratories, companies and non-governmental organisations — have all given a clean chit to genetically modified grain, vegetables and the like. The congress did not fail to highlight that there is an element of risk and that suitable safety precautions should be taken. But then, that has never been the argument of even the most ardent biotechnology supporter. 10/11 9-50 am Feb 10

The congress' okay will hopefully balance the emotional arguments made by radical environmentalists against genetically modified food. The ultimate green argument is that biotechnology is unwarranted interference in pristine natural forms. The reality is that there is no natural thing on any person's plate any more. The original potato was bitter and poisonous. Natural almonds are lethal. Centuries of selective breeding, a crude form of bio-engineering, made them edible. The hybrid cereals used in the green revolution were created by merging thousands of genes from various species. Today's genetic engineering is, if anything, more precise and controlled than was the case in the past.

India has a special reason to not only embrace, but even defend genetically modified food. The green revolution is a spent force. India's population growth is not. As scientists at the congress noted, the next boost to agricultural productivity will have to come from biotechnology. Western environmentalists can protest against biotechnology in part because their societies float on farm surpluses. It is noteworthy that while India dithers, China is aggressively sowing its fields with bio-engineered seeds. Green groups are demanding that such food items be zero risk — something which is scientifically impossible and would preclude every invention in human history. The congress resolution is a useful reminder that the biotechnology debate is still best decided with the tools and methodology of science rather than propaganda and street protests. 10/11 9-50 am Feb 10

THE HINDUSTAN TIMES

10 JAN 2001

Science Congress makes a call to protect bio-diversity

The Times of India News Service

NEW DELHI: The five-day Indian Science Congress with a focus on food, nutrition and environmental security ended here on Sunday with a call to invest more in R&D, integrate traditional knowledge with frontier science, reorient policies to take competitive advantage of the global scenario, use biotechnology and protect bio-diversity, and remove bureaucratic hurdles to enable scientists to excel.

Food surplus has to be managed, used to augment infrastructure and create employment for the rural poor, the congress emphasised. Looking within, the scientists also want "new age" institutions characterised by human resource development, efficient work culture, responsiveness and cost effectiveness. "Human resource appears to be the most critical," said president of the congress, R.S. Paroda.

Recommendations on research suggested a "bottom-up approach to research prioritisation", new initiatives to move more aggressively to protect bio-diversity and an approving nod to biotechnology, which was described as "a very powerful tool to alter the nutritional, therapeutic, functional and economic aspects of plant and animal food."

The recommendations went on to claim that "most of the concerns about the safety of genetically-modified foods have not been substantiated through experimental evidence". Queried on this, Mr Paroda, who is director-general of the Indian Council of Agricultural Research, hastened to say they were planning a national debate on biotechnology.

Investment in agricultural research and develop-

ment, it is said, should be at least two per cent of agricultural GDP if the targeted four per cent growth is to be achieved. The congress is all for technology generation, assessment and transfer through multilateral collaboration—with national interests safeguarded.

The need now, said Mr Paroda, is diversified agriculture for food and nutritional security, the aim being a rainbow or evergreen revolution encompassing all disciplines, crops and commodities. "We must double food production in the next decade and for this, we need a different breed of technology agents, those

who are not job seekers but job providers." A wide base of agri-clinics could provide services, with emphasis on internet-linked information services.

The aim is to extend the gains to areas bypassed by the green revolution, like vast dry-farming areas, through watershed management, hybrid technology and selective farm mechanisation.

Policies need to be rural-oriented, focusing on land reforms, institu-

tional credit and public capital formation, with a safety net for the poor. "Capital investment in rural areas is perhaps most critical," said Mr Paroda. For an interactive rural development process, the congress has suggested a consortium of government agencies, NGOs, farmers organisations, panchayati raj institutions and the private sector.

Women need to be sensitised to needs of families for nutritious, traditional and alternative food including designer crops. The problem of micro-nutrient deficiency, said the scientists, could perhaps be tackled through backyard nutritional gardening.

