SPACE: NASA'S NEXT STEPS TOWARD THE STARS





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FIRST

By Parmila McCorduck

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HRROOH HEROL

DREARIN ROMES

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And in the pictorial. On the Wings of Wind' (page 44) Hern Werk of Frances Aerospice Research institute exposes the institute world of oblies and seens

Finally, this month's florten inclusion Gauge Baarin Tangents: (page 40), about a toenties tampening with the bourt dimension. Deers last Ornor stary. "Deal Pair (April 1985) will be sered on CBS's Twight Zone this year. And Daan Jug seres a high Nech year about a size car driver in Starn and the Barussi Tenzen ("page 100 DD

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Cometa and isstances could bring on the spocalypse. But according to Lew Aler: director of the prestiguous Jat Propution and Laboratory in Placeborn Cald kinets how obtained the intervent of the social intervent provides and the intervent of the social social set with the intervent of the social set of the social set of the intervent of the placeborn system and then calculate places into a set of the social set of the social placeborn system and then calculate places by obtained to the social set of the placeborn system and then calculate places by obtained to the social set of the placeborn system and the calculates by obtained the social set of the placeborn system and the calculates by obtained the social set of the calculates by obtained the social set of the social board of the world will be calculated. Notice that the social set of the calculates that obtained with the places bit of the social set of the social with the places bit of the social set of the social with the places bit of the social of the social of the world will be places bit of the social set of the social of the s

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Thomfon is committed to the study of life in apsice in 1Mmd Managese² (page 74) authors Judith Horper and Dick Toros take to on an importance if fouch the partner





has shot of Conset West is post one of the many spectracility observations you'll every in Solen Sectors. Solar System is also hill all specially commissioned or Lineading the percent of Farrow a shared surface overlocking lateful

DISCOVER ALL THAT HALLEY MISSED.

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The webset of Ther Lart Boots proves Solar System a boot that will be always on a boatschaft by pursuing har beyond the seaches of your uncompation. Full of exclusive object phylographic and apocnity commescend art, <u>Boltz System</u> will show you many sights pursue neares areas halons, and Holdoy never directed at, inclusing the incredible batth and probable death of our own plantet.

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COMMUNIC/ATIONS

Wind

DUND

TA Hispanitements column on wind alrengy [Earth, October 1985] contered many ports that I consider remonicus Desprie its small scale. Here is nothing mappit about wind simply Wind learns have gone from producing 10.000 kilowathbacers in 1881 to 650 milliow leavest hours in 1965, prough to most the resolution

While the costs of nuclear power—the most heavily subscized of all energy sources—are going up those of wind analysise steadily docreasing as the technology becomes bother understood

As for the nose oneeled by wind larms, I find a difficult to hear wind lartenes in operation from a distance of nose than a spartier of a mile. Which environment than conventional energy sources—a a new and personal groupy sources—b a new and personal groupy sources—b a new and personal distance b politiontice onegy source that is destined to benefit al Americane.

Thomas O Gray Executive Dreator American Wind Energy Association Alexandria VR

Kidde Burnout

This situal first time I have ever agreed with or Bongerny U. Spook. He article Yold and Superiedd' [Mind. October 1665] was right on this batton. I have teit for some time that many young ortholicin are boing pushed too head another work times and success.

I decided that it was a little too much when my connection grader was being tooght stiggtons linat in the playtime, and hed only 20 minutes for lunch. I translimited her to annal school, where strewasht under an much prosears. There is since been a wable change in her dataud. Shifa leas nervous much happen, yet all bees nood grades.

The soil resons behind the push for fast track achieving are peterts, isochers, and administators who are pumping up that agait and packling their resumes—at the expanse of the children Deephi W Elian

Dwight W Elkin Katy TX

It's Elementary

Omn's owenth annwarsary issue neglicited in opportunity to cite another important seven the assumnyear oild child—end all the other children—who attend olamantary schools (as well as nursery schools and diay-care tuchtise)

I was about not is include elementary enclose was used of 77 behapsed the survey invitant of Casses of Dama. Outber 1983, the panel of 26 lostin guintet and average included a two the world of elementary of cassion the mast anisosality abnormal level in encourse Bowers pre-indexpans in and capitar Bowers pre-indexpans in and capitar Bowers pre-indexpans and capitar Bowers pre-indexpans and capitar Data to the capitary of cassion the mast and calling occursed.

On Cataber 3, 1985 U.B. Secretary of Educator William J. Bornet disky shed the assistemic year as the Year of the Elementary School, and the appointe a 24 member shafy group on elementary education of which an plaqued to be a member We must all begin to view the level of activating as a continuum and not as a hardronly. We must allow noopside the signature for all serving and which can poinde models for improving activation for all levels

Alian Shactim, Jr Executive Director Elementary School Center New York

Editors inde 34% agrees that the emportance of elementary exclusion has long basis underweitering exclusion has long basis inderweitering exclusion has been been of some of the host of the course of each measurement. A sum of the inderweitering exclusion has been been the inderweiter of the end of the exclusion been deployed and and the exclusion table server last femelar with the pertramance measurement of the end of the end

DIALOGUE

FORUM

Omni welcomes speculation, theorem Associates at this opera forsize. We waste your kind of micrimal dialogue (that provolage

Celestal Salvaton-or Suicide? (Sectember 1995) according meaty The American taxoner could be saved the made a simple declaration to the USSR

The only way to pay for Jastrow's proposed Shitegic Defense Initiative (SDR) is to know the presses reling at the terrebusinesses. Refusal of a first sinke would relax and would spare present and future perientitions of American taxpavata a

Robert Jastrow's Unique inleight clearly qualifies him as an expert on the Stratage journalism about size wars over published

the same as theirs the elimination of nuclear weapons SDI holds the promate of melong critics claim-star wars is so unworkable. Evidence indicates that the USSR has been conducting its own antestell to weapons position of strength, which is the only stance the leaders of that country understand 14 CARL

Poon John Paul II warned that review path of global distruction. The Sovers meenwhile have thad to off him

We the people of the United States in

I appreciate Jestrow's credentals, and my

Jastrow should be throwing the weacht of baland defusing the threat of global conflict not promoting if New Joys of desmachan a highly influential individual tailing us that

depth of understanding of our already Batty Paterson

As a scientist, I am appalled by the kind of the obligation of technically identite people 30 be haped with the postectional mining Otherwise the public will eventually uncover

only a few buds worked out before they fact is that most of them exist only as computer models or an amail laboratory divelopment time costs and performance

a snap to solve in reality the portouter problem can be seen in today's space shulfes which-despite their soprestication and theouent use-are not immune to completely tosfed except in an actual

research on messle defense the state of

Undoubtedly the human race is at a crossroads. Now is the time-once and for is an act of war but rather as an act of terronam or as some miversible metake

to take? How do we eliminate our present. defense system without becaming

I propose that we develop the Brasegio Defonse initiative in partnership with the Soviet Union. Working acto by sale we

