



VOL. 9 NO. 2 EDITOR IN CHEF A DESIGN DIRECTOR, BOB SUCCIONE

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Mech Coloman

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#### FIRS MUIEL

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July 25, 1963, by the United States.

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#### CONTRIBUTORS

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prestures. Tributiva Blandage: (page 64)

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He was unaucosostul, but his results provide an infrared protection flacostity American and Sowiel children created than own air to commenced the tenth innerversally of the Instant Applica-Soyuz space mission. The pictorial "The

ther work which is no in a joint US-Sowet is by Green DO



#### LETTERS

#### COMMUNICATIONS

Cure for Violence?

The nation of psychological contingion is called installing the Program Called Visiones, Appeal 1988; that the solid psychological pre-old absurption that imidia visiones seath to meal violence amply as a function or less that a program of national programs of national programs of national psychological particles and the psychological national or altered by other bacons national or altered by other bacons national or altered by other bacons and observed and psychological psychologic

education is happy frome and a conflorastale at style wed containly come is lot closer to eradicating violence. Erros Wembsub-Austin Institute for Communication Research.

Stanford CA

Course: Consciousness
The visions of a future unwares described
by the physicis-memorised or Affectite
Suit Date: (August 1998) are closer
schemed, and it invasioning teach scorein
however is bound by a commen facility
futurally is desired to see the reference on the

If the Can ablication are energications to all the Can ablication are energications to the Canada and the Canad

Many scientists do not believe in a creator who created man the earth or the universe. After the Sun Dies' is an example of mans ignorance of the Creator Nowonder Josus and The westorn of man as tookshees with God Mrs. Mike Hisboak

Self-Health five worked as a re-

years and other fet discouraged and even highlimed by the athludes of some of my collegues in health care protes some I'm very encouraged by Dir Barnaid Stegdis athlus lowed his patients (First Word August 1981).

same in the very encoughed by Dr. Bernard. Singplis adhable lowed his paperts (Fird Word August 1989). Although meny of us give by service to the importance of the patients will to her our actions say the opposes. We don! Italial we discoprisely disclain and sometimes four an individual's determination to protroption in the haring process.

sour we obtained an entirequire determine an extending processing an extending processing an extending processing an extending an extending processing an extending an extendi

Mary Liptor Mackson Wi

Industry Showcase At the 1986 Summer Consumer Bectronics Show Citon asked attendees to choose

the most incombine distings and registering with Product Chappains included and audio video corruption in video and audio video corruption and personal electronics. Story Corporations (VIII) 36 HBR Intel projection TV worn the video and This abunda and the product and anything the three states (IIII) and intelligence of the personal electronic laword for a visual intelligence and control and the combined and the video video states and video video

who won the sweepstakes and recr a Rado DeStar Anatom watch DO

### FORUM

This month's Forum is devoted to readers most popular rections. The articles often stimulate reaction to selv questions, voice No Ext

We were appoined by Leich Waltach is besigning a weathew oranged. 1999: througands of people and have gotten relixestion tapes. Not one has expen-Withschip story In discussing your article with students

conclusion that there must be an explaration for the arresty attacks that were described in the story. We think that the subsects regresseed to an early ago resulting in a true panic attack. They wern not propaged for that exponence and but all sonse of control. Some of our clients a technique coded the commits emeroracy and to remove them from this state. The propert races a finger, and

Patricia D'Encamecino M.D.

Zoo Story The West ington Perk Zop mentioned in "Intracorso Elechants (August 1996)

Portland Gregon, it is a territic 200 Packy. the first eighbard born in capitylly in polden monkeys were residents for several weeks. There's a pengumery and an sutherno Cascade mountain fres with a stream where others and between play

After I had finished reading. The Bowle Effect [August 1986], I wondered whether 16 (860)

Hisraid Dangerink had taken into consist graftion the fact that David Bowle has a fendency to increase onesi blood pressure

Lisa Wiabol

Moianchology Baby The image of an infant in the crit with in computer makes me very uneasy "Computer Babies," August 1966: The computer-compenionship and stimula loams on the honzon. It will be interesting

Interts are engreted by their envelopment, and with a computer in the onb to proceedings to the child will stoly have be recoursed at a great cost

Parking Churches

Loosed to Respond to Ceange Notibe's white Paying the Stroug (August 1996) Water McCrore is neither a obvaice? on observation. He research has not been published in poor-reviewed journels. He has never responded in detail to the work he conselly democres

McCrone's results are challenged by feart-John Haller, a beachward and Alan Adler a playanal observed. The last in perfect accord with the orthogaspectroscopic and radiographic analyses and the particles observed by McCrone \* work very smally "They'm worm 1 know

scope, and there was no blood " But

McCrone did not chemically lest the particles. He claims he doesn't need to Morrbors of the media chempion his supportive saltements. McCrone refuses

Sattoriox I found "Why God Rested on the Seventh" [Azy 1986] very interesping | heiden to been so since time immomoral. Their sinces cycle but probably indicates that the

ebb and peak are determined by a long altending gestern of boltowor Sidney Reiners

Edon't know if Gorard Debugs a specific

and practical approach [ Low-Budget Fusion," Auto 19861 community and double its reastoron.

and no one will fund a project to test the theory in the lab. In 1963, conversely the High Energy Physics Advisory Panel to the US Department of Energy decided to spend \$4 billion to build a new periole afformat made to generate bell kohmon in this orphan of plasma physics. I'm a retired NASA research engagery and world interested in bed lightning

France J Stermer Krosvile OHOO

## TRFF SHAKERS

#### EARTH

By John J. Berger

en determined and roughly clad. probasies were waiting in the gray prodown light when the con-Dougliss fr, incense cedar, and other species-make the Karmonas one of the truck burnped protester Dave Foreman The pickup truck began to move pushing Foreman up the his increasing its spood until Foresian -- unable to keep he grabbed on to is burnow his legs

stopped Just then a deputy sheriff activitis in three subsequent blockwise for the Crogon Natural Resources Council to file a insulational read receive an Dave Forestein is one of the founding

rooks environmental organization known. millions of acres of land be set asido as wideness areas Committed to protecting widerness and widlife they sell even Foreman begain by volunteering for the Wilderness Society and was eventually

fired as the organ's southwestern rense. legislators, they beloved they had to

program was unwelled. Foremen whe Kodless and rould have been protected every point. The arran vectorized side

We had provided more—and better—

For from continuing the fight, the Willear that Congress would react to a court Gutting Westington he returned in 1979 to New Mexico just about the time.

Foreman found the Bureau of Land Management and the environmental and reservable. He felt the situation galled for anges, even rage, gver the harm

now play in the clock, is metars, uncorn-

fignal chryotor Susan Mospon.... ritus Fixeness of the Earth's oneitine Wyoming Yours activity Miss Roselin In early 1980 they piled into Foremans

isunt in Mexico's Proncete Depart. On the What they created was vastly different from this country's established proving the if Barti First adopted the convertional against Instead Earth First was conceived as a movement of autonomous. no bylaws, no constitution, no removalit tra-

into the headines with a series of guernla-

theater actions and demonstrations.



was in Anzona at the Glan Carryon Dam, which tracs the Colorado River in Lake. Powell and generaliss power for Los Angeles and Phoener, Since the clam was speaking to a ratiy at the dam's base on April 21, 1981 when Forerran and a couple suddenly unfurled a 300-foot-lone rail of

black plastic from the top of the clam As it unrolled, the spreading plastic created After this first sturt Earth First become a reformate Youd show designed to

message to small towns, colleges.

In California at the Softy Boll grows of

Humboldt and Mondoorio courties. Earth Finitiers in 1963 put fromselves between the Irons and Georgie-Peofic Company A kiel-menute restraining order sayod Earth First, contends there is more than

United States to meet all of the country's needs and that destruction of the last tember we need on they turns and prevent west." Foremen says.

In the spring of 1984 Earth Figure members once again put their bodies on provide rock for surfacing logging roads

During the past two years Earth First! thety breeding temples " save Forement management has drawn a stern reply

from Robert Barbee, supportundent of the park. "I don't know what Dave Foreman Suddenly this is his cause college. He claims ha's going to die for the boar and goes through all kinds of gyrations."

> monkeywrensteing '-- the sabotaging of construct shafts deep in the bunks of trees expensive symmit mechanicy and pay couse charmson to buck. Street operaderarred applies do not activate the defect fors. Spring frees car: thus delay a tentier sale or make it unprobtable. The

Earth First is a handful of adolescent popule who take a militant approach wilderness we need. says John Benneth western regional marrager of the Ameri-

be resolved without spiking And Max Peterson cheet of the U.S. Forest Service is more adamant. Tree spions, in addition to being ilegal, is dizes the safety of loggers. frewcood culters, and mill workers. We waw tree acts are counterproductive to the cooper withon groups, logging companies and

direct action irlations, and quentle freater The Oregon widerness bill that presed in 1985) probably had a couple of hundred couple of years, "Foreman says "By consequences, we have turned more people into supporters of preserving oldreleases and making statements

Foreman is willing to endure criticism

Gene Coen, assistant conservation Earth First in proposing a 10-million, to nesses All told Earth Feet syeks millions

work of other programmental oppulse. unprotected roadiess widerness greas remarking witherness. "At a certain point," Foremen says "you just have to say, 1 destruction any longer it yours going to distancy life, you're going to do if without my agreement. I don't think you can

have to make to save life on the planet DO



22 CMN

#### MARK OF THE OLIARK

#### STARS

By Marcia Bartusiak

one than 30 000 light-years from Earth in the direction of the Swan less one of the most powerful X-ray sources in our gallesty. Dygrue X-3. from a normal stellar companion. The two

offer as evidence some curious subsame supposts that the ster is a compact closer

1982 Physicists from the University of which was installed in an old Minnesota non ming. They were mysteled when their of muons (heavy, electronike particios) Microsophi physices Mervin Mershok, Tine In 1964 another proton-decay group

writing in a salt mine near Claveland every 48 hours. It was as it a lighthouse. were flashing ' says Mershak The Cleve Ovanue X-3 goes through sporadic ri the sky display its wolent appeades laws been detected with racks and infrared detectors theorets are surmany that the originate X-ray source is releasing not rages but streams of excep perticles too

instruments as well as with space bused

muoris were procluded by a stream of

were they seemed to have at vylundy the spead of light. But high energy photons

According to traditional theories, when a star explodes. The matter at its core is under the tramendous pressure of a protons and electrons may be broken into smaller elements. The result is not a companiers knocks some quark nuggers.

Given these constraints, some physicists

of the quark star leach clump of quarks in The ruppets are freewn out into space at near koft appeal by the quark star's

This is the freezy. The evidence physicist Edward Faris of the Massards-

would have a thin crust of orderary stellar midded, which would prevent any quick Also, proton-decay groups in Europe and Japan declare they have seen notwice

of virginia Marrivak's toom was able broad region around Cycrus. Of these hour ortatal period. Masshak himset admire. still very much alive. "People don't like this things are not nearly as clear-cut as they appear in terribooks "DO



Dygnus X-3 superquark or quest?

Morrae Revision's book Thursday's Universal

#### CITY OF TOMORROW

#### EXPLORATIONS

By Mary Elin Barrett and Steve Lerner

In fields surrounding for ornal villages of countries from the surrounding for ornal villages of countries from the surrounding reason that on the centre with substitution of the centre with surrounding surrounding the surrounding of the sur

hild has ewepf much of the globe. No place on Earth would seem a more unless yield for a city of the fusion. Yet of the man shawyer about 100 miles outof Morions near the city of Plandscherry, like Auseille, a community before hard prenil leader 6th Autocharlo Strom hard seem all leader 6th Autocharlo Strom to he saffers enhand on the late School, Autovalie has been endersed by the Subrammer of Nations subsociated by the Subrammer of Ideal, and hashed by such lammans as Ideal, and hashed by such lammans as

Margaret Meat I.

Dit this spiral externacity is using a better in the sound of the arrow except of the ar

moving sidewalks and monorate as part of a transportation system for the 50,000 residents who were expected to gravitate to this utopies entitle.

It wasn't long, however, before the

I wor'd long, however before the hard mostless of courton in face out the artificacia valuan down to a more resistant cone When the face because of prevalent cone When the face because of prevalent prevalent when the face of the court were deeply found one as a man prevalent proposed, the counter that of lengthy respected the counter for the court proposed of the counter for the coun

If was nainly a depert.

"When I darta have in 1971, there wasn't a tree between here and the read vallage fave hundred matters every," says Englishman Michael Tast with obvious certifaction as the releases in order of the wood array. No house the network in their body the wood array.

man worked less with obvious enfetigles is the missions in front of the wood areatic house that he and his with Visions to for themselves and their two children.



The perhostred meditation hall at Auroville

Bince then Subre Tax, and others have platfed well over a million trees and established numarous gardene ponds, wells and windonests—and in the process completely changed the

They've riso restruct unusual architecture side data their resides and the hard-unimate 8 is not unicomman to intri hayd-unimate 8 is not unicomman to intri hayd-unimate 9 is not unicomman to intri hayd-unimate unimate in the side of the side of

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contested power outsiges Joan Pouposit, a small overgado Frenchman who is a former engineer typhes the Automotic technology built his so-room house has solder panels than provided him with enough eschology built his fighting and the suido equipmost—allowmanch. A bodge pomerator great him energy to cook and run his refrigorator manufacture and provided provided provided Destrible ther enough location and

the entern Terral culture in which they continues on each of

#### **PSYCHOFASHION**

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By Gurney Williams III

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arena for battles over the mind. Therapasts

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thereafter appear in a diagnostic catagory because everybody looks like yong got in that week!

Fower suggestals are offereaftive "I thrisk we ought to do if the way they do in baseball A resychance condition quich lib survive for (Paken years before it is allowed into the DSM Half of Farrier!

Duty to the proper before the property of the bush of the DSM Half of Farrier.

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women are pathological cases.

Tis all a beddach against women bying to become equal - lays Lectro whiles a Derive psychological Thieses, little directle evidence to support any of the revision. The critic in critical evidence to support any of the revision. The critic in critical evidence to support any other revisions are because many women seeking thesity in recent ty even have gone to a growing number of female psychological critical evidence.



#### VOICEWRITERS

### ARTIFICIAL INTELLISENCE

If see you in Assis C.1 saws computer

somerest List Balf. As he have a cursor deposite his words at the bay of a sotien in front of him. Occasionally a gets one wong, then changes it as he commuss to speak. A inter-facion or quackly gives way to see his in replaced by word in as section appearance. The contracted words are transferred to a hind first window (losse on the notion).

This contents acree and in the protect in the first term in the content acree in the content

cho. If file on two beards made a PC Aff if her a vecicity or of 500 words. If you have like fines, amine devices could soon like most of the pain out of yeard soon like most of the pain out of yeard processing and date error, hasked of becamp your becapits who an observate heyboard your landing talk to your machine and field it information.

ascund for all beat the years, but there workships with beat the content of content of the conte

units, reports Mohael Tomase; president of Kurzweil Al. Most are used for data entry and small functions. But before this point is cut we will be oftening a model with a vocabulary of five thousand to ten.

floorand words. That will be arried at toxt generalize." Large vocaturary speech recognizers.

work very differently appears recognizers
work very differently from make limited
models. Small vicosbulary systems rely on
models. Small vicosbulary systems rely on

these terrolates and chooses the loseplate that the best as the word it must lookly heart. This works well for small selections of words with distinct sounds but not for a large sociaturary. "The only way you can be alongueth between words the 10-less and on its by there contine. Bell year BMX southers."

between verdis find to Noo and too is by finer continui. Seni Josep 88th system uses a straticula disassisse complete from soma 35 metro, words of constraint in the control of the control of the mouth platfast and manner. When a new word sames the popular asserts of the popular and the popular popular some senior popular sold and a status popular sold popular popular sold popular popul

and decident rain by ac

Computers that listen is new generation

Both hopineques work was 1866's wood recognizate a sew to be at least 49-5 perioral accurate withis Autoverticities but to 99 perioral accuracy with highly statistic users. (In case or entry you can other let the machine to by again or small your mine word.) This down it are not provided to the statistic recognises for percent of the words you would nameally user. There with a five thousand and Them with a five thousand and perior the statistic or the second your transmissions.

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#### RACING WITH THE MOON

#### CONTEST

By Douglas Colligan

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The ground price for the section and ammonisment of Obbbers, will be one staked on Placed Stakes Wayner, a few Spirited for the section of th

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r number of occupants i could carry, mean of people into tho people, partiermore of people into those poorly and interest of people into the open and chimfor, reserve of several and chimfor, reserve of which is made have our assume than we be riming and manufacturing facilities on the moon. We know our assulting in not maken men out stamus, also do on addition in not maken and only partier of the people o

Box 9113. Altatos, MA 02134. Enteree must be received by Docombar 31. 1966 We are not responsible for lost, late, or misdected mai. Entires will be judged by a special patiol, and winners will be determined.

Difference of the purpose of the pur

agencies and Prisastein Makillering, Its All Insteads Island to cell large and regulations accept Votal where portrained and regulations accept Votal where portrained in the prisastes and regulations accept votal and regulations accept the prisastes within 15 days of motification from the prisastes within 15 days of motification from the prisastes within 15 days of motification from the prisastes within 15 days of motification and prisastes within 15 days of motifica

ses are worse to responsibility.

All critical accounted will be reviewed and the firstitists submitted to our pared of judges when includes a pool of Styrac module commands of Julies level. General K. O'Nell lastes from Artesta lastes from Control Styrac module commands and since share of the second for the second first produced to the second first produced to the second first produced to the second first produced for the second first produced first produced for the second first produced first p

A long course over rough terrain the routs covers 2.600 miles as the rocket feet to read the route of the route over the route

#### STRESS IN ORBIT

## SPACE

By Eleanor Smith

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Factors Ortice.
The problems are all too real in 1974, about making through the find Sayab mission, dawn members became so heads to glowind oxefel for overworking them that they simply wort on strike.
They skipped working and did what they peaked to in earthy law minut mission.

comor agrection a lightn's schacule. To prevent such a problem from nocuring. NASA psychologists are helping to order, time, and time psychologist are of space-station criefs. With the exception of Skysta most previous spacestights were relatively short. So NASA focused on the sechnicing out challenges of putting man into orbit, gotting time to the moon, to theirting it results approximation of the psychologists. They gave after shift for the psychologists and sociologists flatories vincinies in spaces.

three reports of year invasion many the two things they would not believe in note thermometers and psychologists. Solally however things are different. The agency is beginning to advanwooding what his Sovieta have understood for yours. "For candicidate for the commonant corps undergo extremive says to mediation their psychologist fineses for the data their psychologist fineses for

mattibuts. To determine whether the cardidates have the right soft to winstend the night of long-term space travel a small group of open promises lives in a sealed laboratory in Siberia. Given short supplies, they are then left to soil things out among themselves—excretely

In Insuring brife UR space station. Midd wont for damy such representations will be such a space of the such as a

"The 'suplaner type, the porcer who needs a bit of streads an excellent to send into space for disripative mescript to send into space for disripative mescript to send into space for disripative mescript to space shiften will be at first "explained and problement" (Med of the organi). Mescript abcroned mes explaines But as the state of becomes more souther, youll resed aims of types."