POLICY INITIATIVES

- Improve the efficiency of domestic production, processing and marketing
- Network multiple technologies with agriculture and food processing
- Encourage youth to stay on in agri-business with precision farming

THE TIMES OF INDIA

THE TIMES OF INDIA

9 JAN 2001

Kalam: India can achieve 'Low crop output led to farmers' suicide' 4 per cent hike in GDP

HT Correspondent
New Delhi, January 4

Dr. A. P. J. Abdul Kalam, Principal Scientific Advisor to the Government, believes that if there is an effective "networking" of technology in five core areas, India's annual GDP growth rate can jump from six to 10 per cent, and 300 to 400 million people can be brought above the poverty line. Speaking on "networking multiple technologies for nation building" at the 88th Indian Science Congress this evening, Dr Kalam identified the five areas as agriculture and food processing; power; education and healthcare, information technology; and strategic sectors like nuclear, space and defence technology.

Government departments and agencies will be essential" The core to success, he explained, would be in various forms of connectivity.



Dr. Abdul Kalam

Dr Kalam's lecture was today's chief highlight at the mega-science meet where groups of scientists debated vital issues pertaining to various branches of science on the sprawling IARI campus.

The veteran scientist placed great faith in the country's youth and said all that was needed to achieve the vision of a developed India was to ignite the young minds. India had a population of 700 million young people below 35 years. This was a "big force" and could be brought into action just by "launching" the vision.

Talking about India's status in the world, he said the country was twelfth in terms of overall GDP size and 57th in terms of per capita GDP. This could not be acceptable to anybody, the country's young population the least. India must work for the fourth or the fifth position in terms of GDP by 2020.

Spelling out his strategy for development, Dr Kalam said a target of 360 million tonnes of food and agricultural production should be fixed.

Reliable and quality electric power be supplied in all parts of the country.

HT Correspondent
New Delhi, January 4

DESPITE THE conduct of umpteen conferences and seminars in the country on agriculture, the plight of the common farmer remains miserable. At least this is what farmers attending the Indian Science Congress in the Capital are saying. The Congress is being held on the theme of "Food, Nutrition and Environmental Security" this time.

Even farmers who were invited to speak at public fora at the Science Congress for their excellent work are stating that the condition of farmers has in fact worsened. For instance, widely acclaimed farmer from Andhra Pradesh Narasimha Raju Yadav who has won several awards and whose work was lauded today by none other than HRD Minister Dr Murli Manohar Joshi told The Hindustan Times that farmers in his state were facing a desperate situation.

"Farmers are committing suicide because the crop output is low

and they are unable to pay back the loans that they have taken," says Raju, who hails from the Krishna district. "If I want to speak the stark truth, tell me which political party will allow me to do so," he asks, while demanding that farmers be given proper remunerative prices by the Government so that they can survive.

"It doesn't make sense. When the cost of diesel, fertilisers, labour and other inputs has risen enormously, the remunerative prices haven't. Unless, these are raised by the Government, the farmers are doomed," he feels. "Consequently, as farming is becoming unviable, several of them are migrating to the cities after leasing out their lands," he laments. "That is why I humbly folded my hands today and requested the government to do something for the farmers," he says, adding that chemical substances not be used to enhance productivity as it would deplete the soil.

'India has to produce more through biotech'

Anita Kanungo
New Delhi, January 4

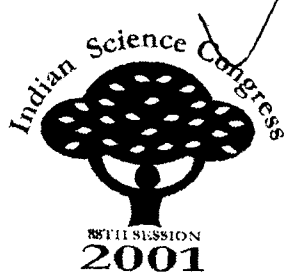
"THE FEAR of genetically modified food is misplaced. In fact, the movement against genetically modified food is more about fear mongering than anything real," said Professor Krishna R. Dronamraju, president of the Foundation of Genetic Research, Texas, USA.