What befor barcement chip could are Perhaps such a perhership would lend itself to further collaboration in such tields as medicine, whereby we could perpetuate life instance of threatening to destroy if

us One never knows-SDI may someday protect us from alien species bent pri

Derard Hill, FWDC

EXECUTIVE MURDER

EARTH

By Richard Levine

tefan Golab, a soty one year old Polsh mmgsart was one of a corps of aliens working in "the overside data which billowed up to burn the ees as they labored over 140 large uncovared vets. Each we was filled with 1,000

On February 10, 1963 Goleb autiened an carteen A police officer arriving on the noted that the almond scent of override

Many of Golab's co-workars suffered the same chronic symptoms exhibited by Goldo before his charaetic colleges - ckro-They know that work in the room was making

After Golabis death, a Cock County Illnos, grand jury charged Film Recovery that lasted from April 15 to June 14, 1965 Judge Banks sentenced each of the men-Seven J. ONtel, former president (Durins, Rochques, plant foreman-lo 25 years

the prosecutors for the state of limors. executives have been found guity of murcles and other law enforcement officials lowof Illinois is already prosecuting another worker-salety case. And other states and cute executives who creete work condi-

could on the adequacy of worker-safety

Hazandbus ohemicals can harro or even kill aninformed workass on the factory face 15 CMN

The mater problem, say prosed does like Monousian is the lack of stoneset estonesets right to know laws requiring employers to inform workers of historica on the rab.

Block in 1980, just before he left office. Previolant Jammy Carter tred to push through such a law But his effort was starmed by lobbyists for the Chemical Manufacturers Association (CMA) Then, when Fionald next year he also stripped CSHA of its kwy significant fines, or assess the

By 1982, in an effort to offset Reanantia some 24 states passed local noi10-tointo diserray A menufacturer shippeno to say len different states had to comply with tan different sets of standards for peckaging shipping and transporting By 1962 the cost and administrative brande and Congress for a federal right to know

new Hezard Communication Standard took effect last fall. That standard prevents turing executives with "primary responsibleity for distermining what points a workplace hazard. Moreover, because only manufacturars not employers who simply

A Washington D C -based organization Group has recently prived some 15 state culors to follow the lead of those in linois. laking executives to certain orbit. Federal low obes permit criminal prosecution when an amployer has will us disregarcied sorker protection and clouth results CO



NEW WORLD MUMMIES



By Bill Lawren

I danted as a simple construction project but ended as an unexpected try into a dam contrain of the human pilet. In 1983 a when concerny in the nothers: Childran forward have begins building a new peetre model is uncover to adjustment to its devertioner property. But as the consorry coll a uncover of assisting first in the memory of an existing they preserved 8000-yearaid marring.

Three years loss cancel analyse of the marror—and the 100 three eventsally loads at the same site—two challenges or the same site—two challenges of endowing to associations were only trajely allocate california were only trajely allocate california were only trajely allocate california were analysis of the same same were properties on by a contrakted, unanchicate like the Arca same same properties on by a contrakted. Unanchicate the like the Arca same same properties on the same logoport or these, but by simple allo Charching the same of the contrakted when the same term same properties on the same she concertors.

As the set in concerned, tays Marvin Ahaor, the University of Tarapase aethropologist who analyzed the Ance mummes the discoursey is evidence that statecraft and mummetaaten dan't receivering op hand in hand......

The Conclove output test cares to give the decovered a small provide the the Use decovered a small provide the test output with the marmers. Use decovered board with the marmers. Use decovered a cubara of thermers and was non-busites who lead along the coast in small, closely the test provide the test of the test field the test of the test of the test of the test provide the test of the Checklero shall the test of the decover of the decover build, and calmitated del marmer back document to the test of the del marmer back document to the test of test of the test of the test of the test of test of

by the drying action of the hot send. But an equally subdard number had been carefully feasibility feasibility to be the ergins had been navoud, the bucksis had been rebuilt with ort and vegatable matility, and the preserved sign had been servir tarify over the mating. Facus were histor covered with hinghly particulation of the covered with hinghly particulation of the covered with with hinghly particulation of the covered with vegatable.

The Egyptians, Alivers known hwd organiaed agnocialaus oo chinawawy hut at a pirople could have encludin lood year osacon. Thus they had the inaxes take to animi the at ansi scapnor of entoiming But it to contain. Thus the optimiser accounts like the Chinchron typically spant aimsof all their working hard how their add the osacoling for flood How their add the osacoling for flood How their add the osacoling for size and animates?

The answer, Alison discribid, lay in the Chinchoro's forfulfous location on the Childen coast "The area was—and still is—incredibly nch in sealood " he says. In



Digging for the roots of ecubarisment.

an hour the Charchorro could probably get all the food they needed for an entre day in that sense the concludes, abundance took the place of statecraft

Were jummo objects investor dearges with Alleroth behavior that most investor galvater sociales lacked leaves three Bethy Rogers, a cultural and soprograph of the Smithernen lockture, exploring the fire gald beth culture of were whigh Investgald beth culture of were whigh Investgald and the other were whigh Investgald and the table of the work whigh Dearge and the solution of the social work Sogifier in the neilab sogifier where we a social which is obtained on memory a social which is obtained on memory a social where is obtained on memory as a social where is obtained on memory memory and and other were were

Allian Typohesson's tail the selective meminication whitecail the Christenson memory Some monotos of the labor were batter holmmen than orbits When those advatalial deal they were minipical powert would be provided the Egiptemes whitee maximization process process whitee maximization process make maximization process the selection make maximization process the selection process whitee batter holes of the selection of the home.

Alisen also typothesizes that multimetic of women and children were prepared to loop their survivoni company. "In all primitive sociates if the explans." The family usit was what if a man level adrine he would never survive. By mummilying the women and children in the the ensured this own will being."

Interestingly, Blogh, by 4 000 nc, the Cherchronis customs had changed. They no bright actives will elistower murmices from Indead they baned than dead along with such items as pols food and weapons flat might be masked in the alterwards "They bogen thinking in terms of the dead person, instead of these left behind, essative Alleon.

Nore research is needed to batter understand the reasons for the Chancinon's changing black Fatasi iscoswiferer may help provide answers. There are hundheds more marrines builed accurd Arica realiting to be uncovered. I wave Allows DO LAST FLIGHTS



By James and Alcests Oberc

in space? The casualities of the United in the tracic Apollo 13 fire in 1967 NASAH engineers take every possible preparation to

Death staks its victim differently in space the vacuum of space cleach would come

would break resulting in branes. But not explode Human skin is farly lough

I deeth occurred near the poles of the moon or Mars of ru deep space beyond the

Its unitably that a space traveler would

three commands lost their lives when an command module papped apen Wiftin one minute their precious cabin air was Vaclim Volkov, and Wiktor Patsaveve clied in

An even more temple form of extrator sistrail chieft is from reportant to later fares that own of up to 1000 race. (A body the "sale" level of exposure over person could be exposed to the radiation

collapse in the lower samples, people who dikin't die of dehydralion and emporeton



Space deally sweaps due and se in zero of

from carbon closide poteoring. In a large space station, it mont take days for the cas to reach lefted levels. In a small spacecraft,

If the air system pumped in ust 3 percent carbon dowde the breathing rate of the have touble hearing. As the levels began to dizzy and become neuseated. When the levels reached 6 percent, the crew members vouid become mentally continued unable

Of paupies there are other more terrelar The heaters could fail and spacefarers could can-and do-break out onboard and crew members could easily die from birns

As to the gruesome task of demosing of the bodies people would choose those build methods with which they re most the corpose to Earth for a traditional bunal SPACETOME

Järgery 22 Chollorane burgh stated commander Michael J Smith plot Judith MoNar mission specialists, Gregory Jarvis, previced episoalist and specificity perfor-

January 24. Voyager 2 will come within

January 30. Voyager 1 will be 2 409 000 000 miles from Earth and 2 391,000 000 miles from the sun DO

From Proseering Space Living on the Next



THE ARTS

By Philip J. Hits

Receipt publishes were expectely associated to come lised in history a transpose ware libre wars only acuto of inguistant for gama-trained, southore books. To choose our armuel survey of the years back, we spiked integers in various fields of science what they read clump 1985.