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you'll read in mix of types.

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worked tagether used once to a mission parformed more effectively than those whose members had not.

Serby and Fourther agree that the best way and Fourther agree that the best way to propose assert station inhabiting to first in agree; is than each cleav at a until Than way says Sarrby, you can leach the whole group how to solve problems on Earth which makes the onew



Coping with the description of space. Earth-to extent help lines and rustate report percents 42. OMM



**ABSOLUT HARING.** 



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#### BARE BREASTS FOR SCIENCE

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-Sant Augustine

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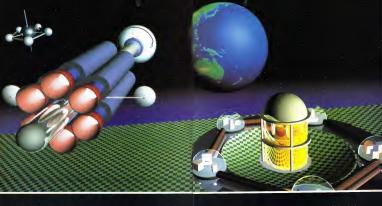








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TIME TECH STATE AND ADDRESS OF THE PROPERTY OF

tamed not to the rust and both of this accessive mountains turn to effects the emportance of accessman when life spain exceeds 500 years, the oblig to mexica froughts—swyconiu thoughts—with molecular binar proton, feeth-eating stoot horder, the collapse of the 4ccontrary on brow today. By the end of that workshop, Fry now

eays, a few things were clear "There were a lot of problems coming up feet were a list of problems comming an lest over the haracer, and notably will prevent actions to the milk of control of the milk of control of the milk o

winderchaid atmosphene is virtually indis-tringuishable from this of the university field. When Fill species or status a points of sky trainer glammers over his size, given him the air of a gobin But behind the represent size a lister, orderic cannot; it was the hot drow him, in the writer of 1935, to a series

procise infinitely varied machines one The talks were given by K. Eine Director, then a missearch utilisate at MIT's Space companyously expressive eyebrows he control. His sevolutionary ideas have

heard him speak in the sombar MIT such torium that frigid January evening the glimpsed a visionary whose ideas would categorius to remarkably changed, into the twenty-first century.

Speaking before dozens of MIT students and professors Drivier explained that the laim nanotechnology is derived from the word /sinomate—a beforeth of a

reser or about no inventive dumains of a flyotogian stars. Neutradictivitips ye simply sectorizing to our or he adoms scale in Thisia day. Exhibit said mathematical mathematical stars of the sectorization of all all the sectorization of a dome star when of adoms star whock. The coloring several to perform star whock. The coloring several mathematical stars of the sectorization of provinces of the sectorization previous adhered in the miscoular resist in the all bud glarges he colori of tusting usesed or a simple OPAN content implication scale or a simple OPAN content implication scale for a simple OPAN content in Bud I flag. Deliver declared, in exolidy how AU flag. Deliver declared, in exolidy how AU flag. Deliver declared, in exolidy how the colorization of the second program and the second program of the second prog

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chines. Devoir fold his sudience: can be wroad as an light of the biological processes already at work today. But nerotechnology would not only imgrow upon the strainer chemicals and DNA spair enzymes lied down on state. If would go beyond ballogy. Correster-Devoir said who a lany floction of the surge of angineering class net.

unit selection has chosen to adopt. The whole is pick a verify being example hastly appears anywhole neither dis solithed geres the block and facility, or the snow and darn Natural selection based and and carn Natural selection based has discipled on the pick of the selection page. The sharp of the sharp of the shockers of the on part four elements.

roted of the 100 plus idements known to dim an And living creatures make this use to 1 the creature of the creature countries and electronics. Whatever electrical against make the control of the creature on (Copper were for example is attempted to the control of the Control o

of mg organisms consists with the passes as manufacture and binding speed of male and cubilled seculal necessarial extraction of suppose for instance that resonance and cubic secular secular

 worst-case scenario of the gray-goo problem lethal, damaged
 nanomachines

space industries wasted by introduciable. To

will reproduce to infinity, and life

on the earth will end 9

flenten just one application." Droder said.
"space shuttles wower from these fibers would be so lightweight that the price is space to their would sink to their of set travel in general.

y A whole range of molecularly parties in mannials harm piezes to metals would be render structures lighter structures in the structures and the structures and the structures and the structures of the structures are structured by the

armitios lee trioges and differences and insulating blankets. These registered. These artifacts but serve the purpose of the colory as a whole it is possible to magine grantiferenced a meteral composed of very large furthers and insole product the product of a social production of the product of a social production of the product of a color a behalf and the product product of the product product of the product possible product product of the product pro structures would work. You would be proyelling may be deared option to computer. In eard, The computer terminal would be corrected to one of several Irlian instructures, early settings to several the computer and then communicate the decomputer and then communicate the denatures when the setting of "Each informations might be controlled to assistent high." Developing "These cables could which a billion times in second, such as the computer of the second propagating the design through mission of propagating the design through mission of

Intelligible 10 years of a process of the corrobotic profits promise programs of the corrobotic profits promise programs of the corrobotic profits and exception and compared the corrobotic scale would want for comparing or extension mode Montage would be allested in this profession and would be allested in this profit would have been appropriately the corrobotic promise the elementate of a brone would be allested to the corrobotic promise the elementate of a brone would be provided to the process the elementate of a brone would find into the lower of the story of the world of the story of the corrobotic process of the elementate of a brone of a brone of all would provide the united of a brone of

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termed the an institute to go beyond be within heard about, Drevier's workshop in the north woods, I deaded to go!

But despite Pry's describe immerce temperature of the property of the technology.

District had an acondo of his own. The do

brance was, Desker had been firshing about firshched been firshing about fished-echology for years. Disease oldes his interest in molecular engineering back to 1976, when, as a guidulas student to engineering fifthat son

erg. The savel, the decided to said, when might be involved in building is becomed all computer. A backmineal computer was the savel be built miderate by molecially so Director 2004 a few buchbooks on melecular backgook out the MIT Section of melecular backgook out the built section. In the savel of the savel of the savel of the stageting symbolics—among only is 2014 detailed have been premier or ginner at the mean systematic ordinal by the organization section of the savel of the savel of the savel of the savel systematic ordinal by the organization of Access of

can return around prother for the feture of the universe without showing weer. They don't have been a good or the standard and in get citry or ear, or indeed and incount any term over a warry wide single of combinations or commissions and time soons without allering their proporties in

the least. The atomic constituents of a molecule wil clasp each other with the exact same degree of fame forever assumen Further atoms soom to want to make in highly defined, very stable structures For a lot of molecular structures, once tab ple automatically. And the smaller things the accelerating impulse takes less time to cause as parts sharis, they re befor at reriefing stores. A inver a few thousand atoms long for instance should be able to wave back and forth 50 million times a

Finely, when you build something arom. by storn, you can build it right. Practically everyting in our world. The macroworld is the location of every storn, everything you build is set as good-set as strong, set as firstle-rectingery allows. And the potental applications are limitiess. If you work

In 1976 this struck me as an awasome Dreider's visionary grit, his ability to loday while supporting himself as a conmunications consultant in Palo Alto, Crénarcoachrology's benefits and warring of its risks. He is essentially a combination MT lecture that had intrigued Fry was do Ivered by the Applescent side of Dravial-Hampelier retreat convened to warn of "to took a large sheet of paper." Dave Forest on MIT oraquiste structors in motiv

to let felds of andeavor Which we did lishen food sculpture, erchitecture was communications fransportation mining religion music, art poetry frendship, ed upgoon, properly notes, and on and on the list would not be effected by runolech rokogy Virtually everything we had remen was going to get changed usually a lot "Alons and molecules are the ultimate.

form? In theory a consumer could buy a would be designs (probably encoded in make How would our economy deal with with the need to menter abjects. Inc chart so that even white unused they as thing not being used. I've a room with no dismaged nanomechines go swry Drexis calls these flawed machines. The gray goo In the worst-case scenario of the cray-goo problem lethal nanomerbrines will novo To truly understand the gray-goo prob lem Dresder acids, we must comprehend one of remotechnology's greatest chair longes gearing up for meas production in the first place. Whosever nanotechnology's an moredibly small amount of work. Friling

molecule a second for instance, would take more then a billion years. This might seem nology but the problem can be dealt with



Each day the biosphere, the aggregate of manufacturing Two strategies allow mass production to

produce milions of callular-energy facto ries known as mrochondrig, which own

The second strategy—the hydrogen bomb of production technologies - a known as replication. In the precess of replication, molecules (such as DNA) are released only one molecule of water a sec-Drawler calculates. If and its properly would rology manufacturing facilities will come with spot catality bundled in. This has nev-

days of the retreat—walking under the great pine forest belong over eggs at breakfast. Replicative cell-repair machines could generale enough units in a month to assess the health of every cell of every human alive. Replicative space probes. Infobing on asserted and sunicht would slow gesson diffusing through the earth sign at

waste site and garbage dump in the world to any living thing Replicative miners' could inspect every cubic centimater of the deepors programmed to probble mole. few weeks-reverse the global warming menufacturing to almost nothing. A givilzation first decided to buy one panofarm...

food (Beluga caviar gumpernicke) breed. cost enough food to feed everyone on or All the planet. That is line as far as elimneting hunger goes "But how on earth." Dream the womer asked 'could our ecocomic aveem adjust to a manufactuting technology that destroyed the cost struc-Bure of whatever it made?

He had concerns about the polatical seld, would lead to surveillance technolbrains and look for suspicious neuron ac-

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1414 O'me could be almosted entrely— I would change as well. Nations more by to

through the soil The hatpeled retions would mics down aforths earth leading to great We came up with a huge list of things

educator who pertopeted in the New Hampehire retreat. The wileins included redous sabdieur bacters that would in making them slightly loss efficient or more fished; and behavior-modification units their

had destroyed everything on Earth Nancelarts with legues as efficient as so-

crowding the broighers with an meditie. matter of days

The people on this retreat were sober sanshie and completer. Nelson says "To see them all acree that this southwas once deat with was a powerful expension it made fiseen mai

best "Eng. he said, this is a service forigi thing about it What they did of course, was form the

dozen or somembers of the society apenser lectures mienter an archive of msearch materials and meet twice a month to prepare for the nanorevolution to come. And I Dresier's smeteble is correct that ou erain ust bearfuveurs, beasus folis

We are as an industriel society just be genning to see benefits from such molecand protein design, he says. Each new acvariotitakes us obser to nanctechnology's.

things in the molecular regim Droxler is confident that progress we research tools to facilitate the next "Feren CONTRACOUNTRY

HOW

a digital apodrum analysis; the ties argued look

We headed a cirbownee, even a subject and

Resisting the easy answer Knowns the Transport of world have

Dely one problem. Will this system, you

The tigh then become monumerial We

The cared enever requires some polity amazino "elgen" processing," to use the engiphilipitation, imagine going to a family reuson

From sen on ESCOPE or PARAMETER. The new ARR acresion



The untold story of a midright raid that doomed a lab and sent reverberations through the scientific community

rson Station by idle two hours removed paused across from a flower shop. and its proprietor wind me currously as site. rearranged her bunches of forsythes. canations and miniature red roses Pacing phones, I glanced at my watch and hoped that I had not affracted the attention of the peroman standing nearby. The call and I wondered-having journeyed from New York to Washington-If my contacts had decided for some mexplicable resson. to abort our scheduled rendezvous At last one of the phones sangled, as f with a purpose I grabbed the receiver "lake the Red Line to Betheeds. Get off there Then go past the top of the escalator to the

If was to be our third and final meeting. the referenation of a sw-month stwistigation into the activities of the Arimal Liberation Frant (ALF), a highly secretive, bately organized network of about 100 animalrights activists whose break-ins at scientific Inhorstones have made thom the target of numerous police and grand-jury inquiries throughout the country During months of telephone conversations and correspond and confidence of this group of laboratory subcosurs. This had been no easy task. Other journalids had wolsted their pledges

BY ROBERT WEIL



MARSHALL ARISMAN



to keep accrosed nerme conductural and that deteited a paramoa among the membest shat dill regend. An eager soltme ALT was to generate publichly for the pight of shused laboratory animals in membran had to be osterned cardious in terration was they of anists. Carabolary though the was they of anists. Carabolary though the ALT care to eagles that I was rether a plant of the FRI now a debronise reportine another large of the ALT looked and had been according to the Authority of the ALT looked and Membran Long the ball on all the Useranty of Membran Long the ball on all the Useranty of Membran Long the ball on all the Useranty of Membran Long the ball on all the Useranty of Membran Long the ball on all the Useranty of Membran Long the ball on all the Useranty of Membran Long the ball on all the Useranty of Membran Long the ball on all the Useranty of Membran Long the ball on all the Useranty of Membran Long the ball on all the Useranty of Membran Long the ball on all the Useranty of Membran Long the ball on all the Useranty of Membran Long the ball on all the Useranty of Membran Long the Ball of Membran Long the Ball on the Membran Long the

Laboratory—was indeed legislation for the Laboratory—was indeed legislation. The find Line train hurting lowest pheeds was crowded with schoolchildren on their ways of the National Zoo, and it stood arecody in their must. Despite the trust that had had developed between my comission and me in unwairness remained. I had checked my bett and shoes constituting making my commodition of their control of their contro

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These was always the classifing less my total value comp doublead and observed, as if I lever a product wanders in Journal of classification and in the control of the cont

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tatic places are observed in the ALF members caulis afford no chairbos. I passed inspection is Alax and I hopped into the Toyota and sped slong to a Hobbidy tim when the tage of us sealing in an Art Deco hold norm awaited the

n an Art Deco hold room, awared the afternoon amval of a mysterious caller. There have always been people sym-

€The Toyota jolled to a sharp halt in a church parking lot. Alex videred me to open my panta . He look out a metal

detector and searched for whed equipment I might have conceeled on my horty?

have cancealed on my body®

eighteenth century annual-welfare groups have pendecidy four-their their popularby often a baservater of the access or heaved of ange. But no consists to the Arth-Values/barrier League and other historial scooless the armind offs to moment that emerged in England in the early 1970's constant all political immatage nor is under earlier groups. a philosophy fundamon stay officer those of ament welfate.

goin in clears pritain and in the Lundon States, when an amountal semanth right claims august that amounts of publishment states august that amounts of publishment sharehold even constitutionally protected rights also to those of numan beings. This is not for suggested that adverse the first inmals were smittled to cultivariety or visiting made and that of generated with publishment and that of perspective made and fast of generated meet all meets and and fast of generated meets one made and fast of generated meets and and fast of generated publishments. The leaders of such groups as CFTA, with its \$100.00 members, when not of the ASPCA or the Humane Society. These mission was less to provide shelters for sitialy dogs or neutring for young cast than to create the ground level for a national

the tradecial and of the opportunit has been energial the AMI if its anonymous members to be the tradecial and the common and

the last institution country for the art the contenting with regional country in starting of each or likeway for the read rememplements country official country and the country of the country of the exposurable before the country of the regional before the country of the regional before the country of the regional country of the country of several country of the regional country of the regional country of the regional country of the regional country of which is a country of which is a country of which is a country of the regional country of

memoria, Itali collect for temperatura in the sweethers for the Memoria City weekend of 1984. I would be an italia single open angi mather to warm not be cold for an everinget assuration. Waters Ind., in fact 5000 columns for cases in Education, Ney 26 A correction in 16 AF. This constraint sweddler for each matter single processor assuration to the control of the collect Transmership desired committing was group to improve which models. "If I hadn't been the I soudd have concrete dividence it was design to be committeed whether it was design to be committeed whether it was design to be committeed whether it was design to be committeed with the con-

and letter ALF mention Many (not her not many moused a vest as about the aims time. Someone came to her house and asked about her availability for the upcomrag weakend. Aff inst Mary thought find the wast was strictly so did. "Out if wort from casual conversation into I would like to talk to you about another job one that we would to you about another job one that we would be a second or second or second or the second or second or the seco

is set was strictly social "but it wort from a casual conversation risk" level (4 ke is to tak to you about another pit one flat we would be training for immediately." Affaugh Miley was always sected about the prospect oil going on new stads, her go silvation was more tramplicated. These sentitle late of shicken to worry about What

would they think it sha iday weekand? She







Demonic images can hide a multitude of sins

## TATTOOS

never like the angels oil our pasaron ches - Decker

For the past few years we'd been going to a small fair which wasn't maily much more than a road show in

Walton in upstate New York. The fair was always. held in late September. when the nights were chilly

turned red and orange and dandelon vellow Cassiula We drove past the Cannonsville Reservor,

which provides drink ing water for New York City marked that this was as close to

seen the reservoir she had

PAINTING BY H. R. GIGER

was listening to hard-rock music through grounds, driving through a held of parked piness. I wanted to ride the rides and lose myself in the accades and exhibitions. If of the midway I wented to forget my job.

grown up in this part of the country and

We met Laurais family in the church tent Then Laura and her morn and sater went to look at saricles, for her sister showed walted in the other directors. As we walted arcade of shooting galleries, artiquetopple-the-mik-bottle garres, hawkers shouted and gesticulated at us. We wasted latters with red son's through the stems for Ben to lose his change at the shooting gallery and the loop tose and we went into the fun house which was mostly blind aishow, the Palace of Wonders with the once

The Most Unusual Case in Medical History Babes Born Chest to Chest "Note" I said "Places like the depress me I don't leelinght about stanng at them.

"That a how they make their morely," God "Well, then Borrry and me'll go in." Disci east. 'Y that a all eight with you

I mached into my packet to give then some the woman sitting in a char outside the tent Till in eet you back here in about ten minutes. I spirit obset to not oway by muself the rattle and sheke of the concessorarea of resentanted a back the life test brightly painted of carvases, the sweet smell of cotton cancly, the perposty smell which were all the more delicious because

smiled as they passed me. God damn if I sawa group that looked completely out ot olson Rikers, purkers, and well-desped yappre-looking types were standing Iglous resson. Even his long, well-formed around a tattoo perlor talking. The longarms and chests, the women who rode with delicate tation wristlets and red and orance butterfles and flowers worked into

sumed to be from the oily-wore long who looked to be inher severties. She had building, instead of standing here in the

couldn't believe that for a minute And I wondered filthey were affulfooed too payor which wasn't a tank as were most of the other concessions, but a small madem mobile home with the words swort

 Something seemed to be passing out of

her, a dark, palpable spirit. I could feel its presence And Nathan looked somehow different, rayacrard

as if he were being defined by this woman's past ?