At present in the Capital to attend the Indian Science Congress, Dronamraju, who has authored more than 12 books and 100 research papers on genetics and biotechnology, poohs-poohs the claims of what he describes as the 'anti-biotechnology brigade', saying their movement is more socio-political than scientific. "Why do you want to go back?" he wondered.

According to him, the debate in India is more a case of blindly aping the West, especially Europe. "The situations in India and Europe are entirely different," he told this correspondent.

"Europe can afford the luxury of a debate because it does not have to think about hunger. But India needs to produce more from less - and only this technology can help you do it."

Dronamraju emphasised that biotechnology 'will shape the future of agriculture.' Even our first step in agriculture, the Green Revolution, was possible only due to the



use of hybrid seeds.

For a similar revolution today, one would use biotechnology.

"More than blind hysteria against biotechnology, what India needs is its own Intellectual Property Regime to protect its biodiversity," he stressed.

One argument repeatedly advanced against GM food is that it can cause cancer.

Dronamraju, who was a member of US recombinant DNA committee, said he had "yet to come across case where it has caused cancer. There is no evidence."

"This is not to say that there are no risks,"

he hastened to add.

"Every new technology poses risks and must be done carefully."

For instance, it was found that the pollen of the Bt transgenic corn kills the larvae of the Monarch Butterfly.

Such instances only buttress the caveat that careful trials have to be done before seeds are released into the field, said Dronamraju.

For Dronamraju, the real risk from genetically modified food is of it being controlled by big corporations who have the money and technology to produce high-productivity seeds.

But this should not be a major concern in India, because the average land holdings are so small that it would be difficult for one company to dominate.

THE HINDUSTAN TIMES

5 JAN 2001

Genetically modified products need cautious handling' Young briga

Satyen Mohapatra
New Delhi, January 3

CREDITED WITH the first ever patent on an "artificial life form", Dr. Ananda M. Chakrabarty, advocates a "cautionary" approach to genetic modifications.

"Even though genetic technology is very safe because we know the nature of the gene we are introducing and the most probable effect these genes have in the transgenic organism, we must have strong regulatory mechanism in place before introduction of Genetically Modified (GM) food or application of genetically-engineered micro organism," he says.

In an exclusive interview to The Hindustan Times, Dr. Chakrabarty, Professor of Microbiology and Immunology at the University of Illinois, Chicago, who here to attend the 88th Science Congress, said, "When you

introduce a gene in food, you want to sell the product and make money but the product has to be safe for people to buy."

There must be proper evaluation



of the impact of genetically modified products on health and on environment.

Dr. Chakrabarty says science can not shy away from the new developments, fearing consequences. He says one has to assess the risk

involved before taking any decision in this area. Each case has to be evaluated individually.

"The chance of anything going wrong is minuscule but is not zero," he said.

The GM products should be thoroughly studied with regard to toxicity, stability and impact on environment before introduction.

He left India in 1965 about 35 years ago with a PhD from Calcutta University for post doctoral studies in the USA.

Dr. Chakrabarty worked on a micro organism called pseudomonas, which are good in "eating oil", in Calcutta.

In the US, when he was working for the General Electric the company wanted Dr. Chakrabarty to work towards creation of an organism which could clear oil spills. Dr. Chakrabarty created an improved variety of pseudomonas and eventually got a patent on it.

Vinod Sharma
New Delhi, January 3

THE CONGRESS seems divided on the question of constituting its working committee through nominations. In the forefront of the growing opposition to the 'no-poll' move are the party's Young Turks, who see in the CWC election an opportunity to assume centre-stage in Congress politics.

Many among those who resent the nomination route aren't hopeful of making it to the six general CWC berths. But a poll suits their immediate aim of emerging as 'good losers' with better claims in any future round.

Remarked a relatively younger aspirant: "Even if we don't make it to the top six, emerging as top losers would catapult us to the centre-stage." The argument basically is that a party in power can recognise talented youngsters by assigning them junior ministerial slots. But this leeway isn't available to Opposition formations, which can redefine internal hierarchy only

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4 JAN 2001