Simp solarnes were recommended. Theretoe (Sect: Book), by beet earling suffer and opported sources. In Advancespeed, the Advancespeed Compared accepted books and and and advances the books at the in an analysis of the Advances Demonse provided Long Ladvances. A suffer permanet provided Long Ladvances devided of Formitals. This is book the motification of mouscel, mathymotical imagical, and appendix to people who lowed is any Mark Insert forget (Ladvid).

Anothin happanity recommanded book is The Remergers Smith (Norton) a collection of Harvard biologist Stephen Jay Gould's latest easays The chapter ties alone suggest the playful but stiful motil of Bould's subject matter. The Freesang of Next, "Of Wapp and WARPs" and Maams Next, among others The Flamappia Strate of the base collution year from Could' says Marin Gescher Soenahr American's columnal enteries. "As he goes on he seems to have masteriad the form and yait odds better and better

Pediter singlate character of besierce is Reliad P Feynman, the physical Netabali. Over the years both coeffields and journale minimum of the start of the physical minimum of the start of the start of the Peynman's provision of the start base with writer Regis Leighton: the the Neura-Neing Mr. Reportant's (Haritat) Neura-Neing Mr. Reportant's (Haritat)

One of the more somber backs of the year is Catherine Cautelots in the Apriloiss (Knoch), which details the destruction



Computer enhanced photo of Halley's Corrior. This cestres visitor arrived early at bookstores 21. 0441

now being place in the torest that guide our planet. E. O. Wilson Harverd is controversal socicleologist has been studying the peoplem and says. This is the best moent report on trapeaul deterestation is subject that is quality coming to the top in public vesticity.

Smaller-built for desenter - part to the on the subject of Quest for the Alian (Bri-Rouser) by Indonen June Geodelei Data La Ledinage Nace Laureau and the Dist Aliana La Cartering Nace Laureau to the Dist ments the company water of medical meets the company in adults to the Dist densits Geodeleis four years of medical messed in their Thad World and it occursts of the take, such one descriping a differ ent country and descare

Where the facts of human behavior must be strogeneous, there is another evideaning proceasive book. Kathy Kontonia Worthan of Stronove with Nicone Basken (St. Martin Marrel). The book explores the available to worthan in the luture. The National Institute of Mental Health Carococe Petit Insta Worthan of Stronove to be an interesting colorige parts speculation part lack about must and previous things.

The question of which books to reach book the return of Hakey Commit was enswered for us by Baphen Eckaeg. The oppondence of a retrack observation of the International Hakey Waich At the log of this lat a Come Hakey. Cross of 2 Address (American Chermotal Society) by Merk Litimarin and Draid X Names This apport throat The New York Trees Guide to the Return of Hakey Sci (Times) Books (CM)



MESSENGERS OF THE GODS

It is an each here (Ith). For those who will be the multiple expensionally observed (MPC). It is an at their boate and minds have been maded as they shill from one detruct ago stells of expension and the preservally prevently welfing in the wings examines for prevently prevently welfing in the wings examines the lowest postcore on taking, where the object of presist avoid the prevent prevent on taking where the object of preresponse to the second of postcore preent and the prevent power to each ago the second taken the Development of the prevent of the second taken the Development of the prevent of the second taken the Development of the prevent of the second taken the Development of the prevent of the presecond taken the Development of the prevent of the presecond taken the Development of the prevent of the presecond taken the Development of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the pretection of the prevent of the prevent of the prevent of the pretection of the prevent of

In the likesplant (the month back exacts, and part of part most occurring the barren was of the Googna an MPD select but M. M. Googna env not be that unuality and MPD may not but and addret we wan certificate the to in task; assist of mihare in any Equation (Them's e paths of them on them's any Equation (Them's barren to the select of the one of the paths of the select the mean selection of table one of the paths of the selection of the one of the selection of the one of the selection of the operating the selection of the operating the barren theory.

Contany free has been undernote explores in the field beenst professional pointel have denote of dentide term susses to MED, and a new organization, the intermetional Society of the baye of budge the foremarks, had is accord rational meeting in Checko bit pairs Dictorier. This going is memory provides a compose, servery the returning bits or adoptionships in confict rates as notoexploy weapond MID? And were un the nome acable discretion out is soon it memory landows and weapond weapond servers in the source memory and and the rates of the source of the source memory and acable discretion and us soon its memory the meticanal body weapond weapond been source on the source memory and body weapond and the source of the source memory and the source of the meticanal source of the source of the meticanal body weapond and the source of the source of the meticanal body weapond and the source of the source of the meticanal body weapond and the source of the source of the meticanal body weapond and the source of the source of the meticanal body weapond and the source of the source of the meticanal body weapond and the source of the source of the meticanal body weapond and the source of the source of the meticanal body weapond and the source of the source of the meticanal body weapond and the source of the source of the meticanal body weapond and the source of the source of the meticanal body weapond and the source of the source of the meticanal body weapond and the source of the source of

Working pleachases beautian to the involved taken a twink what a single portional halo is a testisment, engliqued by a diang multiple of design obtained testisment and the single single and single single bits built on the sectors. The number of desiration observed Britismy, as any all patient of physiotypical resonant a validad Britismy, as any all patient of physiotypical resonant headholds vary as multiple change peaks Britism and Britismy, as provide the research price heads for

Bender O'Repar, vois president for research at the institute for Notice Sciences, which funds conferences on MPD, belawas mulpiles provide fettile ground for majory into the nature of the self. "The whole issue of mendfloody plasticity" rays O'Repar, "seems social to undergo a major reformulation 4 what we learn from multpits is developed in clinical and research terms." Psychothosipat Armatid Diffete, of New Hork City, who has treated several cases, concurs. Suddens, multiples are here in runtbers, Mo messengets of the gods who can skip us exist selected in our sowethe policiestandem of bran and body."

Cince nogrito be mousely along distanchmark, MPD is a construction of the second seco

Before measures, multiples all spicially utilised of their mingorgans at the bit size change grint and inflamation. Technyloch, here such and mana you're all all, one female multiple read Aller all the size of the source and the size of the size of the source all and the size of the size of the size of the source all and the size of the size of the size of the source all and the size of the size of the size of the source all and the size of the size of the size of the source all and the size of change allowing of the other is correction of the pro-

Some multiples stocopous to test innor quotify than other propie do Symptomis appear and beappear reprive, and even thirddegree burns improve more quotify then normal. "There is an intriguing faul of class, "Offegan ase," baggesting had certain kinds of descourse exities smith to MPD facilities environdinary neuing. Testings it will be possible to characterize the healing states them multiples are not alian form: (III offer).