Then the door opened, and a heavyset manwith a bald head and a full black beard waked out Everyone, including the vuodown to the bridge of his nose. The dragon was beautility executed. How the bed I wondered. Behind the dragon man was curly har, which was long overdue to be cut, a cither large cose, and a full mouth him. This man was emacuted as if he had

hands looked sketctal. The veins standing then Rivin, on artist I had not seen in sevwith This man looked like Nathan, but he -looked all wrong I remembered Nathan as filled out and full of the on Orthodox Jaw. who wouldn't answer the phone on Shabbat-from Friday motit until sundown on right and talk and drink beer and smoke strong cigars. His wifes name was Puth. rad for some time and game from Chietherest looking as if he were made out of

Yet I couldn't keep myself from shouting. "Nate? Nate is it you? a pained grin passed across his face if stepped toward him through the crowd

What the helps all the? I asked him ofter What should it bu? It's a business," he than I remembered. He had an impath tack

"Not what I'd expect though," I said I could see that his arms and neck were shaved sion. Persaps he had some sort of a sion rash. I told myself, but that didn't had deliberately made those harfine scars But why ... ? 'Note, what the hell had penert to war? I asked. "You set risean

Nathan looked away from me, as if I had opened a recent wound. The struct rister woman who was standing a low lest overfrom usitied to get Natharls attention. Tixcase me, but goold I please talk to you?" she asked, a trace of a foreign accept in agrished and fred and I holiced dark shadows under her even. But Nathon dich't "Ot course I would," I insisted. Lazzen me, please," interrupted the

ologr woman. Two pomo a long way to see talking to everyone rise but me... stopped right up to him and took his arm above her wrist "Please 7 she seked "Are you have for a cover-up?" Nother

saked her, glancing down at her anni "No "she said "It wouldn't do any good You shouldn't be here. Nathon said gently. "You should be home."

Tiknow you can help me Nathan nodded as if accepting the inevention "I'll talk to you for a moment, but that's at," he said to her. "That's at," Then he indired up at mo, smiled warry, and led

asked, catching me staring at the trailer

Ben was looking assured at the purkers mother to let him have a "rattal" when he



He drugs them with LSD, shoots them with lasers, amoutates a leg or two and rockets them into spaceall to see what webbed feets they'll accomplish

# SPIDER MADNESS

morning light the web gummy threads and to leap down from then twirl and bundle The wide catching aged in the battle. And the spider climbing

web into a ladder of broken rungs. But if coesn't matter. She will build a now web - pile that actually likes apaders. "They are percented rolling it in per-shaped segscaffolding romains. Then she'll eat the rubble and weeve it back to perfection in probably discover something that has But give her tonight a drop of LSD or s modicum of meschans, and the web that. Take in 1948 when a coleague at the Un-

oval web into a wheel Amphetaminist make it amater Caffeine shafters the orstead of in circles. And too much Valum notiones her to give up web building allopetier -- a passive invitation to death



years ago pushed him from human-subsect cers. Over the years confined them, shot them with least beams. to outer space-all m the interest of so-

sevendiosous discov

much studied Even now, so little as known about them that any emergrang highschool student who sets his mind to it can

Wit honor worken with sorders as a vinsity of Tubingsin in West Germany was web, mucts to all the drups that after the indexestes in the act of web construction. It minds of men. Hashish compresses the was prowing impossible to make the move triscal light stopped the spader cold. Could These solder drug disries are the work - macology administer some sort of chemical of M.D./pharmocologist Peter N. Witt. A. that would diviny the building of the web un-





If the light was right for making the move? Witt originally thought that he could, but his attempt was a failure. The applicas revier once changed their acheaute. Worse, the stuming symmetry of their webs disintegrated in the choice that they draw from his woman.

The opportunities of exists and its own put the spotser reaced to the origin (summed but it he reads (S.D. was now except expensed to the origin). Is pursued to the read of the spotser of the read Withhad their of trimeal if "Every Obe-Marray preservois began to its act of LSD and without what happened and we arrayed countries inserred, obusily writing long protocols about what we saw what we heard. The opperances were instructed in each of course and the accounts of the expensed were instructed. The polyer and the accounts of the expensed case, heighly subjective. The spotsers, on the other hand, were like "hallow matters in the west and hung them to be rid to goe These."

were intricate landscapes with liability hundridsed different proportions.

Right with source by spater with two legs amputated Albert two shasoul week of all-ameting parmeents. Societied as less of popular body. Previous pages create spater seems on other floor before and or increase spater seems on other floor before and or increase spater.





the could be changed incer the network of days. (The probagaths of inflowed reads are soon on these grays were then by METhreeff) and inflowed read a sound in the gray part of the probagath of the network of the probagath of the network of the probagath of the network of the

Heb a structure says that, resomed the officient's story Charlotten Web





#### Aboard Skylab the webs appeared to be 20 percent thinner, probably because of the solders'. perceptions of their own weightlessness 9

Here you have an animal bechnically, a spicier is not really mind if one or two diel glo mind, of gourse, but in

wanted action without the unwarfed side effects. With has advised drug compareso, "taut what they actually the scatters orthats in as stool. No or is him been able. cupilities in a menoroccio 5: bor Ineido the glands first the glands through long. green added word award at the rear of the souter's body One and of thread

It is indisputable that the spider linewe the amount of silven has low she makes the whole web smaller. She never runs out in the endole Her first webs are smell but perfect. Since the lychawor is instrictive. Erequires no expenence (but Writ with the help of van icus cofoaques, has shown, though an ingenious series of me-

No two cross sorders, for example, build exactly the same web Although the differences diefy raised over direction, computer that the webs of strings are more similar than those of unreleded speders. If these were human works. Wit rave, you pould say that male builds wells for a while early on but soon stops building. and how he lives out his clays is anybody's quess

Nor do the siblings see one another Hundreds of eggs hatch at a time, the when they begin to build webs several weeks later are shaped of least in port. The drive to build is so

overy 24 hours. And white mals take food from their to vibrations of meets

> soon after hatching and kept there for months-almost their entire lives Immediately uron release. With dieclere were exhibited by the a short sik supply in the

glands. Maybe the steadsfor of emplying the plands in warp construction was the key to

With ancascard the guestion by entireaty empty no their clands with didn't fall but spun out a guy line on which they could raise or lower themselves. So he fourest he could attach a spacer's treveal empty. When he tried this technique on the spidors reared in bubbs - "pulling" them for 20 to 30 minutes on two successave dave.

Challenging the solder in another way-making her suddenly heavier by puffing a lead weight on her back-yelded webs with where she was used to building, she found a way to build around

That's how flooble the system is "Wit says autmoright "It un't collapses. Lots of spiders less a log or two when birds attack. Years ago, when a physicist hend of his became one of the first Can you predict the future of medicine? Compare your views with

# THE WORLD ACCORDING TO

BY MARILYN VOS SAVANT



excellent condition after more than teen are still plue today catisputed surgery into the Space Arthur C. Clarke Chuck Yesper, Age when his Jarvik-7 artificial and Peter Ueberroth he is the

The most explosive news in the for a human heart, received—asmedical history of our decade is an implant—the bionic creation of sox months on the Jarvik heart, de- When Owns began its search for signed by Robert Janvik, one of an authority to olive predictions on Amenda's top medical valorates - the future of medicine Jarvis A physician of the future, Jaryes seamed an ideal choice Following

heart was implanted in Barney (ourth in a continuing sense of sci-Clark in December 1982. To date entitle and visionary thrivers whose 19 patients in the terminal stages - predictions are presented in testof heart failure, who could not wait. It like format to Diray relatives. In tak-



way that an inventor like Janyk closs On page 84 you will find Janyick an-

swers. Count how many times your responses match the doctor's to determine how perceptive your own vision of muci-

1. A household degrostic computer sits on a shall in a medicine catanet in the year 2000. What will it be capable of doing? (Choose as many answers as apply)

a degreeing several down conditions on b adverg what sort of home treatment

a sending information on a patient's con drion to a central data bank which will then send appropriate medication d requiring drug dasage based on the updating of information regenting the

2. Research over the next 15 years in space many as apply?

a nutrition and physical conditioning in protonged space habitation b treatment for variigo o first red for treums in zero o d amergency surgery in spece e childbirth in space

3. The setting is an urban province of China one form of birth control will most couples

mine the precise time of cyulation. such as diaphragms and condoms g stenkrafton

d birth-correct pile for women a multiyear staroot implants for women f birth-control pills for men

4. When will the first human be cloned? d by 2300 e after 2000 5. It has become increasingly clear that States deal with the growing crisis?

(Choose as many as apply) a public education will reverse the transf to surpery c. artificial blood products will be substi-

d-use of lasers will lesson the need for invisitive surgery 6. When will the average life expectancy in

a 2000 b. 2050 o rever o 2100 CMNI

ing this guiz, circle the answers that you 7 in 1995 which of the following groups will think Jarvik gave. Your objective is not to routinely undergo mandatory urine testa to come up with not or wrong answers but monitor degal drug use? (Choose as many a high-echool students b schoolbaachers

e federal government employees

8 In the year 2025 what psychiatric depr-

paulic methods that are unknown today? (Choose as many as apply ) a. chipric arresty

b certain kinds of depression

9. Research and development of impliceable bionic analogs of the following organs. are currently under way. Which of these will

The year is 2010. As head of a fetalethics committee. what procedures of genetic

engineering would you say are permissible. assuming that

the risks are negligible? be widely used 50 years from now?

(Choose as many as nocky) c worre

92. Which one of the following methods holds the most hope for significantly rea diminating environmental carcinogens c new surgical methods d new drugs produced by pervisic engi-

11. The drugstore of the read century will hold far more bascination than the carrie shop of the past. Which of the infowing any likely to be in common use by then? (Choose as many as apply) b irentomor-boosting drugs

p. ife-extension chuse

THREE CITY

12. The year is 2010, and scientists are car peble of genetically altering specific traits and predispositions in the unbornighted Ass head of a tebel-ethics committee, what or osily are permissible, assuming the risks are negligible? (Choose as merry as apply) a altering the genes that would bring on

b changing the height of a fetus by the c. manequisting a chromosome to prevent

a predisposition to activate home d reversing a predisposition toward diae using hormones to after an unwanted

improving the potential I Q of a texus 13 When will an effective vaccine for some

a. in 5 years

14. Which one of the following heats the greatest hope for medical progress within the next certury? b peychiatry and the neurosciences

d genetic engineering 15 Will the United States have socialized

medicine by the year 2025? 16. On Department's 1967, the world's feet heart transplant was performed in South Africa Forty years later, in 2007, what is

Builty to be the most common form of hearta. a human heart used to replace prother b a primate heart used to replace a huo an erthesal or borne heart used to re-

sophisposted dispresse and medical gery unnecessary

17. Smallpox has now been virtually evanicontact workshoods. Which of these return dureases will also be core by the year 2000? b. legrosy c hepetin

e. Alzhemer's disease f rope of the above

18. When can we expect to see a vaccine that will prevent ADS? a 1990 0.2000 h 1995

d beyond 2000 19 Almarty approists can determine the sax of an eight-celled embryo. If frozenembryo banks become commonotace ents gain the right to choose the sex of their oftspring, what will be the ratio of male to female embryos lying in deep slossgu? a 50/50 c 90/10 b 75/25 d 25/75

20 Who should own the rights to netically engineered life forms? a, no one

b the scientist or company that discovers them c. the government

d at governments

21. Whet would a twenty-first-century physician consider the one greatest made.

broakthrough of the twanfatch canfury? a depowery of endorphine, the brants in ural opiates b architecture.

c pole vaccine d interferon e body scars including X-ray, CAV, and

PET scans

I. heart transplants
g anticial body parts
h. DNA engineering

b 3 to 5 years

22 To date, the longest an artificial heart panent has lead has been 21 morths. With major advances antiquated in the told wifer the next decade the where year might the average arthroad heart-tisms plant patent expect to lea in the year 2000? a 1 to 3 values c. 8 to 10 values.

25 What process holds out the most hope for regognition of limits? a controlled drug release b electrical stimulation or grafts of leful tissue

d tissue cloning
 24. When will arthroad organs begin approx
 classly to increase the average the approx
 the United Status population?

the United Status population? a now b 2000 c 2010

c 2010 c rat in the foresocable future a nover

o not in the torescool of late o nover 25. What will be the number one health

25 What will be the number one he problem in the United States in 2000? a madequake health care for the poor b problems of an aging population.

o alcoholesto, drug addiction gall classess di cancer e heart disease

e heart disease I recessive houlth care costs

25 If a surgion a yearly majoractice insurence is between \$90,000 and \$100,000, how much will a be in 2000? a \$50,000 b \$150,000

c \$250,000 or more of melpractical levisuats will no longer be permitted e the government will insure surgicions

27 Ovar the tail two years he population of laboratory chimpensies has visitly de creased. Given the increasing restrictions on ohimparcee importation, how will medical receirchers be able to continuo their investigations?

a chimps will be more easily bred in caplivity, ensuring a sufficiently large labosacry population b other parnities, such as babbons and moreover, will be used reced of chim

other permittee, such as babbons and morkwys will be used instead of chimiparates: medical research will be performed on

tomory in the pee!
d changing methods of investigation will
make it loss necessary to use animal
subjects

28 Shortly after a brief detention in a psychaptic weed, a homeland man is reloaded and premptly statines two people to death in a seychtotic regir. Will the psychiathrical 2025 be attier to diagnose thress and prevent sensar incidents frecugh determine chamical depotest testal?

a yee b no
29 The first bornic development to repand
the capulathes of the human body rether
than to replace demaged or desceled or

a settical supplemental limbs b. right vision contect lenses c. a muscle-to-computer interface d. a narve-to-computer interface

30 Scientists in the Soviet Union have elready successfully attached second heads to dogs, which have subsociately lived lite head hanguants over be considered afficial on humans?" a yell. It no c. maybe

JARVIKS PICKS

Or Jarviks arrowers are given below so that you can company your responses with the Are you need to seculo up need to the

1 s, b c, d 2 s c 3 c 4 b 5 s b c 6 d 7 c (Other groups will be encounaged but not required to undergo testing.) 8 s, b (Curves for vesicus forms of schoo-

B a, b (Cures for various forms of schol phroma will occur sometime likiter in the next century) 9 a b, g, h 10 d 11 c 12 a, b, c, d a 1

11 c 12 a b, c, d e
13 d 14 d
15 b 16 c
17 1 18 b
19 s 20 b
21 b 22 b
23 c 24 d
25 b 28 b

29 c 30 Pat yourself on the back if you knew (in hoped) this question was a joke DO



In an wory tower above the city, these artists' models are created just for the pleasure of the idle nch

# OUR TOWN

BY KIM STANLEY ROBINSON.

I found my friend Desirrand greenery of Tunisia. There in Keen at the northeast corner - the sharmery cards of class of the perthause wewens here was a sumble of wood and with which to look at the world | browns on light green Tamez helpe He put his eve to the ing " (said.

How other I had found him. Desmond once explained to like this in record impethal if time, when the temperature made me shiver a little: this gradients layer the atmosnew phasestrop of his-so, phore in the right way light is handmade clocks or the mellowthat works is o that we sauther beds or the oppmetric can see farther over the honrigus melaciv Clearing my throat did the lens wavened a black dot nothing to get his attention so missing on top of a selver per

I ventured to say "Desmond Took at this he recited after on was the too of the "Just look at IF" I put my eye I have never understood lases to know that I gazed from

how looking through two. Carthage to Rome pieces of curved class can light hit the first lens as would Look what's below if so, what then could possibly learning a try bit over the rail be done to their amount of light ing to do so Our new Car within two longes to make it. Those has a spire of its own reveal so much more? Must-

The black dot was Rome the graceful spee that holds the

"No no Desmond ex-

I clid as he directed ever one every bit the equal of

PAINTING BY RALLÉ

the great cities of the world. The spire seemed to the caked eve a siver roce, a the telescope I saw the massy base of the spire a concrete block like or immerse

"Sturreng," I seed "No!" He secred the spyglass from me.

"Look at the people camped there on the base! Look what they re doing! I looked through the class where he had nine perfectly delineated under taut brown skin See Desmond hissed 'There free going for days. then pour water on the

concrete-to crack it do you see? it was past up he had said 'At that page it will take them len thousand was a Desmond said hillerly I stood back from the rading. Please.

what can any one person do? He took the felescope looked through it not so sure friend Poanck It's a good with knowledge, with expertise, could make a bif of a difference. Heat the sick or They se weeking they soil Or ... or sust one more hand to tend the line . I don't know. Do we ever know, until we set?"

down them? He looleed up at me. 'Of pourse.' air stays pretty chily all the time, even in the sun. "Come track made Desmond." I sast, feeing sony for him These obsesand if you're not there for it. Cleo will prese Now there's something to fear. The said

"Come on inside. Don't give Clies the chance. You can return here enother risk With a grimace he put the felescope in the bay duffel beg, pedeed if up, and fol-

Inside the plass wall secaranda frees showered the coant, curved creenhousesheets but soon efter we entered the form was revealed in all its variety and beauty frozen in place yet still pulsing with playing pards, a couple stopped forever at organia i felt for familiar porcono mobil guiver of exchement, caused partly by the torce helds of the tableaux as they kept the lavor ectorages stopped in place but

mostly by replace by a physical response

seems a good year." I said: "Latroady see throne or love preces of ment Now, now, it isn't all that bad. Some im-

defined their year but no more than usual." entry had been placed. Like Desmond before he gut sculpting. I was chiefly interdance that revealed by themselves, all the grace of the whole act. The year I had base of the display as her parmer firmly How long I had worked with the breeders gramming their unconscious education and framing and chorogographing them in and howevery often that had them dance

### € All the tableaux were covered, but

were raised, all at once. The human form was

revealed in all its variety and beauty, frozen in place yet pulsing with Me 9

most moment I had encounted! Now my of all that is grapeful in the human spiritof a proper acide to the yewers I was ing too. On the two faces were expres-

almost identify true. Yes, if was sabstactory Descripted only shook his heart. You don't understand. The miserable world below our line art above, they are parts of the same whole! We get I keep dong this-Desmond<sup>†</sup> cried Glea flowing through was wide her even begit with maken Come see my latest riper absent med Desmond followed her, his face so blank legendary. How it had started, none reonce been lowers. If so, it was before I knew them Others said Desmond hated Cleo to

sips said that this envir explained Des-

mond's new morbid interest in the world else pared about-regiscovering into sci-No. his and Cleo's was a more fundamental hadred in clash of contrary matures

New Departered started at Gleo's new perb artist, especially in facial expresshoulder with an expression of intense vulnerability and portusion pieroed by a

on the tableou base and slopped them in if teapon Poy desput His to curted and he said loudly. 'How did you do it. Cleo's cikint ask. Each artist's arcology was he projection of the artist's creative unconspeus an emirely private cosmos. What to adhere to the code of athes regarding

Though the rule of privacy was maintiesed there were of course questors mutered. How had be created such a though if Arthur himself had not blown out steen, believe burnered as the concessor. Many perthouse to investigate the blast. We found several decuptated eclocarons in physical violence to the ecoperate and at agreed to abide by it. Nothing, however enforced these rules, the arcologues were

terrale of law and social obligation these Deamond asked Cleohis brazen queeton. with its dark implication, she blanched, then I sensed she was abaid too), she refused to reply Desmond stared floroely at us all. form all part that instant "Little gods The snafed, and left

That would goed ham in regulation if not his distempet, relieved that we could now pagne corks were already bringing down reception was a notous party that I heard on the tableaux force fields (this was supcreantouse-gallery that I heard that Desgallery with Clada redheaded actogone. Utter scandal This would gost Desmonet man than money they would exple-

scrub walls with robots or teach children while the rest were rounding up and pacesearch of Deamond, to warn him that he

having shared most of them, and i humed Pansan bouleverds of the perthouse's northern quarter. My first try was the brodoor with the key we had quietly reproduced years before An indiscretion for the chamber-Desmand on his back the energy of the great spire were flowing up into her. He was breaking all the toboos

on it 'Degrand! It's Roarck! They saw you I had no precedent. After a good thirty I however, was one of faces who with

east corner of the viewing terrade, right

there outside the glass well of the green-

passapoway into one of the perthologic other infrastructures I ran Despite my knowledge of Desmond's ways and my house-gallery where fas it was now dusk).