Multiple personalities are more than just braterio case heliones. They offer interesting possibilities (or entroping countrils knowledge) edge. Their gifts represent proof of the human nervous system's capacity for instantaneous reorganization. Each person is a living lish a tertimo manual of humais ability—COUNTE ZMEIG.

CONTINUUM



Pity the poor pathologically rich. They lead a reantingless dologi vita sustance of rightclubbing, traveling, and losing around

AFFLUENZ/

Children from nch families often fall wicht to emotional disorders caused languit by--get the--postessing to much money. In a recent study John Lawy descutive dector of the Cerl G. Jung Institute, in San Francisco, dubbed the condition "affearers".

Young heres he found, may lack the motivation and selfdescriptine to stick with a challenging job, run vite difficutly establishing long-term relationships, and feel generally alenated from the world at lance.

as we do

The participacy is selected to be entern bondom, guid our bang weality, support the bonders on paranea, and search stabul having others, making commitmenta, and exprosory thorneoiles healy Many and banks. Tuey maintains. They kill the traveling, going to inghtclubs—whaleare does not constitute work."

several weathy includuals as

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well as psychologists who specialize in countering the not. He was hered to catry out the research by a tyccon concerned that his chicken were all risk of cotting, down with the symptoms of "weath desease".

Levy beloves hot allurans a specialized American attiction because the money here is, like the country cest, matheney young. Tadbon in other countries dotains that here to evait directing a tense of meason, whether in politics, philethropy, or some other ciscomidred endeavor

Any suggestions for a curr? Twock/die nos if ordinary model-class people were more sympathetic to the skiptic of the rich." Levy says "And if yours going to get nch. you should under stand that your children may face active serious etto break horarche".

-Robert Brock

Beexuality it immediately bubies your chances for a fate on Saturday right "

BRAIN REBIRTH

Do human bis after both of a more base offer and the third A more sounding no has been the medical potenties on serphatic attement to this quasition 190 may lise beam cells neurologesh tif us but you mad certainly don't gan any new ones. Now this com montwaction a beam served, uated as a matul of unaspected findings from research on carsives and, more recently ratis.

Independent Nacional - Independent Nacional - Networks - Network

A calify's of course a file cay from a human being But another researcher. Smithy Bayes of Indiana Uniworkly beleves she has uncovered evolves or the sat powth properties in the sat possibility that humans may also be coursely field. Insulta regeneration in to soch a natural talent might sometoy be harrassed to help solve votime and others with brain damage "55 a long shot" concedes Natilationer, but the liket hel neurogeness (the tomation of new brain collis) well undersotted for so ting in bails and lower mammas means (hat it is well worth searchers in the humation)

There is cause for skepicam, however, Nitratocehtar, Paakka Rakic, of Yale University, touring of the original for the generation of new balan kottikhorm ports out The carrary research has grim us a much balar close of which paid of he human form we stratuid be looking a form we stratuid be looking a form we stratuid be looking a bro signs of the capability Utili further revelopation are done the possibility cannot be nated on a⁴⁵

-Kathleen McAubile

The live poet dreams being awaks "

-Charles Lamb



Cananes hold the olive to a neuroscientific breakthrough



It you were mude all intervation would you list soward the creange Showman result should not had any technic to make such

DOES ANTIMATTER FALL UP?

If matter tails down will antimatter fall up? Physiotis doubt it but they easil see because no one has been able to measure how growty allects attimater how cent group has found a way to see how fast—end which way—antimater fails

Gravery seems aimple or reasons, Julia table at the reasons of the set of the second tratector ball. Gravery, is were tratector ball. Gravery, is were by shorts at the animation product of a second tratector animation of the animation of the second tratector is moving much bao fast to animation of the second the product of a second the pronet second tratector and the second tratector tratector and tratector tratector and tratector and tratector and tratector and tratector tratector and tratector tratector and tratector and tratector and tratector down LEAR's antprotons enough to missues how much grawly tugs on them---

The physicals explicit antiprotons to fail down, like ordinary matter Hynes says it would be "incredicio" if they fail up and promises to double-check any measiusements that show they double-likenth

"Man a the only enmal that laughs and has a state

-Serrue/ Bure

"Even in civilized marikind few! traces of monogamous instinct can be perceived." ---Bartrand Russel

CKLE BELT

A mineturaged artilical pering device that relies upon tactile sensations relieved by a transitiasion bet worn around the stornach may give soma it million Americans many of them childsen, the chance to sscape the scundless, speechiess, desideal world ow andured by the pro-

The invention, for which the Food and Drug Adminislington has just granted marketing permeterion, is called a vocater II as the handwork of Frank Saundees a San Prancisco memory who has specialized in expermental and perceptual polychology for 15 yees

Severetts institution Coportion hopes to bogin selling, et \$3,550 apaces, the 1- to 1-spound system, which includes a vibrating bot, a layed microphore and a processing box the two deprocessing box the two built of several second second patient deprocessing box boxes between this are no bugglit han a Scary Kalkman

The was imagenity diporloundly dual proget ab not be normal later, "says D Rehbourth Offer an Matocala population of pediatrics and populations and the Lowenth of Masma Matiman Denter to Child Dealbourneri in the Fonda School of Modicine Magin awar later speech, winaineg schated from the bearing work for a Notime communicating at best

This is how the secondworks. The behavior is the series of the goodparted buttoms needed against the wears's atomach than someone specific. The again microphone packs up the sound, and the procoscor book, wom on the hop, transist a down nith the channels, based on the channels, based on the operang different buttom so the work the sound channel in general different buttom so the work the sound channel in general different buttom so the work the sound channel in general different buttom so the work the sound channel in the board on the source but the sound channel in the source buttom so the more than the sound channel in the source buttom source the source the source buttom source the source the source buttom source the s a pattern of tokks across the water's stortech. Those tokies charge in frequency, intensity and location, moving from one of the goldplang a nch variet of entailtons that reflect the subletions that reflect the subleties of human speech. But have let by the refl

Oter calls the device a tobic ball, and he and other researchers in Marini air elabor et the progress made by heir subjects, some of whom were 100 percent norwestaal and have now de veloped vocabulenes of almogt 1,000 words.

With the profoundly deal, says Oiler, 'you're trying lo bear through a dansand system. If we wore to overcome the problem of speech communication for the deal, we would have accomplished something werv, why major"

-George Nobbe



The vocoder vibratiss words across the wearer's storach





Edmond Halley In Babylon Ins celebrated correl is old news

BABYLONIAN VIEW OF HALLEY'S COMET

Scientistis studying Helley's Comel es & maties te closed pass al the earth in 75 years, in lete 1985 and early 1986, may cuil aome new facts about its predicted speed and path by referring to altronomical observations recorded more than 2,000 wars ago in Babylonia

Trafas the opnion of setronner Richerd Baptheson of the University of Durtern, in England, who working with Durhem graduate working with Durhem graduate thermain Huage, of the University of Vienna moderly of Comel-unit (6 or oppose and the complete disease)

Between 750 e.c. and

A to 75, beptimistion explains, recorded their daly observetions of the planets, the phases of the moon, and anything unusual they noted in the heaviers. About 1,200 of these estimation relia tests

out been stored in the

aches of the Breah Mucontrol to Septement. Second to Septement (Septement Second Second

Bephenson is adamari, that the Biskyohenis must have observed Helley's Cahet, rahler than some other phenomenon, backues of ther detailed accounts that mouto bowly through the display that the probably had for thousands of verses."

He also points sut that the two too 164 or tubits place the contrain the heavens in nearly the storage tubits place where Staptmissin calculated tool Heaven built have been taken between howenber 3 and Noumber 28 They mention it was that in the Heaven area of theaven and then it moved gradually b Sagthruns and deappeared a little nontheave of Jupiter Thing. Their provide the financial and deap-

-Sterry Bale

NALIVING MACHINE

The invention of the whole was one of marking's technological trumphy. Now Ohio State University scentats have opened new tronters by invention the lea

A soparion tessaron ison heaters by Neber NeCher and Kenneth Waldon has diveloped a 17-bol-hong solargest computer-controlled cabeline superscini vertice (ASV)—a walking mechine that looks list a plant Exercise set insect The ASV, not a commercial prototype but a "prod-of-concept" mosti, will take its first outdoor stolo in the option

Research on computenced weiking machines was infoated in 1965 by McGhee and Yugoslav engineer Rajko Torrovic Thair inspiration animati

Writes represent an existing proof that land vehicles can be built with a much higher performance capacity. McGnee says The ASV, capable of speeds up to eight mess per hour.

can po where wheeled

vehicles fear to head, climping sleep slopes, slepping over driches and we'ls, wading through swamps and mud it can prouete end addateo lies a hybrophy.

The driver uses a joystok to steer the ASV, which is powered by a 800-cc motorcycle engine Setaen onboard computers condinato the motories of the six printed legs and use deta from an optical radiat system to choose loopings

Mothes their the next beek/two/h is attern annel performand twols will be man made muscles "We need the mechanical equivalent of the transitor" he explains. "a increacepocontectual element that can be deposed in layers analogues to muscle floor" (See "flootic Sod" June 1985; for more information or weiking motics).

-Leah Wallsch

"The solar system has no answety about its reputation " ---Raibh Waldo Emerson



Chic State's ASV. A gant Elector set insect that can olimb steep

30 CMIN



Porcine prisons two passive pigitis into publicaus portein

PIG STRESS

How aften do you theirk actor ago attendes ? Starting Carts of the University of Isiness, dose—constantly Curts messares the ways in which crowded conditions of commercial confidement buildings during big starking buildings during big starking to discord how gap think and tech. Curte redelegates tervisionments on make bage tervisionments on make bage ec...and how positiable for leaves.

How do you tell a detressed pig? Armai behavtorsts establish baseline routines in the pigs life and then compare them to habits in the confirement building to see how they differ.

They watch sove about to give birth, for natance give birth, for natance threas resemble cheerleading regimes. A sow may stand up, hurn acound, pave nod, make a nest, lay down. End of up, hurn acound, pave nod, make a nest, lay down. End of the furth a natrow continement costs, site is blocked bem furthing aboutd, and there is no straw for needing, so she pawel at phartom straw Strass makes har repeat steps more than usual Or she gats the southe out of whack To reduce sow stress Curits hes rediscond

criatis to allow netural trills. Pojots an under stress, to, because they fold to establish occursive, order Respectner Remoki Grandin net transity found with Titaso of pogs for periods of weeks in each case there wilk a bost too; that would balk her, own with off will big in the straw and patient two othat organizations of stapping the offermant of stapping the offermant of stapping the offermant

Initially site precipitated a parane showdown. Using a board against the public occus porker's neck. Grandin pushed the animal against the tence instauty if surrendered "She was a changed pg after that, "Grandin story".

Lesser pags cannot be sever planks to protect hierresives in pensi from dominant pags. What Curies has done as to build similal boxes into the waits of conlinement pens, where a builed hog can like when another a built of hom. The go right to them," he says. "See non fillings to a machine"

Take non tange to a magnet struss can also be lowered by noroducing a bit of sun mo a pop's life. Cursa has simply subpended a toy rag on a rope over the pen The plucity politics wonly these rags day end right in cut, entre pens have been observed to per up and

"Ever since the young men here owned motorcycles, rices: has been dying out " ---Max Freich

CROOKED PSYCHIATRISTS

A disproportionality large share of the physican's laceaid out of the government's Modicare and Medicard programs for ects of traud and ubuse have been psychiatristis, reveals a study funded by the Department of Justice

Although peychatrata make sp sat 8 percent of ell physicians in the United States, they accounted for 18 percent of the 347 crocked physicians suspended from the two meticial-benefit programs over a 15-year percol—the worst track record of all the meticial disoplenes studied

"Obviously this doesn't reflect well on the practice of psychiary," says cristinolo gat Paul Jeskox, cotauftor of the study which was to analysis of all physician nooffs of Medicare and Medicard "But Learn saily say that psychiatrists are any more consist than the same

the medical profession

Paychiatratis, Jesilow ponts out, may just get caught more often

The fiscult and advances of the persphares included + Balang the government for up to 24 hours of therapy sessons day, when they'd actually seen patients for much sharing sesual lastics with patients than charging the government's programs for that times

 Charging for therapy, when they had merely dispensed churat

Submitting bills for fictional

Charging for therapy done
by other psychiatrists

"The government has a very limited budget for audits of physicians," Jeslow says 'so a great deal of traud and ebuse is never uncovand "-Enc Mishara



Shilly shores often bill for

CONTINUUM



Cores looks like an ordeniny C camp lost it picks up messages of defause from themis, realized or majors under transmission

TALKING PLANTS

Adde from a willed leaf here or a data sisk here, her sod huth is that plants just don't communicativ every well with humans, all least not in any conventional way But Dr. Fraiar A beactiow and his consectants at the Bethist Pactice Northwest Lationatorias, in Richland Washington, betwee they may have found a way around that prohiber

They have developed a davage they call Cases, after the Roman gocideas of agnoulture. It measures with undarity accuracy a plentic able for help when it andownters such directful orwanters such directful orwantent such directful orwantent actual conditions as chruppit and poly/ion.

"It looks tile an ordinary C diarro, and it his around the sizm of the plant, "aga Beaction is student of plantvator relationships "Shake will change the diameter of a plant's start-whenk tiand thef's what Cares actually mean are:

Ine bolanical explanation is that when plants feel

32 CIMM

stress, he siny poses of heir lawses, called stornatas open or obse causing minus changes in the dameter of their stams. This elignp attachment, connected to a micophocesor and a recording davors, makunas hese changes, elicitively permitting the plant to "speak" when this in toucle to far Cores has been used on such plants as corn, applie these sturilowers applie these sturilowers applie these sturilowers applie these sturilowers

do accurate a real concertrief if can measure the stear caused by cache or the suffur checked horn auce eshaust within two minutes after sepasure. Thinsi can be conducted at least three to first days before a particular plant's leaves begin to droop, according to the Battelia measurements

Boedow says that Cense can help predict more effective impairs inchedises, calculate the usefulness of a worky of lentilages or measure the impact of pollutants on famming areas

-- George Nobbe

BASKETBALL PHYSIC

At last a scientist has

Herball with consistent accuracy--how, in short to launch a sphere 9-47 inches in diameter through a 10-foothigh caroular rim only about 18 inches webs

The quest for the portical shot begin about say years app, when Pater J. Branciazo a physics profession at Brook (yn College and amsteur Bball pilayer, was asked by a crony. Tryoure so smart how come you shrik at beaketball?