He and the rednesd were standing next to Desmond's telescope, their elbows on the railing as they looked over the edge me from emerging from the shedows. They tons-a talk about trival, inassential things years of companionship Such calmness. such resignation I could only watch

Deamond sighed and turned to look at

his tingers, watched the gold in it gleem in The women pointed. What's all that Dusky world below, long since in right

vast, dark Africa, the foliage live block fus. sand bordes. Vita pricks of light like yellow stors. That's the world "Desmond said. But his words didn't appear to touch the women. She turned away and Vted an echs of her regression as a status-life! I

"Darren" she said "I wish I'd rerrem-A convension from another world resarred here. I saw Desmond Keans face ward and grasped his arm. There's no terre you really must get to one of our prisort of sentence they might hand down for

A long married I shoulder to thick of the tableau we five made. The world is a cruel

He best over to fumble in his bisp. "They if But-but where should I go?

You know this city as well as I! Try the nallery's service elevator and get on the he was about to give me further directions and a whole mob poured out. We were hand and spanted for the closer green-Kean, he was climbing over the raking. My lar package strapped to his back DO



"Go ahead and laugh: but he's made some amazing discovenes."

### EXPLORATIONS

first themselves embedded. Autovillens are also makens the long least off the Computer Age assembling imported components and selling them throughout

g year for the town and employs many the real massion of Auroville. The leading Bill Sullivan a former seminarian film maker and teacher from California who has

and if everyone is still fighting with each Autoville has no mayor or dique of lead ers. Governed by a 'consensus decisionmaking process." Autovillans sand to make groups that meet about each project. At working group finds the activities of an other to be reconsistent with its weeks of munity water meetings. To date, most of these configurations have been between

New Age technology and a modified ver-Thisselvests ago however a serous po-

they own Auroville and should have the final say over what happens there, while aut-

even a lew death fracats) that the government of India opened a police staton at

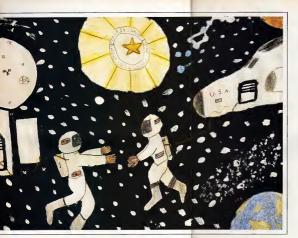
While a legal contest continues some Weite an experiment not an example Avoidant pontout mesolance he con facts in their budding utopes. Others see the yony of their shustion. While The smoothly because she controlled both the But after the ched in 1973, the chicken hadden to the questors of who owns

tion of how the weelth should be divided chemy "and they ve both proved failures support those whose pos don't bring in rupers. All Aurovisins who don't have with a subspicionoe died shelter and an air lowance of \$12 a month for incidentals.

proud of the ongoing educational propess and the freedom to experiment. Talk with working on myself." In this respect they are was on the edge of a new stage in evoluness would eventually occur moving humanty to the next rung of the evolutionary ladder But before this could happen Aumile Michael Tals, "none of us know whether



Mr Whalen, is that you or your hologram?



When the children of the two superpowers were asked to forecast our future in space, this is what they saw

# ARTISTS OF DETENTE

BY JUDITH HOOPER

Space expices forting a larrange Miley Way where large, ringed

planets are drawn arrong the cryst journs of the team countries of the same. Commonate and astronate lines have call to exchange worm reads issue their calls to exchange worm regions in the call to exchange the company views created by children, asserts to relate the company views of create a series of create a sent to exchange a sent to exchange the children of the common of the countries of t

existed or of exchanges between the two superpowers instabler to participate in the exhibit was sent to schools throughout the Sovet Union and the United State. The Protection of the United State in The Short commencies the tenth aministry was not a commence of the Commence was not a commence of the Commence when an American and a Sovet spootcost made a exclusion in Earth orth The stown operand at the Christian Theater of Mountain Wellmonton, CC, this sent surrow Wellmonton, CC, this sent surrow Wellmonton, CC this sent surrow.

The airchibit is dedicated to the moninory of Somantha Smith. The temperación Manie schoologif who was invited to Raccus effect work harder for informational passor, it is a perhaultative from the Air Alicia Johnson administrative decision of the Samantha Smith Foundation, explains: "We felt that an was this most will airwis to call thesauth some of this most will airwis to call thesauth some of



Earth, the paper walls of bureaucracy and the cause children's drawings are expressions of imaginary walls of national borders." integrancy was or negrore octobers. The diffeograph was or negrore of the change and hold of Mater. Find Region, the creator and hold of Mater. Profit in their less: The eithbild provides the Region Meghborhood also three that the most natural way in the world to help make a loan to we can learn from these children. It holds between nations—letting our children often use and in my work with children besides and all here in common.

how they see the world and what's really im-













Each child whose art was selected to- Dake Sayton one of the crewmembers on

agreed by these astronauts and three cos weren't even born when I flew that messon. monauts congratulating the young artist he points out with some amazement. Their en-Someone who found the message of the white particularly encouraging was Danald says should be a message for us all CO

## TINYTECH

deeign problems required to build even play molecular contro antique, autors art cienstand and build over more elaborate

adds, is stready in place. The molecular mechanisms installed in plants and are

neesed bacteria could be used to make again and again. Its even possible that manuscule peedle-tip sensors, already

ton can be adapted to seserable or cleave. There's an important difference be tween the line of advance and the line of most deact way of seeing that a dealing-

arrive and how we get there will decend His lave of reght remarkably class. Droxtorrain. While supporting himself with weras Messa conferences, Naval Research

Lab workshaps, and meetings of the U-5 Doublective has recordly published his book about what will happen when nenotech-

corning around saying this makes sense.

does this we should be able to do it foo And roboticist Manen Mosky, Donner Pronalogy could have more effect on our maand the harnessing of electricity

Others have responded-appropriusely nerhans-with quation When Droxler laid out his design for a nanocomputer at Xerox ii Palo Alto Research Center just said. 'I found the theory plausible. But it

seems for off Physics just stars to get word A recent review of Dresser's book in The better able to handle almost any land of

to refit a single protein and quite another to per millions of different types working if will be a long time before scientists gat

younger devotees has taken his massings

and the others at back and take the long add) in crity a fraction of reduced environ

cell communicates with a second through a surge of chemicals. Whatever the advanon a more modern signal-propagation technology like optical fibers, maybe to-

borws of somi Soorer or lates they say Lindburgh of the study group has likened that seep to crawling out of the opean all over again. That anglocy, other members. say is the best we have but it is, if any-

Jonn us nelve the recent when we decire

SPACE

difficulty that might anse in spece What you see in those accepted proups is the mability to express hostility overty. ings of hostity "underground." Even so they may lind indirect ways to express

fried to build in salety valves. They somethrough his speech patierns. During penods of tension ground crows may beam schedule or ask a family member into chall NASA will have a mental health profes

signal constantly awarable for its grows to a video or an audio link, says Sonty II a crew member lost control or becarre de white gotions he has if the space-shiften tumor), the problem might be treated on-

to-space psychollenapy or be given a numberative drum A their objects in NASA is trying to prevent any psychiatno problem is the fest place. With the cost of each crow member's labor definized to

of sue, one having a montal broakplywn in evely astronomical DO CHEDITA

page of the left H A Co.



If the dead could speak, they'd talk to this man, the real-life Quincy, the Hollywood coroner who brought rigorous science into the death chambers of stars from Marilyn Monroe to John Belushi

## INTERVIEW

ended in murder But the aming the knob in one quick motion he dark room."I love to enter the minute-to-minute movements

open the religerator to get people's life styles the type of they wrop in one homoide ! the burgler so the burglery.

PHOTOGRAPHS BY DOUGLAS KIRKLAND

burgler was hungry so he had a bits to eat before leaving medical detective and forensio

States when he was twentythe autopsy on Marilyn Monroe



Forensic investigation is like investigation is like moviernaking in reverse. We arrive after the list scene and from the evidence, roll the projector backward, frame by frame, to the title.

the root to conduct the star's subsign suppressing the seneral collegues because his store was toxed conflicted in collection and shopping the pubtics and shopping power were microscottics and shopping seneral representations of the start of the start of the start of the start inflament of Marmons skin. Nought states in the analysis started marks Considerated in the start of the started regard. Considerated with all shall be started in start of the start with all shall be start of the sta

tal and chloral hydrate
Monroe's domes soomed to prophesy
the Sintes as a decade of drug cooses.
Deputy Medical Examiner Neguchs skilled
in toocological procedure and instrumentation, rose repetity becoming 1. A 'n sec-

solars rose mainly becaming. A 5 second order material examiner in 1987. Seasely had a year offer in apportment in 1987. Seasely had a year offer in apportment in 1987. Seasely had a year offer in apportment of the member of the support in the member of the properties of the support of the member of the support of the s

criting possibility had firsts fishes may red have been the oblig quarter. If the IPIX accepts greatly exponed the redirent of what contributes retween of preced evidance the 1960 Sharon Tallou-La Bencha modesplace chowed the ulmano salar of 1964 payor because of 1964 payor challed profile, in storing an application frequency their protections that the challed profile of the size of Challed Challed Preferric has a diagnostic challed Preferric Halace in these ports of the size in Challed America has profit to the size in Challed America America and the size of Challed America (Inc.).

sor is a fee.

In 1980 Negouth was feed for going over the east of Course y Administration Office. In 1980 Negouth was a constrained office of the east of Course y Administration Office. In 1980 Negouth months of Instant distallable for was remarked at a Civil Elevine Contention. In the large of the operation of the large of the operation of the east of leaf of the large of the operation of the large of the operation of the large of the large

topy feelibles and drug heating, believes and tissue-evaluation equipment. And Negotimes and among the first big only medical examiners to put together a start of specially timinat orinne-scene separts.

Death weds the body to the crime scene. And Invalidate, warry of under the start of the control of the crime scene.

rigidated classic modelabili present the body in recommend until accepts. Mogalities in which is concusied in a proportion of the way the obscrubed in a proportion of the spot field of the copper of the south of the denoral her notes; can be everything,—but, manely act suell-mediated Procorphism; obtamic overwise immolesse collecting of labteracies. An additional presents in exemples. An additional presents in extragalized in the second contraction of an exquence of everytic programs or profung closur to the misused detail—an inmissionally artistic deposition.

In this Secretion Registrit leagues to accept with even external registrative primaries of a reference of an TV V is resent in except to appear as a free except to the excep

lever, the chief midded locarities is a public certain fair, and areas of the cold constantion,—the fiving Clean has personal to the cold constantion,—the fiving Clean has been as the cold of middle higher through the cold of the cold

That inexponentially to the putality enrode in IRIQ, when he we should to gain the IRIQ, when he we should to gain the IRIQ, when he was would be gain to addition, designed of the disease of the inexponential to the iriginary of the iriginary suppressed of the iriginary of the

gers, began to multiply.

The Figerman Science Censes operated.

1972, equipped with stars of the art suboxy facilities and drug-resting, balles are small stars evaluation equipment. And No-could have among the lab by of which the star of the stars of the star of the sta

was Commission valed to average the de arean Noguch was fred

Despee an unsuccessful appeal the is anything but bitter. As a full protessor of University of California at Los Angeles School of Medicine, Noquety is presently instructing interns, residents of particlogy. and postgraduate physicians in anatomic and forerest pathology. He coauthored per at Large in which he interpress note: nous and controversal court cases outside his own jurisdiction and unravels forensic puzzles from history Today he have trave decided whether his thard book

rwestigation of death by stabling, conbrate at one of Noquetics favorre restau taking their exter the weatress said. Dr.

## Own: What does your approach entail?

dence-encluding the clothing of the deof the event with layer by layer photograhe should address himself to the traditional two Wis ' What was the cause of deem? time of death-connects both to the se-

Generally a medical examiner close rich scientist he needn't worry about them. I Gener What metruments do you use to m-

Noguchi: Marry tools are such everyday rarres as the magnifying place are power of such fluxrescent materials as lipstick and hear Portsble X rays are used to see through walls uncovering hidden bullets Occasionally I take a small lab to the scene. The great different is whether to

the body is helpful in estimating how long 105 CAN

of an image-show prints or impressions of an object contacting the body Suppose a person has lain on a con-it's maybe materies of the con. We the configura-Geser is Arphoree Berniker's technique

Nocuchi, Yes, Bertifon believed that avanage is trult differently. He registed that by measuring specific body features you coulant disguse themselves. Fingerprint-

ion into the twentieth century when I used the Six Millen Dollar Man shooting lossion at Nu-Pike fun house in Long Breach, Califorms. Some suggested the durrany was a murrry made of McCurdy, the nationaus

### I chose to begin the REK autopsy from the toe to make sure I

 didn't overlook anything. I . ' didn't want to be influenced by injury alone. I was then

under very great pressure ?

McCurdy at the trne of death we were able

This technique can go both wise. Forensic soulptors are beginning to reconthe skull. Porhaps you've seen the move. the oris skull? It's a difficult procedure but usyful in Isacing missing persons

body, but I suggest that the body or its dence is actually staring back at you but it may not be on the corpse. People often sonore the ceding one area I always look for including Weave office found drains stached before soously; ties. Sometimes, Grays Once in the autopsy room, what tools

Noturbi. Of cruise the socie is a vital in-

of death. Generally a heart weighs about fires handred lifty grams, so if I find one only cerfain conditions could have caused the-such as twoertersion artercecteross, and certain king diseases. After a drawning lungs often weight between earth funded and nine hundred grams, whereas

grams. If a king weighs more than a thou sand grams, there must either be a tumor Chronic drug use changes organ weight

and contain crystals-mostly talc, somelungs. Many lymph glands, the spicen, and

on endocrine glands. Often the adrenal show gross changes. Chronic drug use also causes a westing of the gorests Noguch: My interest in wounds and bruises

salant It used to be a simple distriction from which we can learn a great deal. A

yields an impression of the object but also Brusses have a whole spectrum of color

changes. The tresh bruse is usually pur plish, the classic black-and-blue-with exelling. After a day or two it moves to purpish soci, then radden brown to joint brown and then yellow Before turning yellow it. often takes on a greenish has. The cycle usually takes two weeks: although a deepsealed bruss can take longer to resolve. intervals by using the electron microscope

Orry, We've arrived at the classic dilemma. Did the wound happen before. Noguciti: That's always a crest challenge If it happened below death, the would should show some besue reaction, whether bleeding or first signs of healing. After death a bruse doesn't occur because posed has a noie voliny appearance....

without bloodstone. The couple of seconds ground death is es urberetty down so issue reactions usreque. The heart on oil orget functioning, but blood is self-facility flyers a server bitter by hand moulded commet. Sometimes a blow at this dage will create the appearance of a brisis but this swalling is often lacking, there's skin and tesse broaking of but you get only a lessage refler than a homostrage, as when blood is activally pumped into the wound.

promotings, as when you can access on access on the property of events when you want of the property facing an association of which in here a property of the property of the

of wounds.

Green: Figor mores is one of the ultimate.

clichés of bad horror moves. What's really Noquelic Piccor generally develops after about an hour and almost always in a doscending order. The jaw and neck stiffen first, then the elicatolists and upper arms. followed by the trigers, and the logs are last. Full ngor takes sen to twelve hours to complete. This gradually lessers, and bworty four to the typic hours after death. usually no ngickly is seen. When noor mor scending order with the law becoming reliceng-elmost like magic. This top-toboltom order was a mystery for neveral After death coypen is no longer supplied lated, thus offler and offer Why the devery short in the law a little lorner in the neck, and longest in the leg. When mus-

the aminist forest based down that Grown. With the consider of the Discreta regarding the consideration of the Consideration regarding-benefit properties to insylvate that get the consideration of the consideration has large magnifying globa to outly wounced And we self out of this in the sale through a large magnifying globa to outly wounced And we self out of the large through less than the consideration of the consideration properties and the consideration of the less than the consideration of the contege dependence of the solid contege dependence of the solid magnify-sheep polarities of the solid the consideration of the large dependence of the large dependence of the large dependence of the consideration of the consideration of the large consideration of the consideration of the large consideration of the co

the L.A. medical examiners office uses a

and obtained the control of the cont

get cops to the operating gun. But that's not good enough for the What about the primer? It is usually a combination of least settings, or bishout. This but is comed the primer period by the wound Primers very from batch to belot So somewhere in the wound frack, usually

GThere is this Dick Tracy concept of the retina as a photographic Birn. I see you, my murderer:

but should I die, that image would remain, like an electronic impulse to be receptured.

at critry and exit, these eigns of pames, ceeing, and builet are dropped. Them are all leids of 'Ingleromis'. One of my tovertes in the wourd fixed and its certents Ceers: Whit all book of the transmission eldefrom microscope (TEMP). Nocurity: The TEM's toverdocated and bei-

can eternolociate, encore, and can view also the during dark for code in process cases. I have seen a rescultor in drug, and a rescultor in the case de contract size way have could originate the markets from Second the way have been described in the case to businesses for the case do to be contracted in the case of the case drug and the cases of the case drug and the cases of the case drug are described in the case of the case of

(GCMS) it analyzes drugs down to the molecule and is assential to differentiate vanous hallucinogens "full could, say detinguish between a britanth of a gram of

tinguish between a billionth of a gram of LSD and PCP with it. Owns: Neve closh nates for drugs changed throughout the twentigh caretry? Neguchi: Drug addiction is, sectly, a con-

Negotivi Ding addiction is costly a contant in modern cubies. Doly the specific drugs change. Note to Wald Walf, Loring the Fifes amenhalamines and other samulates gained popularly. In 1969 case, 1957 there was a hetero-overload and 1957 there was a hetero-overload and 1957 there was a hetero-overload and the highest insidence of drug related south mustly use to hetero. Other less drugs were bothstanden inflammation of drugs were bothstanden with a second of the second drugs were bothstanden inflammation of prescriptions. Others, and a continential or prescriptions of disease. PDF—1957 costly orders to 1, 14.

and Santianeasoo PCP can on the open rather suddays Unideo occarie and herean it can be menufactured in a garage "Ma obligation of a displace in chambley. Even footy mode a displace in chambley. Even footy mode CPD beats are stated when the purspe inplace, to be department in after an area we had hugo, Candervine shoroustice. Correlative to the search hereal in all this control, and offer in a history sociation of the days on the special ALI of a subdenbose. Here has good ALI of a subdenbose. Here has been subden as within a

Own it is and tell PCP regions element Request More for any other displand asid effected, but Der comme at Vive Ptrill self effected, but Der comme at Vive Ptrill in the Commerce of the Commerce of the Ptrill as single-may plant for the tell performance of the asia product, waxed by the doct make self ping product, waxed by the doct of the Western Introducts Western and what we was branched they had not been defective, we budged and self-make of the commerce of the design of the commerce of the commerce my drives less! It is doct in the charged of Sales cough, hird troke the west in the Sales cough, hird troke the west in the

Cereir With Monroe, wasn't if a question of suicide versus murder whether the taskil drugs were swellowed or impobio? Naguchi: The autopsy found a large amount of Nemburpi and chloral hydrake, but the

case within typical because the stomach was empty I did not see any residue, at though the stomach and greate linking were



Computers that see. hear, create, even go servie? So who needs a brain?