Interstanding of the organization of organization of the study the markine. Ho draw lines to depict shooting area realization dispectiones and acriticate aquations and formulas. Then he limed students taking set and upitip shola at valous detances from the basiver.

He may the developed litefrequipt an editor-verser and traced trajectories of each shot on a transparent points shear placed over the verser screen. Opcosting on the assumption that behind every successful athletic technique is a fundamental scenttic concept or natural law the analyzed 77 stebs in still.

Key conclusion? A higharching shot shands a nuclbetter chance of sniking sweatlyhoms than a lowfiging one For example a 20-bot jumper with a 497 tradectory leaves a margin to ence seven times lower than a 437 jpb. Hance i whushy all the beat shoters lower than a line beat shoters lower than the lower to be not to use the window apalitosia

be professor also found

that shockers should meet

the least possible learching torse—what he some "rmimut locks angle" otherwest leaven as a soft touch. The slower the ball is dollected from the hand, the more learnery as light, the better the ootds that he shot, even on contact with m or backboard, will drop through the hoom.

Backingm is also a plus Releasing the ball off all live. Ingeritips with a sharp down ward lick off his wirst automotically imparts backings. A ball to shot will abruchly lose more speed on hising the rim or backboard than balls with forward spin or nome at all

Bitmozzo nov noicearoa 'Oodor Junp Shot' publahed these thionasin hite Amenoan Journal of Physics 'But I was more excited by the prospect of saleng my telo-goal percentage fram telongal percentage fram telongal percentage fram telongal percentage fram telongal percentage fram

"Nabody gets jushce: People get good luck or bed/luck " ---Ortion Welks



Score for "restriction-force



The records designing how Earth Ruchustes over breat Short later burnts can one determine this measurement within an earth

MOON LASEP

By teng increably attent base basis leach just two hundred Hilliomhe di a second langi at special missions sui an the moon by the Applio sportness a contribut af the Linvessky of Hawai s Mourt Hadasia Colorivation provinsia Colorivation provinsia Colorivation provinsia Colorivation provinsia more accurate any ji ba within all holt, over the order and a transmithin

Tenng how long it takes for the laser light to go up to the moon and come back to us " moon-laser project manager Louis Mackins explains, "gives us a measure of the moonts distance becauce we know how tast light reads"

Each laser burst is so noted biy short Mackink says, that as departure and return can be smeet with priport precision—resulting in the superaccurate measunments of the moons detarrow. This short-burst laser (as opposed to less apcastel know-burst lasers used at other obschridzonds; has only recently been perlected by NASA, the sponso of the Mount Haleakala project

Mappink and his crise asis majority flow (request losor mossurements of his moons fluctuating distancia as a way to gauge movements in the earth's Pacific crust They date with be analyzed by goologists in an effort to generate accurate eachguide predictions

"All were really doing is ome bindy surveying " leaders says " using the hoon as a reference to letermine the changing posion of our observatory in the earth's surface "

Wen have always lumed from the appendanced which is similed and depositioning, to the dubious, which a unimitial and full of hope for

-Agnes Reppler

"Scentists change the world without knowing it" Louid Arthur, temps Ballow

ATHOLOGICAL LAUGHING AND

Thousands of viceme of

multiple sciences, stoke an other born problems within a strange and disitioting davider. They burst into unconstruction largeting of learn, repardless of the concentrationes. How a team of researchers has kound a teatment that ind only controls the symptoms built may help segten the nature of enclotion.

It began when University of Pochetier muruilogial Robart NL Hierndon saw a multiple softeness wicht who complement of dephatision but was contactify lagging He traubid her with amforph here a standard amfolgheet son drug. As her depressor cleared up. As her depressor cleared up. An in depressor cleared up. An in depressor cleared by Auszleichty the contractotory reacts he referred the case to his colliserates.

Herroris colleagues-De Parodok 18 Softwards Romat A. Rudok-gase Hong to 2 Goldwards with accornologies language accornologies language accornologies and accornol accornologies and accornologies

How does the drug work? The researchers say that anothers has be seen as water building up betrind a dem. It gales an active effort to leage the dam from collagers "In the sandoms," says Rucick, "the pathways that nemaly control emotors are damaged. "The researchers and full for drug acceleration and for the termine demonstration families."

Since seleary's came into existence, the necessity of normesung the level has has been been been as a selection mounder, whereas among the project Romans who not only had a more cancer, so how the a daronemy hour her level hand of minutes but level not field hours barry' existent field hours barry' existent

No one ever regarded the inst of Jenusky with institience " ----------------------Charles Lamb

"Mysteries are not necessary

-Johann Wolfgang von Goelhe



For some pasents, implifit anomalower, deamsalco



CONTINUUM



About five years ago a



know in which spence-lictor

- 2 Communications satelytes.

W Chasto de Bergener wee ence use /d managery Autom SKATEGOU SKD DUT macamated weeks to augreform standa autorati s

EUCEDEUL UDSDL/ HOURIOS

Some sky watchers think Chicken Little might be right



BY EDWARD REGIS, JR



One day block 50,000 years ago is appeared over the Aronana, in seconds their somtlike became a binding freball bearing of a football field, shed took fragments as it plunged lowerd the Argona plan listend # trained a straigk of vaponzed meteoroid and white-hot ar Seconds later it slammed into the ground with the force of 20 million tans. tons of rock from the eight and sending doud had cirited away, what was loft was a grahin the earth about a miewide and more than 500 feet cleep. Known today as Meteor Crister, it marks the site of an asteroid moact. with Farth David Roddy and Late driving toward it now in the early morning opciness. At a time when many of his collectures are recordly preparing for a visit from a beingh inturloper Halley's Cornet, Rodoly is one of a small but duckoated orgup of acientista worrying about a not-to-

PAINTINGS BY DON DAVIS









Here the gash in the land is unmistakable and enormous, almost a mile wide and more than 500 feet deep ?

mendly visit from an expatimatise interloper like the one that smashed into the Western plain

Pecify a in such sector ber of the US Geological Burvey, at Fagetald and is a wold expert on plandery percustors imagin-work and here and statuted bernfolgy was added bernfolgy was observed to be a sector and the source of a sector pact with Earth J Aro her pack with Earth J Aro her pack with Earth J Aro her and Temporal Linguistic and Temporal Linguistic and Temporal Linguistic



on the similarities between nuclear deloted ons and the walkgo of extratometerial bodies on our painst this has what averas to be an investment in adjustment, impacts and aloge holds in the ground. Taddy has work the Newsatin test sale, monitoring unchands uncleast revisionant.

As we head down teterster 40 beverd the cater to express the research for his lacomous wet comme smallups. For most of human heads the says, the texavers were considered to be piece of texame, the texavers were considered to be leaver than the caterior on the most will catering heads they don't be leaver than the caterior on the most were taking to be edtion. If the texame texater and the most were taking to be the of half the caterior and the most were failing to Earth and fail they cater hom advector.

The pape popping bought which in invessed interest in setorus & VHz owing at the back wide if the more with all its construme, and the images of Mars. Mescury Versus as well as the satellites of Lupping and Sature, we could be them had the lung daylights beatern out of it? Pooldy asgutates when we saily begin to pay senses attribute to la advicad impacts "Roddy and others are convolid if it happened develope in use sale result or could happen here.

With the whole solar system to cerven around in it would seem improbable that one of them would be a populated speak of and on our truy plenet But "improbable evenis permit them selves the tuxury of happening, is a Contucuts and

The fact is that the improbable has already happened diterencupt. Some 70 onlines are incupited by the program of the other activity impacts from exchanged bodies. The most recent supported impact is known as the flueguide event On June 30, 3064 a control siturming in one amount spot in centrals Sibera, near the village of languais, setting fire to treas and destroying wildlife over an area about the set of Rhode lated These wore notuman casualties. But the comet ocald and as essth them the Monave

The next time, experts say we may not be so Loby "There is a renote but set proceeding of a mell address impact deator in the forecee able tune, were planetary sciential. Clark Deators, Andress Expense Institus, in Deator Anote expert, Expense Shoemakor, of the U.S. Greekped Survey, has committed that there is between a 52 and

40 percent chance of another Tungueka ecole event happening somewhere on the earth within the noxt 75 years. And in 1980 a NASA advisory gloup warned that a "large asteroid lookid somewook destoy. Carth civikation"

These device prophetics travel a few questions to the quarter the Unsol States operation belows on device more than the clear annexity, a myone doing anything tabuli the softwaretime travel in the more is a qualitary software. Set for who are an two only verting astetioid watch programs under way, or en clearma and on astetional watch programs under way, or en clearma and on astetional watch programs under way, or en clearma and on astetional watch and the set of the set to graph an astetion of watch and the set of the set of the proprior between the set of the se

Bit should we really be all that concerned? After all, how much damage could one asteroid do? Up ahead the nm of Meter Crater reset in the distance from our perspective if looks like a low flat-topped mesia—which is exactly what the coverous thought if was Coon Butte three called it.

Bracky and by could be tacket in the local of the universe and the drive Three is close as bracky we are the base of a small most than. Unly we dish to the log there in a close that has most than the log there is a close to a grant crute. These the sub-there is noting but 4 to be expression of the sub-there and there is no tanks that is a small could be a small to be close to the sub-there is no tanks that is a small could be close to the sub-there is no tanks to the sub-there is no small but in the sub-that is an and the sub-there is no small but could be the sub-that is an an an and the subtion density of the the sub-that is an an and the sub-there is the same who consider to the that are used to be the sub-that is and where who considered to the tack of the sober of the sub-that is and where who considered to the tack of the sober of the sub-that is and the sub-that is an an an an an an an an and the sub-that is and the sub-tha

As I look down into the creater I can't help but recall a smitar site about 300 miles southwast of the creater neur Alamogordo New Mitcoso I waa whele "ming the world-bitts rucides bomb vias debanated, 40 years ago "tosiay, except for a chain-linic determinationement in

Previous pages latistic rendering of the sveation of Meteor Cuaser in Anzonal from the moment of impact (opper latit) to the result (far lat). The page the order that is now Lake Santa Druc in Argenizea.



FICTION

Better kenp your head dup as you play seductive songs for the aficionados of the fourth dimension

TANGENTS

BY GREG BEAR

The nut-brown boy stood in had crept over the split-ral the California field, his Asian tace and brick-pylon fonce from the new studowed by a hard hat, his housing project across the short, stocky frame clothed in a T- road. School was out and his shirt and a pair of brown mother-adoptive mothershorts He sounded appas the hohigh grass at the spradoled all day. Or at all old two-story tanch house, and then he wheted a few bars from a a huge pano weboard and Hevite rules scotta. Out of the upper himself dancing on the keys, tapping foor of the house came a maria out the Onental-sounding D high frustrated "bloody hell and minor scale which suited his onoris. the sound of a fat slamming he thought He loved music on a solid surface. Silence for a He opened his eyes and saw the manute Then, more softly a thin, graying lady in a tweed women's question "Not going well?" suit leaning over him stering down 'No 7m swimming in it, but I with her brows knit dont see # "The enzyotion?" the woman asked tready "The tesseract If it doesn't get, it ant asper The boy squatted in the grass and latened. And?" the woman encouraged The conversation stopped The boy lay back in the grass, aware he was on private and He

He closed his eyes and magned "Viv (to no private land," she road He scrambled up and brushed press from his parts "Sovy Thought I saw someone out here. "Pwl." he recked "Is that a came?" abe asked querulously. "Pai Tramont it's not my real name Im Korean " "Then what's your real name?"

"My folks told me not to use it

PAINTING BY MICHEL HENRICOT

anymore. I'm adopted. Who are you?

"My rame is Lauren Devres 1 she said. "You inst naar baw?"

He ported across the texts at the close

"I sold the land for those homes ten years ago," she said. "I don't normally enjoy chill dee transauter."

Second Ball court

"Have you had lunch?"

Mo.

"Will a gniled cheese sandwich do?"

In the broad red brock and the kechen sitting at an calk table with his shoulders beredynamg above the top he ale the mildly channed sandwich and watched Lauren Davies watching him

Tim trying to write about a child' she said. It's difficult I im a spatiater and I doffi know in alian wolf.

You're a water?' he asked taking a swellow of raik

She shifted "Not that anyone would know " "Is that your brother upstant?"

No she said "That's Peter We've been leven longthar for two to wars."

"But you still you're a spraker---isr'i hall somepne who's never married of never loved? Pallaked

Never married And never you mind Peter sinstethnikip to mis is none of your conourn. She put together a tray with a bowlid soup and a tune-traied sendwich Trisslanch." she said. Without being asked. Pailtrailed up the stars after her

The is where Peter works. Lauren explained Pal etocal in the doorway systematic computer learning and industrial-gray shearing with eoid carboards exuptions sharing each level along with bools and crucial boards. See pair the lunch har on teo of a carb, nating presences) on a box of topor date.

"Still having touble?" she selved a thin man with his back turined toward them

The man sumed assured on his several charglancochorelity all the line in the lanch and stock he had? The har on the lanch and was a nch, gloosy block on the close cut eds. The color changed alexapply is a Bright, block-block of changed assured in the stoce and large green eyes. On the dosk before hern was a computer monitor. "We haven't been insolucions." In sead, contrast to Pal-

"This is Pell Tremont: a neighborhood vistor Pal, this is Peller Tuthy Pars going to help me with that character we discussed."

Pai looked at the monitor curously Red and grean lines want through some moothprehensible transformation on the screen then anoxided.

"What is a lesseraid? Pal asked remembeing the words he had heard through the stradaways he stood in the field.