BY ERIK LARSON

Rocerts, Livert la my terbyyetr distruction or cells body was ever compate Theoremeterbers, assistance had been a place of cells—— And with his matched a displayer proj conventional compating or mercens, ledings, and excellent gives a place of the same Bit Lambert to was as a costs, and departs that the delivery on the further burner or all tests on. other thing. Men I had seen when expected to remember. they were deed drunk, women who ... No computer, not even the largest in computer. By using handleds of had dianced on tables, all now of the mechines that plot our weather individual computing units and linkshowed glammerings of the impossi- and check our tax meth, could cope ling them with many thousands more ble, success, don'ts solerate. They wish a tenth-year college reunion, it, connections, these researchers by looked different. Some had less have, you could drag a Cray supercore- to simulate the brain's own broad and new parms, deen-sheven jews, and - pulsi into the class test and periodic templed reuron fields. They call their wastenes that needed more than the everyone in front, the computer systems neared networks and use "skoch more room" that Levi Strauss wouldn't recognize a soul, wouldn't insurctiological terms to describe the action for us atom bombers and buby understand a word, let alone remem- components. Some networks all-

come to me in a cry Schmetzer (Not can build things that do modest di- wont confuse them his real name but close in spirit ) Aust - agnoses and chess and interpret nucan would fell in and flood his room. sommotor expeditions of a ret."

what they think the brain does when

borners Stil, likewithern and could bur the full play of past scents, mady show conly thoughtile quality pull their names from the thousands, sounds, and actions that tag along the They can adjust their own caself-ere connection the thousands, sounds, and action that by along too. They can alget firm own consequences are consensored as the country of the country Soon these networks could give

Subminister. Like the right that we clear magnetic magnetic assessment as special-radiated technicities that produce marched on his dorm room, charat grams," says Scott E. Fahlman, a near-visual images of target aroust, ing "Schmeitzer, Schmeitzer, serior research scientist at Carnega, and speech-recognition and synthe-Softwelder, Once, we leared a Meton University. The we can't build see sweet that can handle seef by took not filed with water assumbly something that has the common man life Room accords and all. They door so that when he opened if the liveness of a five-year-old or the sen-may even guide unmarried, auton-When his cat disappeared the word - Fehiman and a growing group of - scape or along hostile borders. Fusprinted that even the cut could not sprinted that even the cut could not should him and had committed sui-cide by learning out the back weakers in grow on a wholly new kind of they'll dehibit creativity and interesting

PHOTOGRAPH BY FLLE SCHLISTER

and do that simple human task no ma-The work is now moving from simulation

to real hardware, attracting money from the New the Dalanse Advanced Research Projects Agency, and NASA Bell Laboratoties and the Jet Propulsion Laboratory see building the first neural chips, and THW ino, the huge electronics and defense concern is already selling a commercial "neurocomputor" designed specifically as

in the long run what were ofter is real. humanine viteligence," says Carriegie-

The brain is a daureing model. At the vasify different " says Christof Kooh, prolossor of neutral systems and computation at Ceilerth 'The brain has chomicals it is expeedingly plastic. If you look at a neuron and then you look at it had weeks litter in has changed as shape It's constantly batted in different solutions. It's very factory response It's workware it's squistry And mostly it is complex. Our briefs are packed with 10 billion, maybe 100 billion

neuron, cen hive 90,000 synapses. the When we remember, see, here or think, our brains do immeresi calculatoris and seem to do them all at once in a creat persist. such of population. Whole helds of ness grs on the effort This diffuse architecture endows the

drunken binge can kill off 100,000 neurore-yet all we get a hargover The appliative memory the ability to link one memory to another to see Schmidter and best example of associative memory at work taken place every weakcley night on TV game show Contestants by to guess chrases, suverce, titles, and names from cost a few letters. Last mosts for experiols one contestant guessed the name Xalv Savalus after seeing only 7 of the 12 letters

in the actor's name. She won a coder chief an end table, and an unitrelia tree and said TipuldeThe happer \* A complete world: do from very yeary tast. But if one of the stance in mineral, the famous chaps in the

TM DMM

have to as through, but only one can peed says, "but if you have a big truck in there

you're stuck Neutral networks, however operate as though they had thousands of triviumels This finely grained and massively parallel angrowth to computing gives computers vague instructions. For neural ners, alsocative memory is a category, "Some of the general properties you get in these

systems are strikingly like some of the conatal properties we see in neurobiology. physicist who splits his ame between Calsuch and Bell Labs. You don't have to build

ture of the theory. Scientists had studed reural networks in the Ethns and Splays, when a simple are the way the Boatles drew screening.

> ←Soon these networks could give us

speech-recognition systems to handle real human talk. Brorix accents

and all. They may even guide autonomous robots over the Martian landscape 5

on de promises. In 1969 Marvin Mintely. they Sourceur Papers wrote an elegant, dipearch. A law scientists continued work on modeling the track count coverties but

party into what is now known as traditional Highleid brought networks back with a vergeance in 1982 he published his own elegant bit of freelymatics, and it switched

would happen if you parriedled hundreds turned the thing on, the engineer would have busined and walked away it was in-Hopfield showed it could be done striply world can't help. Computers get stuck at the Von Neumann bottleneck, ramed receiv. Hondeld proyed that a petwork of interconnected units would operate by the somewhat unfairly after John von Neusame mathematical rules as a particle roll

particle might settle into a dimple on the stoly surface. He calls his computino units numbers and the connectors between

One way to pacture the system-short of knowing a lot of complex, abstract physics of San Francisco, with its many steep hills. Nob Telegraph Russian Now suppose a into town and lands on a slope of Nob Hill.

The test place where he stops rolling is a stable state, one of many stable states in the city. Wherever the skyd iver landed on valvy, that paracular stable state If the skydiver landed on the far side of Russian Hit. had rol to another stable state, an-

Each valley is a memory The many of their interconnections determine where and how deep those valleys, or mamories. has a dylarent hought weight, ago has color and so forth Hopkeld's equations sale

Harry and each of the other 99 frends you can remember only first Harry him blue on the stope of his voley. If you remember more about him, you will wrist up lower. But

That's auspointing memory. You know a the about Herry, and that's enough to bring outing until knows a lette lot about what the bromike requirence if a few units are deatrivial. The evident still functions. It may however, show signs of machine servicy, a property known as graceful degradation

nothing but an expensive repeir bill Thore's a trade off, bowever. While renworks prepared does not. The list wellay you serile into need not be the lowest. you might come to stop at Chinatown in steed of milino on down to the Financial District in solving problems this means that a naural network may come up with a cook answer but not necessarily the very best one But then, this too is a very human trait It works even better in secon. Most noural on powerful, conventional machines. But at Bell Labs, Lany Jackel and Richard Howard have taken Hopheld's theories and stable energy states much the way the

tested them in prototype orgus. They list 484 'swrapses 'It stored four short names. and acted as a small associative memory. and extraordinary. The system worked

meantly as Hopfield's simulations had proabout one second," says Jackel "This takes a milliorith of a second. They are

rors and half a million interconnections. How do you program a system with that Arrawar, Maybe you don't have to A brain

able a New Yorker to drive in Los Angeles on a first war. So you build a system that can learn program toolf, or at least change its concurry to adjust to changing informa paradox about intelligent machines in an office at the frishtute for Cognitive

teacher David Zipsor a colleague of Rumethan's, is saybying a system that through Dego-(LiCSD), a simulated neural network is learning about arimals. It is sluthing it cicigotic a teacher. He does his research trads and trying to dovise its own way of on UCSO's Crey computer one of the representing these arimals so that it can world's largest machines, housed in a glarsystem is hard at work. On the agreen a alike network capable of recognizing real nursy was across a matrix of numbers. controcus human speech among differant speakurs. No mechine can do it wet peuring now and then to deposit a black squere over a marriber and then to crises if set of problems, teaching the system to network's creator and acting director of the institute prefers to gal it is neurolike or sounds ba, do ga; bi, di, gi, bii, dii, gir For existing speech-recognition machines along principles are supposed to be the name as we find in breats or the same to a first approximation, he says "But we don't posed to recognize But continuous magice that the actual numbers of units are the name, nor that the exact conurs of

He has not the system so that one yout unit represents one arimal. When the mechine has brushed learning, he wants to be in any way," he says. Already the network appropriate net of descriptive teaching at and each represents some cheracteristic of gramats Burrelhart teaches the system by pro-

gramming it with a set of target values, or porrect argivers. If the machine answers transported unto that they we made a fact by the oursor incicate when these error messages are being passed, or propagated, back.) The network then strengthers the connections that move the system toward the cornect arrange and

At the heart of the network is a set of hidden units. In effect, these units "no-

CIMPI

tice" what features the animals have in SPIDER common and what sets them spart. The these representations and by morning will be subtle enough to "know" that a bodget to work with lesers, Witt enleted him to

perform laser surgery on spiders, hoping to discover precisely, which nerve areas are nonetholess different crestums. In experiments with an earlier network. Spiders have hugo brains, or rather acveloped its own infernal representation to distinguish plants as a group from animals. very large nerve cells in one enormous mass in the opphaighterax rul representation, their own representa-

"We shot around for a long, long time but the evaluation process was very compagated. You have to take your animal photograph those webs. You do that for years and arrass hundreds of webs and bursteeds of aramais. Then you take every arrived that you have shot and dissect it to

have been shown to make. The fact that it mmics the way people do it makes me get exact sloes of the brain and find out where the damage is And so on The resuits we got were not what I had hoped But his retained abl need an exploit for But there is a space-- a central body in the partiest nervous avoiders—that seems tions that have to do with web building One experiment that Witt deviced he was unable to observe feathand. This was the study of wab building in zero g that sent two cross spuders you apage aboard Sky-

case Will is purbainly the most interesting fredrig. The specters adapted to the acsurppy of granety in a motter of days and was the lack of up/down asymmetry in the apace, protestaly because of the spaters suffered from and treaty died of thest and letting his system come up with its own way of distinguishing sounds. It may choose them by placing most scraps in the webs. final webs resembled the webs of old spi-

dern built sett before deaft Perinnel from research for tax years now. bleet in fact it is a more complex sound. Witt lives on a farm in Knightdele, North Casolina and no longer keeps his stacks standard techniques Zipser breaks down the sound rep these components and proof spiciers. He could capitalize on his knowledge of the aremais, ike some other duces a scringtarn-an abstract "picture" wery chillerand durin, on will a sende speaker out their thread and sell it to the optical inclustry for user as cross heats in instruments

When Open presented his network with the sextants. He could raise spiders for all 20 such differing sonograms, the network ways want to soart science projects in the spring, when there are no spiders avail-If hadn't heard before it recognized them. tact with spiders now is through his photos The surpress came in the way the notwork represented the sounds. It chose the The web is self. You never not bond virwel sound as one characteristic for of looking at it. It's so beautiful so intricate, so moutes with right pregularities, which are repretly the assesse of beauty 'OCI

companion but it did not do the same for the consonant There was no 'one sound'

the same kinds of metakes that children

of mind. Rumehart says

out some of the strangest w ever to roll off

Deorge Eberhaldown I personal personal

overwhelmed by Denhart 5 mourners as book entitled GFOs and Net Esthamment of Contact Mourney (Scalington Press) has been selected the lography on UFOs localises more than 15 600 errors bove ing 36 countries and

15:00 serims contring 36 countries and 461 years.

Daring the day Eborhelt works for he Arrendan Lissay Association as the additional for the Arrendan Lissay Association as the additional for the Arrendan Listanes Warra But on a ver-

mags and western his firth seryan old Dhoagoen pursues in his sind agetwide when the mad about a Calfornia cleant. His a sceking some of this awe to ad left the pursuing pressues here on Elberhart's cost late Good Michael's Plays Figure South (1956) chichology the unit outrier it includes a reference to Politic Brit.

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UFO UPDATE

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y of just plain brawn
howes contactly no shortage of that. Eberhan se. If the leafned anything at at home big. anything can get method, directly a series.

super il represents an amazing aspect













### INHLIMAN RANDAGE mediately but had to confer with her hus.

hend. When he name home from work around six they retired to the back porch

would have to cancel their plans to attend a party, but this would be no problem. member of the family "I have an old dog

But the right before the mission Welling became more attacks. She had come she might be contagious to any primation welliang the dog and then paying a few talls. Shortly before comp to bod she tele-

The next morring Valenciate a vegetar had been a long, restless right so she was regre than eager to proceed. She drossed with care, choosing it gove of work prants, a twic four secart, and tan hiero bootsmartrriance worker micht weier Belone

abolitionals in their light apairst slavery. salvan howen was isolated by a long drive of the Memorial Day weekend. The large

Docume the crowth of the occasion—the searmly errorseed Weener The two-women in raids in the past and had even trained together with ALF leaders in England Mary pable inteligent and tough under pressure as Valorio would be the de facto leader

sione a newcomer, a woman in her \$1/70s. Momonal Day caper would be a rite of

passage rightneorganization. Her nerves. the those of anyone about to commit her The orduo was to total five, and the last untried quest, was stated to have only a

he second gertleman was of a differont coliber---a veteran of the ALF and a polisation of the fearn. Values was expenckname) as he was known. He had bein their joint endeavors. One of the elder statesmen of the organization the Hacker unimagirable causily lowed hurrens in he

6The Hacker was and had seen

unimaginable cruelty toward humans Later he had developed a myulsion at

the treatment of slaughterhouse anymats 9

The actual briefing of the sale house

by Building at the University of Percent varia. "We had detailed downers and a examine thoroughly. Mary recalled about more grussome images. She had known only by hearsay about the work conducted

on the table key a photograph of a rhesus morkey in a tark with its head being material was provided including a recent cleans from the Jordalo Globe that out

at the University of Pennsylvania be the primary target. The Head Injury Laboratory according to its leaders, had frauma and irreversible brain damage. But whose skulls had often been fractured by responses had been measured as then heads were opmonssed by a hydraulo

where but an insate informant had alerted programs nearly of the cirries work. to have taken the baboons." Warre seed. more animals in the future. And in all prob-

Having familiarized themselves with the ting the group listened as the Enguerdant delineated their separate responsibilities. complex while the two newcomers would west, periord cutarity. A second every wer-

definite risks, which of the participants

Valenc Mary and their three colleagues in case the two ages of met up with a cultant on his rounds. At last, after merry hours of deliberations, the Engagedent Emphasish elaborate briefing. Sequestered for the duration of Saturday in the safe house, all five were fortedden to make any phone palls to playing Moropoly in which going to set was

from the winding driveway of the safe. rickship with a carry of five humans and a ladder placed in the back, "It was shortly before midracht. Many remembered. "We drove up and down the man street, look

ing at the business and its does from the case adds, through orbitolock componence. All the exercising used capital amounts of Finding to window, and the exercising used capital amounts of Finding to window age. The fished residue to Finding to window age. The fished residue to the labor and or fished to a second for or fished and a finding to the labor and the fished residue to the second residue to the two commissions are interested by the vari-Valenders fished fished to the fished to a finding the fished conditions, proceeding the fished to the fished with a fished to the fished with a fished to the fished with a fished f

controlly through the controlly process
in, like occaping convolute, in engigle feet
that the controlling convolute is engigle feet
Than hand stacks: The Hacker was supproced on the weeked down the neight had not
sampled via the wide to the hard feet
sampled via the wide to the feet
offer man, perform a study or a likewing
mention and wise to create to be leave
that me, Welen excelled to the two overman
start me. Welene recision if the two overman
compared to wealth the controlled or any
compared to wealth the controlled or

equipment to reach the cutside or wisy betaminal turnities to their a gast inglese. Leave the cutsion of the cutsion of the reach My mind shought was a strategy reacht, but it was just for a faith My nation losses and then carry on "Makes was feel to proseed as well." The patients in all second as well. The patients in all cutsions are selftered to the cutsion of the patients of the cutsion of the cutsion of publishing the cutsion. The cutsion is a published to the cutsion of cutsions are cutsions and cutsions are cutsions.

of a chrismatic underworkf—an Cuttible from Mecopolis, First Langh ween of future like below the ground. The Head high-Laboratory was coopy to denthly Methor enmonthered. There were is stirty out stateway that lost are for as subbasefers. They calculately denthly wast employed by extent the astro-parameter of twell astro-parameter as a samp parameter of twell astro-parameters. So well of three parameters are considered as the contraction of the parameter of the contraction of the contraction.

or the right place.

The lab was right each to the boild more, and exemiting the wise the dead of light size were businesses from the staff. The placess trop the staff. The placess trop to be staff. The places step to leave the succession of with the having and cooling system. It was impossible to wisaper to Many or even to have imposed to the two of usual their documents and wasted We could not have been document as the staff of the staff of

mit that room." I was really allocked at how deems! it was really allocked at how deems! All you was, Mary added. This was definitely real a speace for ammis. It you have any undestanding of them, you know how as single to show they sent to the gaptate or a shappe. To have brought an ammid compress, when they would be or an award cooperation, when taken everywhere by a owner.

Alter a reconstruction through the and the body was a shappe to the sent of the se

ductwork by the same inside confederate. We were prepared to break in to the chief that are care free resided, but the key was there. Once we get though the first door, here were to bit of a size All the legits, were on in member of the label. But the form was a resident of the chief the same was a resident of the chief the same was a resident of the chief the same was a resident.

ten' manecalant, but the layer was them. "One every through net did out, he may be a fine of the war to this air XI ha layful was on in the same of the same of

before I tax somewhet sustrated but inniver we had to get our primitive but make.—Unit of accounting the tapos.—Out of the way. "At the end of the big soom was arrunkly oftice, where a metal catenic had been left open. It was really dirty. He is a government office in a basement asmawhere. I saw

The hydraulic jack was kept in the larger room, There was blood on instruments, on the

bandages left on the table, and on the skullcaps that were put

building was like a modern rencamation of a creenate underwell—in outlitie on the monitorys' heads. 9 ture life betweiting gound. The Head hypy Laboratory was easy to bottom? Valorie re-

> some old stops on the floor. He ID? Gennardij kept no pictures on the well it his was based known to be a pusyboy. He was sont of the taxay-drossing, Ishan-loven type! Westing white suspicel gloves, Videne and May vinacekat the laboutary. What ever mose the researchers had left on finday they weald find a most happen or labour or well.

ever mose the resourches had left on through they would not amount tagger can contively they would not amount tagger can conund the first papers of remail to fine or
garasters were amounted. The computer
were turned on and Mary sproyed colors
in its clied cheer from tables load in the serk were emailitiat. The video coupprosts
of Computer Mary and country of the country o

sceres from lay experimental links disstroyed Aut he dozeno of open mery of them detailing explicit between becamer insister bourly in fact, syndight the could have alread in law serment y destroyed in the coulses of the 45-minus assault. Once Velerie and Mary were trained they disting the tapes. Mary book about half of them. She would have them out of the building, and the others would be left ann motivate control to be middled later on honded while leaving the promises, they

the train and selection of the control of the contr

ear of the complax.

Strangely, Weters were unable to select the moment of the thamps in Athe care with a market part of the select the moment of the thamps in a site integer good in rough the source of the selection of the sel

implicibility we were secretly to other close. If Pladspleight in modely these was the United States the nother country on the base of the central most have been obtained and the base of the central most been often or the widerest most been often or the widerest most been often or the widerest most been often with the second or the widerest most been often and the second structure of the wider that was the second of the widerest most often or the second or the widerest most often or the widerest most or the widerest most of the widerest most or the

other organizations.
To far the two execution from some reliable for far the two executions for the properties of the cashed the properties of the propertie

Westworten-Maryland booter "Lout from

there and then Alex [Pacheco] was con-

stolen material, gave the purioned tapes meet Dr. Germarely had made in 1994 to a Permsylvaria scientist could not undercaffed Unnecessary Fuss

Our sw-hour marathon interview ended his Hologaust past. I hoped that he would sometime in the future. Valence thought that couling inflicted on animals with the chines

If you could only look into their eyes. I registed her logic. Toars world in my eyes learn leit not for her intorvitory att-

make me accept. My grandmother was on You cannot equate the murder of humans with resperiments on animals. Humere are wholy different | insurers

I retailated. 'Are you the Simon Wissen-The ALF Valence moded, has the un-

fortunate job of trying to pry open the door sistance in many ways

her psychological motivations. I asked a your work with animals has supplanted a deers to have chicken? The woman—who gazes from laboratory torture—psyched

"No. I have never wanted to have chidren. It is one of the first things that I knew n life." Valeria's answer seemed much too rehearted, and i persisted "like are your

'As a women I feet in some wave that my



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work regular hours. So you never know when they'll drop in. But after a sip of Jack Daniel's, you'll know why we're always glad to see them



CHARCOAL MELLOWED FOR SMOOTHNESS

children into the world. I also believe in population control very much

parred a passon, and her militarity in more de? Perhaps Velene's prolound empatry for the bulboons of Germanell's laboratory with those tortured creatures. Like hos volumented. Her concentration camp lay froutance of roles from the furnaces of Auschwitz in an unnamed Third World of the potonial upper class. Was if E. M.

Forster's India? She wouldn't commerc but Visierie stad, "and I was raised to turn a in Switzerland sking down the mountain

have decovered what you feel moved by transper curestons and dutals, we were both tyreal-en. She had not gone as far as blowwent you the ball-sporn and removed her gars, I retreated to a corner of the hotel

slapped into a ten secket and a pay of versty and was off, with a good-bye and nothing more bearment office of Dr. Germaroli proved them containing approximately 60 hours virgus female caller telephoned the office

brains attached to twisfed wren inchined

maternal instinct goes toward those aremates crawling away in pain from opinitind tables. Besides such menfest on elthemselves at work in a littly laboratory no place where arrena's would want to be Among other research infractions, the gical procedures and smoked organities

Description enderce the Unwariety of of the vandakzed laboratory Dr. Thomas prospect in humanely. He stated that the south Health (Nittl). Speaking to the Pittaburgh Post-George at the end of May 1984 Dr.

6// Josef Mangolo had looked into the eyes of his victims, he wouldn't have done what he

chrt. And when Germarelli Jopks at his animals, he sees no reflection of an inchwikial 9

Langfit said. The armais are anosholanded the program vehicliently lokowing the besiden Both sponists mantained that and that their scientific investigations into

the stage for finding new treatments' to deal With Service Paulities Press interest mounted as the controin disquise spoke briefly to reporters. 72st ment on its trorf page while the Cable News Network ared portions of the videocluding the ABC network, relused to broadcast the material, heading the warn-

Given such coverage, doubts emerged

aganghers Dr James Wyngaarden director of NIH defended the clinic describing laboratories in the world "James Watson. codiscoverer of the DNA help, later stated in Westproton with tweng servicity this business? This is complete and abso-

Unsatisfied with the response from unraid on the Philadelphia campus. Again Webser participated On July 28, 1984 of group of thieves broke into the School of Veterinary Medicine taking with them a dogs and eight laboratory pigeons Just as quickly as before the animal notes publicity machines sprang into acself as Lauren informed the Associated lengt means to save America's foraction

was prognant and that Jasmine a missed semewer had become 'depressed and Challenging such assertions, the unwer

to promate and hurrenn Dr. Robert R. Mail shok deen of the School of Wooringry Medicine and a highly regarded figure in that the descriptors in PETA Nava of the gate, pipeons, and dogs stolen from the

gata: Marshak charged And "the second dos Jarmon was the subsect of a study that controls the banking reflex. The disas While Marshak staunchly defended the

was less supportive of the activities at the Head Injury Laboratory, then part of the mal asponmentation is really recessary. on animals first. But hed he been informed about the return of Germanil's nasted. How did he feel once he had been told? It don't trink I want to comment on I Marshak, given the fact that he pre-

seded over a different school, had not been Videne rejected the assertion that the dean had no knowledge of the lab's conknow what was happening to the arima's on that campus, but he chose risk to care,

Valent mantered There are sety thouthat compus every twelve months and or adovate any of the pain in one of his on male. Valene said. The been made his ver echool. I've seen what he runs, and he is a Nazi of the first caliber

The Head Iroury case was a story that Alax Pacheco attempted to show Unnecessary Fues of an approved congressional viewing, but prossure—which Pecheco atsomerring to be parcolled. A tow days later PETA invest the press to Phracelohia. vessing alloted the interest of more than suit recordors. Later that month one people were subpoweded to appear botors a ers, Pachoco and Ingrid Newtork, rodoundor with Prichego of PETA, were summonant to court. The D.A. according to Pactego was gong to "pull everybody in Trus fail the Philadelphia district offer-

was Edward Rendell A highly ambridge politician he would subsequently make an 'Parasall's political ambitions, clouded he athes ' Wenn later charged They straid have had him prosecuting Germania, but in Principlyania the unweight can be the he needed that starting it was clear that they were and desperate that there were nothing they maily could put they finger on." Faut deepas the best offorts of man like

twied to meke any headway. Boyoral of the animal activists including Pachego, India wiresees would talk the investigation was

that had shadded its members from exposure had again prevailed, yielding the grand wry nothing but a mountain of

practice. Rendell remembers the case surreselvet differently than the animal rights plance from these people, but they fought us every step of the way. These people were turny they weren't fee the Berngers' Plendell observes 'Thoy weren't rested and prosecuted and make they case in court. They den't have the com-

have gotten up in court and said. Yes, we broke the law, but this is why. There's a thing gated uny nultiposion where the jury has the right to find detendarts not quity regardless of the evidence the group wanted to make its point, but it

The thett had destroyed vital medical information about hoth anymals and humans.

Besides that. the descriptions of the cats pigeggs, and dogs

were false." Marshak charged 9

restriction of the person agrees." The momentum that the animal-rights movement had gained from the raids garned over into 1985. In contrast to Rendall, on a major tramph Nonetheless leasters close clown the head insury Laboratory tions of the committee in April 1065. Plantmon support of laboratories that continued to ments on animals. He stated that "NE-had that, eithough re-funded year after year mans." Challenging the contention that the arenels tot no pan. Pacheco told the begans that many of the bebooms were laft.

In scient of such testimony, Genneralitine current in June 1985 a new grant of \$500,000 from NiH. The money would en-

grant inturiated the activists, who vowed to trike more militarit action. What good were

Hanging a barrier that road wawa, confrom venous animal-rights organizations preetigious government science instrutions. They demanded that the leaders of bedang of the Head In pry instaution. They yowed to remain on the premises until their demands were met. White President Rea-

ation at Bethesda Nevai Hospital, drectly in golly on Monday, were growing welly by midweek. Many of them leared that arparaments proyected the motivation for them-Stubborn as the arrinal extremets word the chractors of NH seemed equally reexintened to response to the sit-in. the au-

were blocked, as were normal access reutes that would have enabled the demgrenators to money lood. A precessus from day to day the protesters housed blankets and meets that had been left by style by hand to eighth-floor of lose, where sang music to cheer themselves, rowifing gut the occasion. They gave Julia Ward House's The Bottle Hymn of the Republic a pest-Cwi War interpretation, singing

Paul, and Mary's classic Sedies folk balled the animals, I'd sing it for the creatures all over the land "word the new lyncs that were of American history, its leaders imporburned Manager Hindder then secretary of health and human services, to view Unnecessary Fuss and to withdraw Germer True to the words of The Battle Hymn of

the Republic. The activists would not be moved On July 16, 1985, 13 months after 77 hours after the larger group had invaded the NH offices. Secretary Hockler The protesters had trouble containing

would finally be shut down after 14 years. Attracts Heckler had wewed portions of the stolen tapes she claimed that this had

Dr James Wyngaarden, the head of NH, stranged his openion in the aftermate imposed by a foo Reagan administration.

ply with the Public Health Service ocacy. policy. Nitt officials put off funding for any was net bearing to told Leading offirasks at apperatio establishments through martelons, effective as of January 1986

ranged visits at other arrival laborationes hundreds of stories in newspapers and on brimpian, they have launched an ethical debute and created a public awareness and browned scientific informations. A host ratiquels gribulars—excluding slaughterhazes, fur compenses and cosmetos

a corner of 1986 respectors from the Be-

Laprism scientists, while inspecting many of the goals of the movement, point out that the renmal cause can be taken to many of the leaders of amenal organiza mestance for example, of laboratory chimnomines, scientists would be unable to that his schools arreal subjects have been used not only to further our understanding

102 0869

you's themselves in such instances as the development of a vaccine for parvoviral entents which affects doors. Without such monuments instern of door through-

out the world might have suffered and ded Marshak says Nonetheless the clean submits that These animal-rights peopie have clone a great deal of good by forcing the research establishment to claim up its set but the military groups, which malinesearch, are not being realistic Two years ofter the ALF's forey into Dr.

Philadelphia flut given its so called happy a miestone in the history of the arimal lutionary legands are made. The activistis were actually able to take on a previously

crecy the periodeents have not become another arest Mary was slightly more forthcoming. Hidden behind a mask, she talked to the press like trembled occur sionally as she recounted the detain of the 1981 Cirty Vistano, her political rhotonic kt

described her serrinal tole in the arritral Write the Hookier decree in July 1985

offer the extent rest p. 1004 What the nows troke my daughter said. Mary's heart fluttered a bit. She was

foorful that har daughter knew. What did you hear?" the mother regired worst fring you have over heard of Mom? been given any proper anesthetic and fisal

something to slop it. And she said. Morrow you don't think they will ever do first again. do you? And I said. Those not "DO

TATTOOS

clump of her that hung down in the back with their orange hair and long, bleachedwhite raths is, probably to exhibit his own. 'Nah just waiting for you," I said, living, trying to ramore my feelings of loss and

become my own

We spent the rest of the day at the fan had dinner at Morn and Dad's, evalched TV, and left at about eleven. We were all about seeing Nighan I know she would set at least that a what I told myself Ben fed saleep in the backsest. Laura. watched out for door while I drove as my night vision is prior the should be the one ten attress. Most of the time her legs are stretched out as far as possible in the foot well. Hought the numbing hypnosis of the road. Every mile felt like ten. I keet fyr king stroug Nathan-how he looked what he

Direct when a the matter? Laura miked when we were about heliway home "You're 740 Im and treet, I need being Second But there was a selfen edge to my leettheir Hwas an Frough I had looked in one had seen corretting of myself in Nathan. bad recrement his learned forward, hun

"We've got a ways to go." I said. "St back,

I harried up the heat, the temperature had

alternoon. The treak show protestry gives you reparroos it nivers did me I don't know what's wrong with your crandistree Laura and "He had no busy ness saling you in these. He should have

his head examined "I told you." Ben seed "It had nothing to You want to talk about #71 asked

No. Ben said, but he didn't sit back in You should at back, Laura said. If we got into an accordant-"Clave" Ren said. There was allence to

I dreamed about?"

I straightened up, automatically looking

I knocked on the door Nathan didn! seem successed to see me he welcomed inno and the cuffs buttoond, bidges the scens I had seen vesterday. Agran I list a shock at seeing him so gaunt, at seeing the webbed scers on his neck. Was I returning to my linend's out of morted curparty to see what he had become? I felt maky and retremed. Why hadn't I sought

ter friend, i probably would have Walking into his studio was like stepping into his paintings, which covered most of the available wall space. Nathan was ings I had seen in progress years ago. On the wall opposite the chor was a porting of a rude man weaving a car's grade. The light was directed from behind, highlighting the shoulders and arms and the large. peasant hands. The features of the face were blurred but unmestakably Natisana a woman Behind frem in large red letters, was the word curcus. The faces were ordrary and disturbing, perhaps because of that. There was another pareng on the well where Nathan had set up his fation studio A self-portrat Nather wearing a blue worker's hat, redishet, and apron and standing boade a laboratory skeleton And there were many paintings I had never seen: a whole series of lattoo perrongs,

seemed to be staring dractly at me over taset cords, which were list out on a table street with plasses. There was profess then held a luminous technique, an expthe pantings, and covering every swaloths space was flesh-not the flash that I had soon outside but detailed, colored deand mythoal beasts, as grossque as anybefore dark suffysed the trafer, and the

which at lirst clance looked to be norrep-

crets then the wate or paintings The older woman I had seen on Sunday was back. She was sitting in Nather's stutist chair. Beside the chair were a cabinet and a sink with a high-dionosted faucet. Pigments, dyes, paper towels, naplone, bendages, chargoal for stengils, needle tubes, and bottles of soon and alcohol were surprised to see this woman in the char. ate to see Nathan But she just didn't span

probably didn't mean a thing. Anyone could have hidden battoos, old laches, servators. presidents Disin't Barry Goldwater brag ened to me. "Sit rivers Whydel you like a dank? I've got some beer. I thris. I' you're hundry. (Ne got soup on the stove." Nettern

the sort to be gatting a tattoo, although their

was a vegetarian; he always used to make the same miso soup, which held start when I set down on an old green Art Deco couch. on a battered raik desk. The letchenette small reingerator, and a table attached to the wall. And indeed, I could small the like meer agams of Netherts soup

Though this is Mrs. Stranger: Nother said and he seemed to be drawn toward me

### •He looked W as if he had absorbed the sickness of his

patrons, taking they poison into · hymself and giving back Me. He was turning into a

ahost or a shadow Not even his tattoos had color?

vous I wanted to saik with him ... correct with him. ... find the man't used to know "My Tarot," the woman seid. "I'm ready

Norther set down in the char hosado hor and switched on a goosenecked lamp. which produced an interne white light. The trader seamed to gain substance. "Do you think you can belo me?" she asked "Do youtherk it will work?" "Evou wish to believe in it." Nother said

where the concentration-camp latted had "You know, when I got these rumbers at the carry, it was a doctor who put them on. He was a posporer like I was the didn't then while the spoke safe as many people ownings in their year. But she seemed to need to talk. Perhaps it was usil nerves

totoging her wrist. I watched hen work his dicity seem to have heard a word she said. his own wrist that was being tatloged. "I know Manapia." the women continued. "Do you know who he wee?" she seked No. do "she seid. "He was such a nice looking sky Everything else in the camp was craw and the sky would get black from the furdown 1 She continued to talk while Nethan

I fried to imagine what she might have looked like when she was young and in the pamp it would have been Auschwitz, I But why was a Jew getting a lattoo? And then I noticed that Nativaris was were

bleeding. Tiny beads of blood scaled "Nathan--" I said as I religowely shood up. But Nather looked at me sharply and

where I was "I'm all right, Dovid With talk about # later I set back down and watched them.

Mrs. Stramm stopped talking sha seemed cather now. There was only the

nome of the fair. The sir approach heavest in The darkness almost smothering. Yesterme to find out about your husband." Na-Fengad toher "You led to ma didnt you?" I had to know if he was alive. He was strong, he could have survived. I left messages through the agencies for him when Germany I thought to go to South Amer-

co. I had frencis in Seo Paulo." You runn to America to cut wourself off from the pass." Nathan said in a low voice "You know your husband had deed I gan But you opuign't bury everything. The teltoo is chemoing. Do you went me to stoo?

I have covered the numbers." I couldn't see what design he had made Her wint was bleeding though a se was his Than she began to ory and suddenly pain and anger at herself Nathan slopped working but made no

of her breathing, she said. Timurdened my prient I had help from enotine, who thought orsed at her own words

again, but his voice was geriffe You do what you think yours the testooest "Nather began again Mrs Stramm continued takens, though the still looked news from the machine. But she taked in

bear for My more were facel on Norhor's wrist the dats of blood had connected wito a latter, bright stain on his shirt culf. I was only seventeen " Mrs. Stramm contribed 'Just married and pregnant I had my betw in the pamp and Dr Menin the hospital. I was taken care of as if I going on outside the hospital in the camp. in the owing, wasn't true. When I had the was perfect Dr Mengelis was very careful when he cut the cond, and another doctor assisted him, a Jowish doctor from the camp Achl she said tinching she boked down at her wrist, where Nathan was work no, but she didn't say a word about the blood solveng through his shirtsloove. She

No stopped and relified his instrument. "But then I was sent to a barracks which was filley but not tembly provided," she continued. There were other children in there, mutilated. One sot of two shad bean and I were going to be an excerment There was a woman in the barracks looking after us. She pouldn't do much but

for my baby. And after they had finished would be killed also, it was the way it was done Dr Margele killed all sunviving par-My only hope, she said, was to kill my baby. myself if my buby ded naturally before Mangale bagan his experiment, then he mont let me live I remember thinking to myself that it was the only way I gould save

at the hands of Mongole So I suffocuted my baby I pinched his mamper that very well Dr. Mongolo learned racks harriself. He saut he was very sorry. and youknow I believed him I look com-

my child. I should have begged him to kill What cruid you have done?" Nathan sakest "Your child would have died no matter what. You saved yourself, that was

were me? "No." Nathan past, and a sad artrio acpeered for an instant-en inappropriate Mrs. Sharry stopped talling and closed penying together I could best that, and I

me. She taid me that nothing could be done sensed that something else was happenind between them. Something seemed to be passing out of her, a dark, palpable And Nation looked somehow different more defined it was the light from the larno no doubt but some lend of exchange seemed to be taking place. Stolid, solid Mrs. Stramm looked notice, its if botton ternee. It was as if he were becoming de-

strument down on the cabinet and taped some cause over his own bleeding wrist Then he sust starged at his work on Mrs. was sifting, so I stood up and walked over 'is it all right it I take a look? I asked, but

neither one arrowared met neither one The tottoo was beautiful. Makes in a way I had not thought possible for a marking on the liesh. It was the cherubic face of an prosent each other—an impossible fig-The ewis asserted to be looking upward

and outward as & contemplating is high stazon of paradise. The rumbers was lost premio as Netwe had studied the work of the masters I comprehend a Madorrie such as those on the tettoo. But the telloosed wings were so dark they remended me of death, and they were breeding, an

"In beautiful Mrs. Strarren said, star way he face would have looked than set where he was no looked mehausted, which was how I suckderly felt

> "Can you see the old numbers?" "No "she said or first then." Yes, I can

see them " Good Nother sold She stood before Nathan, and I pould

big-boned proust full-bodied with a strong were light. And she looked relevant in given birth. The strain was come She no larger seemed grawd with the

could feel the psychic closeness of chaft like stale, framed air Nathan ladord seaded





and still only Aut read the of for an own better deal

our thus weach to work, to play, to owen and dree. The Man-

A light switch discrenates the sheeksy.

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the sharp cleansing focused (sh) Would you mind if I looked at your tal-

Mrs. Sharren madded then padeed up her handsag and took out her checkbook. "Will you accept three hundred dollars? 'No Epared Consider 6 perd

She staned to argue, but Nethan turned oway from her "Thank you," she said, and walked to the door

He turned on the overhead light, the sudden change from darkness to light un-

Teilme what the helf's going on " I said Why did your wrist start bloeding when

his part of the process." Nathen said vaguely. Do you want coffee?" he asked, of taking around any subject, peeling away

rabbanical horsage. At any rain, he wasn't coffee out of his treezer and demond a pol to the Moley, we we talk down at the table one. My about they begreen to active ... to of another heart attack () try not to pay atthoughts soll flash through my mind, no matter how respond I try to bed Surely It was museular. I join myself I had been wresting with my son last night. I needed to start swyrming again at the Y I was out two than forty two. After a while the option cannot my heard a bit-6 was a very, vors

even with the overhead light turned on it reed, trying to lead Nathan. 'She seems Jowesh acrongo that she should be getting a tettoo. Though rreybe not so strange rance she carrie to a Jowish tottooist."

ing Jews " The good that alred come to you for a setoo to cover up her numbers, "I said. "She

could have had surgery. You'd hardly be able to sell they disays been there. Most of the people sust wont tattoos,"

Notion said He secret sightly defenewe, and then he signed and said, "But sometimes I get people like Mrs. Stramm people when I'm telloong. It's something the automatic writing mayor: Than the fattoo takes on a life of its own, and some

This whole thing . It seams compleasy crack, I sed amounteened his partings the large curvages of circus people, carry people. He had made his lowed the carriers. Ruth didn't seem to rand. She was independent and used to fond of taking grueling, long day trips. Like Nathan, she was full of energy I remember: through circus people. He visted twiton perferos ha produped then were haunted and he became interested in the idea of living art, the relationship of art to society. the numerous, symbolic quality of possitive. telloong, which he did. He had even totloosed himself—a tiny never that memori to be forever nestled in his pain. But that ordinary people and his paintings were seiling of more than five thousand dollars.

times it changes the person I tattoo."

"Shells dead," he whispered, and he took

What?' lasked shocked "How?" Cannot as are was always alread of "

and I started to sweat. It seemed to be gen-How could all this happen without Laura or me knowing about #7" I asked "I sust

"Faith went back to Connecticut to stay

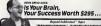
Days: "Nothan said. "I know she had and they all turned out negative. I least dreaming about it, and I could see it burn. ing inside her I thought I was going grazy | probably was | couldn't stand d I couldn't be near her I couldn't help her ing, got back into the tattop culture. The poerangs were selling appropriy the taltog stuff-- I did a lot of closoup work, you wouldn't even know it was tattoos I was

DEPTRICE - BO I SERVED FROM In Stamford. The dreams got worse, it phone I could see what was happening mode her, and I was helpless. And I was a

"What do you mean?" I asked God darnn t, it was not He dign Largows



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"Tell me about the soars on your neck. And my check everywhere," Nothan confessed "It started when I can away, when I left Ruth I started taltooning myself Lused the tattoo our but no ris." Why? Lasked

and your arms

We first I guess I did it as practice but then it became a sort of pureshment, it was painful I was painting without pigments. I trives I can see the tattoos, as if they were I discovered I could see into other people and not of dow their lasts differently. Most people I'd just give a tation, good worksometimes even great work. But every coco in a while Ed one screething when I was working I could see if someone was some pypases. A women, a friend of mine. saw my "bloot" he leaghed when he seed when I started bleeding when I worked As

my friend used to tell me. Twerything has away. He was turning into a ghost or a sheatow Not even his lattoos had color My whole arm was aching I just couldn't ig note a. And I wan so close in the trader that Loguido Lógadho. "Eve cod to get some rec." diffeeth talept in days. Then if elt a burning in my neck and a stationing pren in my chest.

ared to shout to Nerhan, who was stand ing up, who looked shocked who was coming toward me

a statue I could only see Nathen, and if was as if he were lit by a Territor large. The promised lying fallocs glowed under his shirt and resolved themselves like parecos under a stage sorm. He was a livro could see a grotesque carcature of Mrs other tations expressed the ugly minor sins were also figures of Nathan and Puth. All of Ruth's faces were Madonne-like but Nathan was received perfectly and term-

bly he was a monster portrayed in entirely human terms: a waten of greed and cowthan's chest that looked like a Dunir on craving-such was the sureness and delamid grasses and plants and flowers. which seemed surroal in their juxtaposging for Nethers—who was depicted also to return. Her obest and stomach and neck wom hierating, and one could look into the cavities of the open wounds. And marchng away descending under one napile of

Nation's cheef, was the figure of Nathan

HE DANS

He was followed by shorubs noting labuious beasts, some of which were the skill etons of horses and dogs and goats with feathery wings ... wings such as Nethan had beloned on Mrs. Stramm. But the figure of Nethan was running away. His faco. which had always scorred askew—a large him look like a seedy Puck, the very dinpodment of panerous frenchess—was and long rather than crooked as a was in real life, and his even were nervoy and thed mouth which in real life was full, even now

was drawn as a mere line. In his hands Nothan was carrying Ruth's heart and other organs, white a child inding a skeleton Pogsaus was waving a frightone The colors were like an receipmen, and and then the pain took me weepped itself ike a snake around my cheet. My heart

6) caught one last glimpse of the walls and cering, all pulsing, coalescing into one grand

tattoo all around me, and I followed those inky

exament paths into grayness, then darkness ?

was pounding. It seemed to be exhang in greened and lifet myself screaming, even f i might have been soundless. I felt my ertire being attaining in fright, and than the colors demined. Fairling, falling, I caught one last alimpse of the webs and ceeing. Ni publing glowing coalescing into one grand tottoo which was all around me and I followed those play pigment paths into Laura and Ben, and Het an overwhetrend remain of sprow for Nathan, For once I didn't soon to matter and my secon of rusting

if would take an elemity, an elemity to think to warry back over my life to relive it once if I were underwater and a faraway explobeing pulled away josted and I for the tearing of pain and saw bright light and hyant an electrical spanency a sawing And

nent, gazing down upon me.

I woke up on his couch. My head was pounding but I was breathing network. number My arm and shoulder and chast no longer ached although I felt a needlelike burning over my heart. Reflexively I tourned the spot where I had felt the tour-What the hells this? I asked Nathan who was aften beade me Although I could longer find the outlines of the tattoos I had seen, nor could I make out the brilliant proments that I had imagined or hellubriefed Why do I have a bendage on? I felt perio "Do you remember what happened?" he asked Nathan Incised (I Even more wasted His face was shirty with sweet But if wasn't warm in here now, if was comforther tation, it had been softing. I had felt the closeness of dead air like clituritrophobia. Christ, Lithought I was having a heart

atsack Tolacked out I fell Tigaught you. You old have a heart at n a hospital?" I select remembering how

¢ felt to be compressly holploss in the It could have been very text," Nedson. seed, agreeing my question Then what am I dono here?" I relead

demn it it was wrong I let a rush in my head, and the headsche became sharp "I took gass of it," he seed

How? 'How do you fee?' Thirve a headacho, that's al. I said 'And word to know what you did on my chase."

"Dont warry, I don't use parrent They'll ke you into a Jewish pernetery. Nathuri "I want to know what you did "I started Let 6 host for a lew days. Change the

bandage That's all And what the hell am I supposed to rule water? I reked foll week, yet it was as if thad sloughed off spretteng heavy and deadening

weather had turned unseasonably cold-I regioned that I had not seed good-bys. I had left as if in a daze. Yet I could not turn around and go back. This whole right was now and apologue and try to find out

what had really happened I draw home and it began to snow a everything blush-white luminescent. My chest began to sich under the bendage. Eddn't get home until after twolve Laura

was worned and attrious. We both swi down to talk in the untrolatered chara in



and these, the lary land of the least control of the land of the l

wheeper, "I can't believe Pu/th's gone We ware good hends you didn't know that, did you?"

"gussel claim! "After a pouse! lest," addn't fe Nathen sation me I stid you I was uncorrected. I claim fe Nathen sation me I stid you I was uncorrected. I can't how if Lest resely believed that, She hed been a nuise for Yozen years.

and this had been a muscle for fractive years.

"All for the day of the fractive years.

"All for muscles a book at what is with a sound in the first work one quest motion into 1 and the groups with a sound out the first work one quest motion into 1 and the groups was ward for the groups and curricular the first muscles when were then, measured what a view my first ward for white one or could get inducted within horizon for the curry first within a control of print first and the first measured was over of central "to use get hopeties or ALTS convolating the limited."

"No, he kept everything clicen." I said.
"Did he have an autoclave?" she asked.
"Yes, I hank he clid."
Laura word to the drawnstars bathroom.

and come back with Betadine and a clean benchings. Her fuzzy blue tethnotic was sightly open and I tell myrell becoming earthy. She wise a try women, small-

# The Artist



Not another abstraction/



I have abstractions





Did you see his expression when he realized I don't do abstractions?





busted which I liked When we fay lived tremely shy in bed, even though sheld albecame aggressive, open and frenk and

the fathor-or more precisely the webs-"Can you make anything out of the?" sixe asked meaning the marks Naman had clothes on, and we were kesting each other

beering clear and strong. After we come chest, the parade of demons and fabulous him walking off with Ruth's heart. I could

racle alop unicoms and skeleton dragons stopped. He looked as skeletal as the creatures around tim as if his life and heart It was your and sall beefing Locald

hear the demon angels shouling and

I woke up with a lot I was shaking and sweeping Although I had humed up the toward her phost in a semiletal position. All everything in the room looked shadowy blue And I let my heart pumping fast left let in the dim light of a streetamp near

saw an argel wrapped in doubly wrige

an angel such as the one Norten had but

angel, who seemed to have some of Na

picked him up, carried him to the couch

ther's frequency-bis concional case and full mouth-had spread his wings, and his perfect infant hands held out Buth's heart colon sink I feit a surging of We, as if I wore being owen a gift, and then the living imape of the tallipp deed I sharered neked in passing through the #4tting storms on the domer wordows. If was as if the chill were

passing right through me, as if I had been opened up wyde And I knew that Nathan was in trouble. cold water But I could feel Nation's pres-Twn lifet's great sachess, an oceanic great serted If had stopped snowing. The lights were on in Nathari's trailer I knocked on in Nathan was dead on the floor. His shirt was calm, his demons finally exprosed.

feel his strength and sadness and love

fluttering of engels' whois DO

rood to

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seems to fill the room. This phenomenon is crusted he picture and sound from the new Panasonic o recorder, PV-1742. In fact, it has

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ghost of a chance once you see what this VCR can do: its HO direutry enhances the image. The Tech-41

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### ACCESSING THE FUTURE

#### PACIFIC SPACEPOR

up the tower of the Cape. If picker for a force 1 to the control of the control o

Then the countdown begins, proceeding smoothly toward ignition if its your feel top aboatd the shuttle and you're not quite sure just what to expect.
But the Cape is not Cape Consistent, and the open in the thing to the copen is not the detailed to you and

Censered, and the coopins risk the Alberta You've just been safely bookled into your seet in the gapes shutter a Afferia, an indivinced arrivation version of the old NASA shuttlee, and what you're about to expression in the execution power of a findit prested by realistic simulations combined with special effects.

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special effects.
The first of a new generation of high stech theme pasks promises to sum today is quadity out modally is quadity out modally is quadity out model distertainment contest into sophisticities densorpherming on voormants. Practic Sussipation in Southern California just only flow in ordinal past just only flow in ordinal just only flow in the latest breakthroughs in acregional confirmatory. Scheduljed file open in 1982, the speciment will of 1982, the speciment will be 198



plots with shuffle and detaining sease station. Visitors will "Make of for is 30-multip indicated before the station of 100-month shure of the station of th

ptd—and tour a smusand exhibitmental environment.

The beal way to beach should he future is through development, brade or SHE Development or SHE Develo

agers by using smulated

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—Conne Zi coass Open to the pu

FIRST FEMINIST TOILET Fruity there's something

on the market designed to combat what its inventor calls one of the rations mot destardly domestic problems. That's that unterlang husband who goes to the

believen in he model of he night and historis the lader seel in the up position. Thus sendering the look a wassey that for the unexpecting, sleep belogged with who stillows. A bit of women claims revenor Cling, Janet. Ident of heat the seal when they go to the best women the model of the night. They the lin, get seet and blamb then have been and blamb then have here.

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### STARTECH

### ACCESSING THE FUTURE

### When hospital patients

pick up the telephone. They do more than reach out and truch aomeone They also leave garms on the receiver that can inject other paof intection and to save money at the same time The cheep (\$5 to \$15).

Toops, are given or sold to Our Lady of the Lake Re-Button Rouge Louisans, was n cameged or stolen phones before begoming the

switch to the disposible vanets, which it now selfs is \$2.75 MONTH TO 1:300 COtients a month Several phones and most of them

are pleased Our Lady of the Lake infections Each year 2 milion American hospital pisherts contract such winetions from stach and strep and 20 000 to 36,000 of from die according to a

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faction control at the CDC. | mutual motion. Metauthitia who cites telephones as seasons official toda infect and may carry up to

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end Warner and Polyosam have assibished a versire called The Record Group (TRG) to pome up with programming TRG plans to ittroduce 100 lifes, including Telephone 975-563 6888

CV units will include out

majorig it possible to display speriers through an ampli--- Mucone Costolio Access Avadablass 1987

cational programs and other

## What is it like to day? Have

On a short videotace nated Personal Accounts of who claim to have crossed over Into death-and m turned to tel about it

Their reports contain separation from the physical found peace Most report being priveloped by an a mother's hug to a small

he or she no longer has a

fear of don't Twee in termendous pain thety-rane year-old public-



# The digital compact disc

(CD) and music video have helped revive the record husiness. With spanes CD sales and the growing popvideos consumer-electronknown as compact video (CV), which will be capable intalk CV will rolute only



ety. The doctor declared him. good-bye to my wife Suddenly I was im-

merced in a boots liver and felt a peace greater then I had ever known From open a wardow orto another granted the view he sign can help others who fear doze

Access The 24 minute. for, is systable for rectal (\$60) wo days) in half-not in from the education departs ment of the American Jourred of Nursing Company 1-600-621-7018 (In Illinois 312-R28-11460



Fortunately, there's now a Tre Mereor condom, marytemestral affects but 6 does problems along with sive band that eitheres the trefs Liquido fast in

leakage or slapping (The uch ) in waterfacts son oreilly fluids -and therefore transmitted desector—and it's said to stay on even efter with a special 'approprie

d in being part on That the peckeging rupat a female market. We found feel thety to 8thy perchased by women " says All Marky Women say Don't

> somothing I can take to the -Judit Hooper Access. The new-and

ket in August of this year. In prevent the conception of the first space love child.

swars back Press your Europ against a temporatwo-sensitive patch on the gent for ten seconds and



you're maily fruppry. If you are amply renyous netter then metabolically in need of food the petch will turn a green through bluet indiyou're really hungry. The cent has a "powers seems conseponding to the color perch - the darker the color

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### NTERVIEW ODNITHUS FROM FROM FROM

much reddened But the is standard for batchingle abuse. And the was not the first time wed seem an empty stomeof. Life the liver, it gets used to handling the drug and passes it quickly into the small steetre. Because I couldn't find needle marks. List Bodave the drugs were assisted. Monopole liver actually find all sized of

Monoce's liver actuatly had a level of stored barbitustate three to four times that of hat blood. Yet her blood level was high enough—equivalent to about torry or fifty capacities of rigulal-strongly believing pills. For the average person, ten to 1 floor are potentially littral.

Ownit Evan so, doesn't first show that someone mystee her thinspace or nuste to misterior, mystead her with these drugs? Nagudis. This challenge has been made, and even today I don't first we can tell some sequentiate that the may have been

impacted and official, bit indiced assist for the SCAP Community of the Community of the Community of Commun

peived on syection from him hearty-four hours ghost to her death. There are many mysteries incommended that an ejection such as a grand jury of D.A.'s office eopen the case. Over With any will be observed with how

Gear may all an accommendation of Monre dell's Monre dell's Negretin Parliago this cape keeps trataming because site was one of the last are posterior and in many ways an American depart auth this knoot of our concust and many is soully about the relation to the Kornedy trathers. Et this amazing double money is soully about the relation to the Kornedy trathers. Et this amazing double money are dell'american site and accommendation accommendation and accommendation accommendation accommendation accommendation accommendation and accommendation accomm

were assessed and of the control of

number of formatis-tends seat. Policy don't move in coroner doesn't move in who's going to take over? For exempting allow a conomial rain the whole topool of the old cereativy in Vardugo Hills. Califor-

ray statute uniting. It happened to constant over a hundred boden that bested force across the state (their above to be parts and mits the higher parts and one to the higher across the state of the parts and the constant to the parts and the parts and parts the parts and the parts and the justaclose by calling a country lawyer. I said "Fingals", I am pain! I was the linst critise scare to represent a governmental amoney and I cannot be soldie works.

justidación by calling a country lakeyir 1 soci. Trogat c. I um gargi 1 lives the first on the scane to represent a governmental agency and i contend the public world. heavy buildours in Those bodies poses a health haused. So we moved. The Verdugo Hilliagenson I had dispersion in a food and food been briefled calling wit in cadeles. Those bodies changed to a similar seaffilike consideracy fact orders.

on aimost sospilak consistency that testes decay. The outpress looked more like that not copy the outpress looked more like that Adoptions, as the called, happens when a contigenation of monitors and highly afraline got sects with this success or did the popular consistency. Deen: thus ay an investigator insisting themsite and electrical but you often do pressite consistency.

Most murders
are committed by amaleurs
There is
no university degree in

how to commit murder. There is no standard

test. And you cannot easily practice ?

exertions sportled in free confect. Negotia has a "war right in all the program is a "war right in a stage was "Table ne personal in the surface. For oil accordit but, was closed in or come a lay shalpped from a sopremer. In all the program is a surface of the come and the surface of the come and the company of the come and the come and the come of the come of

the assistent had to get out of the stuck to shoot her—it was an execution-type shooting. He badgarite allowed us to cathhim. If it wasted to do the autopsy facelpints angulic have disappeared. Great When you autopsical Robert Kernady you bogget at the time is first a bodiing down procedure applied byte body?

Nogach Existly I am very concerned with gating too close to the cased body—one may lose the ownail grazo. I chose to by get the RFK autopay from the toe to make sure I don't overtook anything I don't work.

to be influenced by the injury alone I was under great passauro. The more the passauro. The more the passauro, the more than and that is a style a medical detached should have. The isonator had three gunshot wounds—a head wound belind his right ear and fixe through the right armpt. If

The scrator had three gurshold would — head wound being hed wound being he sound being he seemed he sound being he seemed he because the secrator of the secrator of the shooting the gunthowound to the head wouldn't for the much except from close the section to resolve the book where the book would be seen We must enterwhat the book constantly moving, with arms expressly changing position. When you exact must book, it's in a horizontal sales so I had for

here been We mad mormatic the Body consistent moves, with All sections to consistent moves, with All sections to body, it in a honorand state to I had to preparately well extend by place the body or a signification with a build prefetched the state, it is not been a supplication of the state, it is supplicated to the build but the would to the smealer a serricly state that a sum these objects through the state or a to lead to be smealer as early of the same them to be smealer as early of the same them to be smealer as early of the same them to be smealer to consider the same than the same to the same than the same of the build comment. The secretification of the build comment the secretification of the build comment the secretification of the build comment the secretification of the build comment. The secretification of the build comment the secretification of the build comment the secretification of the build comment. The secretification of the build comment the secretification of the build comment the secretification of the build comtant the secretification of the build comtain the sec

probable that the feed wound was the text one, and filler's taked this arthr effect, in a prefetcive maction. The projection of shots hash to been abrobately established, but that's my operion. We know that the three gunelos wounds worn at claser sample. I had my staff com-

were at close region. This in the fact of membral is alwarss of the energy's head of contents and the contents are always and the contents and the contents are always are always and the contents are always and the contents are always are always and the contents are always are always and the contents are always are al

When I testled before the grand say, the deputy DA asal. "You meet these heet?" I said. "No three scheet." And the said. "If you made a matake you can still charge it." But I said (buyles). "You not open to charge it." Own: Who made the PEK Investigation.

such specialize for future political deaths? Negatis, it was ecosphornelly complete, and there were official characters. The exsummation of his clothing, especially the removed of this of their for tening ports to the surgery was not than typical. To recruich the sequence of events of his strading, we needed expert sourmation from many

son of relevant physical evidence Orasi. How do faminiac scientists differ from other report 657



songities, but we are temperamentally closely with police junes, and lawyers. Also





mor is a safety valve for us. Because of the construer of being surrounded by dead

Naguchi The public expects unusual par

mediors in a different vein. Greek Do you see forensic spience and Noguciy I do I think my style is unique

Fach excus anewsproprieroe I someons torns as a vesual art. At the death scene I

probably see the same things professions or detectives see I'm rist only spring I'm recognizing and pulling factors together

Oreny. Your style seems to balance an Nocucity I try to recompliativem Part of the

my Buddhis upbringing In Japan death is

amoration although most of my staff document speak for harself is one of my taxonte expressors I reposit it to resident patrolthe evidence together you compale a systema The server of serturous becomes the statement of the deceased-

Running mentionalism is the movement kat scane of the cowboy move—after the able materics—fragments of the last scarre movie. We kind of roll the projector back-

Own is the madia nation of the loatife of the briefled Mans, in court teramony happy or resity?

Negachi We want so emotored. We sostand that if you are a professorial woneet your partier sell go badly I greatly

respected the late Kerth Empson Namous several bid cassis, including Martin Monthe opposite with Roberto Calvi where I

Omer Would you go into that 1981 case? harder for the Vatinan. He tose to prominance through special political connectrans including Michele Sindons and his underworld associates Waster before Calvi ded, four hundred million dollars disacpeased He fied to London and shortly

tran's Endage on the Thermos about seven AM He was last peen alive about eleven rs, the right belone Calvi's clothes were submorped in water at one time or another High tide was about two-lifty and fact when

As the first conorer's inquest, Simpson who conducted the riskal autopsy, said that the sury rendered an open verdict, meen-

Ower Didn't you mapped that he could how here provide post out not lolled by Noguchy These are many compoundswhich in the public interpol I'm selection the GCMS can I lafrom the secont from I

strong muscle released betremely difficult to trace Some hallucirpoens, you see motabo-

on Indire the metabolites that knoor for Omni You've considered many pages with

Naguety I hope this isn't common but in the many cases are find a gitter. Through





#### **OMNI** TIME CAPSULES



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As I see if the subcal maters—with its development of forensic science. Thesiscal display has its place in court but overnases Jack Ruby, the murdator of Loe The informative Healthiri Catalog shows yn Bult a very powerful dramatic attorrespected Even F Lee Baltry has had some

agancies have a hemendous stake in conclain And bungling and dietomor of ov-

wars are not colorful but you very systemence afters the countrion freetrical dis-Organ Why is 4 that providens accounts

Nosuch: The human brain has a remarkable rejectivity and subsectivity Lefs say

bened image. Vital, testimony is very sub-

Ones: Asp come patterns and parcers ages in L.A. different from those of other mapy case,9

Neguchy L.A. County had lifty five thousand people de n 1966 of from en ryfrom other come L.A. now leads in the heavy use of strrularts, and we are now

changing the design of the drug has been And there are certain unique ressors.

why the I. A. churc problem continues. Holpecasily marks. With a hit film or record comes great preside glamour wasththe negative knile cust?

Nonuchi Krife wounds are frustrating becharacteristics (but I thought maybe we excellent opportunity to make a negotian

chmensional picture-not really good iguates at the temperature of boding water

Own Will Imporparing be supersocked by

use common sprice Most terroristing to ma. rapp.......a fusion of periotic and psychologzeton as part of the identification organism tonin may tell us much about the

psychology of the dead person. Wave been conducting "psychological" autopsess for twenty-live years-let's acid near And there is an absolutely luturation school-like something out of Dick Tracy. This is the concept of the roles as a photo-

vise is scary—the "ast made as an elec-



computercial tomography we can rouse the CAT marting for an image of the brain Going further, we could key in an image from the ways) center of the occapital area away completaly

We need a whole battery of electronic and homedical impreses. They would as bruses, contingers, and bone freetures. The applications are widespread as the Chelionger desister to the specific common of a hopero-grane death. There death. I would also like to develop the softing possible evidence at a crime scene I don't want to wart days or weeks for lab senorts. I want to tap into a warehouse of weggons so I can make spot tests note:

remember the details of all cases in the Extras a specific harpoon stype one with a hit of a fall. I'vi like to know what ensingthey encount of an unforepain instrument to those of many thousands of other available

Own. What do you their will be the role of Noguchi Corrotehenswe medical-legal rwintington will become an integral part lwing-wolfers of rape and nonlater chief

medical core in preson. Or suppose a bulmendant is awaiting this Because the butlet carnot be removed, its stretions carnot barrel Techniques do exet to alontify this build while its still in the victims books but

forma hopes to establish a program lead-Anyt the rulband of death should be contin-The American hadition of whitewash eulogies, of letting sleeping dogs lie, oil not from death. And because these death every are proposed over and over squar... Const Whee do you think of Quincy? Was the TV show really modeled on you? Noquote, Jack Rugman asked me to en-

dorse the production I provided all the synthion is accurate though highly dismatered, with many episodes being comus many months. I like Quincy because it

Owey As a payeter haven typuthed forender the insulance of your expenence? Noguchi I'm interested in giving artistic representation to the create science Most

the colors of death as gray dark green, or have I see starte energy and use siterms odors-mostly red, onships-worm colors I've been asked if I ballove in restsalon of the spec from the body at death

Once Why is the perfect ones so difficult Negative Aiditor usually chooses the most construction method, one that box into his upbergro. You set carnot revierbally

55 whether the trout write for Lawron or the wated with its cumbolic mensage, for solvative no trace. These is always an excharge—oi, soi fiber it takes a reeky sharp intellect to handle the well. And dis pessed of the body is a very great problem. corrected in a hurry I can Propretically so much about how it can be detected. amazous. Thereigh no university decires in

The medical measures should meeter a Ones Please controls Newarth I rest my case Prunel Web clear seporte cumouter. The days when any Most orings are still committed by a perone with experience in handling dead son known to have something to garn, eaproxity revenge by the letting. From mo-

are from where the later seems to have no personal connection to the value - the nameless, serselos killing is very difficult. I believe however some murderer will soon start to use very sophisticated seriole inmit the pertect murder And Two been soled many many times. (Pause) One could make remaint a natural event, the

tack was induced DO

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counseling centers, these new thorapsis viplence more rapidly and less expen swely than male psychiatrists. The new categories she says are part of an eltempt to we back business had to the pay-

in the tace of ordica like Waker psychigrean official status Instead they'd be letted in an appendix to DSM, a reference usily aroused by furtacies of rape conbuests they existed out the last, vent grained eranges to homose-unity. And they made as for example was promely pailed mas

name for PMS would henceforth be the tongue numberg pentuteal phase dys The chief advantage of the new name according to Spitell was again a matter of current baltion. It doesn't invoke in

ages of menshuston," he says. And magochism-chwis peccés up the wall because But Science stood firm on other mause He saws Walker's allegation that the rowsions were an attempt by psychiatrets to

ensering cross courseling century for short Walter now tave she is pleased at the deletion of the last references to homowork

mystyphe's eyes by clarreng there's a dedare relegated to the appendix in this ediname charges she says are cosmolic versy will go away in any form they will be perorative to worrers These may be other alterations before the

In the middle of these swring currents

had nothing to do with trendy syndromes ders. He says its just something I picked up in the parden "Spaper says DO

## J&B PRESENTS THE TELEPHONE CRYPT

In wartime and in peace, man have sought to find ways. to send messages in private,

To make the meaning per-

phone-dial, with each number

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landy (predictability) of English

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Look for the solution to this page



### GAMES By Scot Morris

Gove readers continue to ameze up Last steplates replantally is lactor

solution to a century-old classic. Then

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heatht of a tail building, using a barom













solutions" the easters said "Take the then measure the length of the spee." The

and "You could be by the byttmiler over

the height of the building

basement of the burding, find the superintendent, and say. 'Sr, I have this very fine becometer have which iff give to you if you'll fell how tall this burding is." The wildry illustrates the lost and of lases thelenging, our mose simply the above, to look at flungs in new ways. The buty

to look at things in new ways. The bully coatake timed with thesis by highlight modes of the lang. How creative any post cheeses of the lang. How creative and post to try to had more ways to measure things the coatagle of by our lang to the case an officiary width has a compact? Four that had allooky boward the sunpack at the many lang to the sunpack at the many of the case the basis at the angle formed boward.

arrigle points chacity south.

Now if a your turn to answer our vanishor on the baronister operation. High do you use a watch that describ woll to help you tell this time? Don't peek yet.

FROM LIGHT-INCH TO MELLHELLIN
In The Lithmase Spit of the Second
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using buth mende unto as the screep one with black (IO\*\*) of a second Admovia new to resiste a split second to use and the second admovia new side, were to vessible applit second ours puch series as the light role (The time of takes light to travella mile of obout, 1986, DOD record) and the light solverer (about 1980 ours) accord). He defined the "Usingte split of the second" as the light skins, the time

required for a ray of light to basel from one end of a proton to the other—the time required for the fastest known motion to cover the smallest tengole discarde.

Creative timiters have also devised ways to message temperature by leaseing

from the rate of its rad clicks. Characts chirp at a rate that is directly proportional to the temperature. By counting the number of chirps every 16 seconds and adding 40, you can calcutree the temperature within two documes Entwertee it. you've ribing on Feditional harboat tracks: (98 leef brig) you can meesure your screed in miles per hour by coursing the number of nel clocks every 25% seconds. White these everytes these or upon week to meesure colonary matters other forms are less senous. The methodes, for everyte, modeuses the arrount of

using trains of toy as the paradigm of lemite beauty.
Solamon Golomb in Johns Flapking.
Mogazine decaded that if micro-imegaone millionth (10-1) and mega-imeans thillion (107) their to' microphonose we equal one megaphone. Similarly, 107.

poolso make one graph QMZ Polso Colombis "Megameraings" to their regional conclusions and find following operations in 1 to independe 2.2 × 10" millioned — I bearby or 4 what? 3.2 000 moderagleship 4.10 cards 5. Windowly 6. 10" fail? 3 indicased 8. 453 digathers crackers 9. What unit do Globallo propose for missioning the Globallo propose for missioning the 1.00 of the propose for the propose for the propose for the 1.00 of the propose for the propose for the 1.00 of the propose for the propose for the propose for the 1.00 of the propose for the propose for the propose for the 1.00 of the propose for the propose for

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ania commemorative T-shirts appear 75 up. Covers of weakly newsmags arrest, network speciels, "instant

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Send Crisva position than two corporal world to measure somether

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\* It was so could it was all the way down 
to Celeus."—Tarther Gweld Serbuco. 
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201 will recomme the sused one open 
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Plasse send rat a free copy of 1.5s Maxsery of Life 1 was macerely ensessand. Name:

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### CHIPS

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a discovery!

In these also big surpreser from tide not. The works, White about a law discasion down to the control of the con

knowhow it works any botter from welender how the brian works Such incorutable machines are a long way off But current networks are shearly

way off this current retroche on minus, showing they can do new work. Nestor line, a start-up company in Proidence Rhoota Island will probably to the test to marked a nourse net machine. Notton founded by two Brown to Netholic live. Challens (Bourn-net) Nobel live.

mais Lean Corpor, were public in 1960 and expects to begin saling as that product this year. It forms entity require insteads program that can read hand printed letters of the appropriate and learn the designouses of anyoniss type. A production of anyoniss type. A production of Days Schools and programs computes. Chris Schools and programs de-

Ches Sodeled manager of systems design supothermocher replace abortputs relycount for contain applications. An insurance agent, he says could use it to till out his policy forms by hand without having to use his relycond to pump a computer current from box to box line for his decision, and—a measuring all present

digitating pole- contentions believing device—index the paper would bill the computer what shapes the sperit protod on the form and the nativorus outdood obtain which leakes the shapes represented. The system establishes as own rules " onthe Sootheid "t distantances what it needs to discovered the base pottorna". At THAI this is through Calendo Artificial.

Inteligence Daries noth of the Deeps, Rebeat Holder Neibere and cellsaque fight burt time Mark 18 Insuraccomputer, is \$33,000 help-speed refework insuralizationagnatio speed up network research. The company is cuestify marketing the michine as a received marketing the michine as a received marketing the mifect Neiberson a statistics. Mora from, he step, well allow chapper speech recceptation and opportunity and the proception and opportunity speech re-

he styr, wil alow chotype spectracy cynden and synthesis systems, and those will strong in less separated products. "I'm not predicting that bacters will have their but they might. Certainly computes will. That will probably be the ubliquitus inteface between humans and computess." He

predicts that by the Nanakas most computers will be half search, half neural, and so well blanded we work be able to sail the difference. Users need both, he says "If you're an estimater you don't want a neural network computing your orbit to Mans because you may not write;"

case you may not ether.

He won't say much about TRW's red,
generation noutel net system. The machine, the Mark IV is hush-such stuff peel
for by the President's Debress Advanced
Research Projects Agency Now undergong teeing and debugging, the system cain.

rance retrocts and 5 5 million transconnection elements and 5 5 million transconnection Ha worst discuss what the military plans do with it But there are obvious reasons for the Percaporis interest. So much of what a

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Flashat shows me one such mage a 9-62—not set a big but the bomber, engines and all his needed 12st defenset toder were to get the mage. That takes time And no one wents to dawdle with a bomber heading his way. This solution paye listhat, may bo neural.

This adultion days final, may be missed in embedies and fair associative minranes. With your a live glance by the radar gathers, say, 20 percent of a Stagets emogram, his experimental system can not organize the beating the stagets are series of the second provides enough information to connect the second provides enough information to accuration by minranes that is a series of the second provides are series of the second provides and the second provides are series of the second provides and second provides are series of the second provides and second provides are series of the second provides and second provides are series as the second provides and second provides and second provides are series as the second provides and second provides and second provides and second provides are second provides and second provid

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works] are really billing us something or Podde professor of computational vision at MIT colls neural net research a fact Heception days by says "I think more things

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Birk of gorna DO MINOLTA BINOCULARS WE SEE TO ALL THE DETAILS SO YOU'LL SEE ALL THE DETAILS There's samething enade every pair of our breakulers that's also incide every

any benefators that can magnify a subject up to 16 times able to overlook. Rimonators confled by Missolla are much







By Mitch Coleman

Mann pioneered the field Kits, and knothole sobs.

Harold Marin was nevious. As he unwound the lest yard of gauge

Marks slubbed out he last expand to of