"If it is four dmensional analog of a cube lim trying to find a way to teach myself to see it in my mind's eve." Tuffy sed. "Have



you ever tred that?

No' Pal admitted

Here Tuthy seed heriding him the spectacks. As in the moves

Pail donned the spectrales and start of an time orders 1%2 in teas of a fold and unbias its protogram. The teas of a fold and unbias its protogram and the teas of the vorkatiop. The weak in the asia control of the order a transmost of alumnian protogram and appointed a long the distance of a teastanchor like a planther build parts the appointed along the distance of the bar weak build be insteaded by motion takes beyowe to be knowned with Throusewith the parts because, but id rather learn on the Carry work with the section of the section of the section of the team on the Carry work with the section of the section of the section of the team on the carry work with the section of the section of the section of the team on the carry work with the section of the s

" toy why it " tuthy said, exapprised " toy with all sorts of electronic trings But what did you see on the econem?" He glascial up at Lauren binlong. "Ill sait the food H sait it Now please don't bother us

"He's supposed to be helping me." Lauian complained

Peter smiled at her Yes of course 11 aend has downshirs mail tille while

When Pail descended an hour later, he came into the kitchen to thenk Lauren for unch. "Peter sia seal hala. Hers trying to see certain deschare."

"I know "Lauren said sighing

Tim going home now "Pal sed. "If be back, hough if it sail tight with you Peter invited me

"I'm sive that it will be fme" Lauren repled dutsously

"He's going to let me learn the Tronclaver. With that Pal amiled raciantly and extend through the kitchen door.

When she retrieved the tray she bound Pater learing back in his chief eyes closed. The byuves on the screen patiently kided and unfolded cubes core nuously passing though one another.

Aftat about Hockrums work?" she asked

In on it i received representives bit coston. Lauren calified Pill is totation monitor on the second day to apprise them of their sorts totation and the women assured her it was gate all right. Sometimes here a total calified send him home if the causes trouble—but not right away? Give me a next, she taid here have an enclusion.

Lauren drew her lips together tightly tranked her and hung up

Peter and the boy had come downstams to skin the kichen. Ming up paper with Ine dowings. Peter's teaching me how to use his program. Pail and

Do you know." Tuthy said assuming his highest Cambridge professorial tonis. Itsic a cube intersecting a flat plane, can be out through a number of geometrically different cross sectors?"

Pai sounted at the sketch Tuthy had made "Surp," he seed

The showed hissigh the plane the cube can appear to a two-dimensional challane Wing on the planes wilds call time a Failched—to be effer a trategie a rectangle a trapezoid a montous or a sopular. If he two dimenscored being observes the cube being contrast owned/en



ON THE WINGS OF WIND





Laboratory observations a subset for the sectory observations and and the benefits a constraint of the sectory benefits a constraint of the sectory property and the sectory observation property and the sectory observation makes and the sectory observation makes and the sectory observation makes and the sectory of the sectory and the sectory of the sectory makes the sec





Fluide motion through a turburnachune (top) and a cykinka (bottors). Water turnel experiments have turo scalade whort adverturing form a defa wrog (ascorp) and insigular flow patienes ascord in a model combat jet (sgiff). Knowledge of these



mechanisms has helped to improve accolytomic designs. For example, studies of one plane in landing configuration forum from the tail, below just do changes that microsce the uplift of the whichwide accurd the wings.CO





JOGGER ON THE HIGH ROAD

BY BARBARA ROWES

The vestor multi have been neuropay the incharacy systems to a second system incharacy system income of the incharacy systems income of the incharacy systems incharacy systems in the subtrained systems in the incharacy on the events of the incharacy incharacy systems in the incharacy on the incharacy systems in the incharacy on the incharacy systems in the incharacy on the incharacy systems in the incharacy systems in the incharacy systems in the incharacy systems in the incharacy incharacy systems

His feeds promeet to keep pumping him at His backy cut through the sealer quacky, and the blackness of the lake surrounded him it must have been a bit We barry pulled through the clariness of spinor Man three 49 weeks tiller on August

astronauta in zero o, developed the

rides on each mission investigated

transd mission specialists—including Senator Joke Garn—to perform

medical experiments in spece. There are dozens of other theories and accomplishments to his credit in applico to two specificants

He settlements issue at the settlement in the most candidate once you learn that during his thy was well N45A. He was may had a laboratory to call his own ho been of assettinis impliments has vecine. No should laborhcare montar his shuffe outporments the vecine. His status is final of astronaut. Oftenidy, he has never been assigned to the medicaltescenth area.

ted to the partial of space motions and based on his student of in-flight body charges has several theorem on the health and physical trateof those children destind to be bonamong the stars.

Therefore solves that to be allower the regiment instead to allow that the solves and challenges the gravity that gravity and the solvest solvest that the solvest solvest the solvest solvest the solvest solvest the solvest solvest s



Keeping pace with William Thomton space jock, doctor, engineer, and intentor may mean a brisk walk around the earth

PHOTOGRAPHS BY MICHEAL SIMPSON

688 approaches the human body the way an engineer or physicist looks at a complicated machine. He loves well-engineered things 9



a lifetono triend. He was to take on his fa-

In 1952 he entered the Ar Force where 'I made people furgue, he admits "They

M. ONV

later.) Eventually, his contrabution was all knowledged Both the Air Force and the Navy whan honor, before his thirtedh birthday.

Lince leaven the Air Force in 1955. Them-

co June 14 1958 the couple mirried The was born. Son James arrived two years later

school. To be able to finance a medical edupston he pried Del Mar Engineering Lab Later he developed a medical electronica

1963. I toolish's belowed he'd his like other

physicans and start a nice plactice as a human body. "Heid been bilten by the apace

NASA washi accentros applications fram achieved your phase parts in 1984. Beauties, at age three-wo Thornton was by NASAs standards too old to begin twice Well send worry about him doing something foolish-

Because eterns can incrnally prove they have the right stuff by doing rounds. Dr the Thorntons moved to San Avlorio. Jenrifer breathed arother sigh of relief. San gral, "she says But by 1966 her confidence

Antonio, Thornton was assumed to the Art

Unike his preciscessors in the field. revealm to check cut the presenting equipone had resorted to reprous analyses. No

by chickle simplicity he conceptualized the Then the translated those data map scientific

seamed to be losing weight during sciece Boht. There was no way to determine how in more then 5 000 years. The astronauta then transibled that if formation with pounds Then in 1987 the ano encurrements to

estronauts changed "I had wanted to ge a candidate with unique qualifications for solving a mythid of medical problems. "The

Later that yeer America's enthusiasm for space exploration was devisibled by the trapic Apolio lire. Other problems ansued NASKs budget was out to the bone during the headst of the Vietnam Was

vertific the weight loss expensered by all stumped NASAs dietary expants throughout the Sockes and was becoming a matter of

study with accurate daily measurements in one else had thought to messigate their workload His Rx Increase the calono in

It became a hairmark of Thornton's career to take on every challenge-including those after a flicht, the size and strength of their ico muscles decovered approachty Medi workput on a stationary browcle

But Thereton know the regimen was doomed to failure. While working with Ken plotocal effect. Using extensive missisurily

he adds. A one-hundred severity pound mittel tute for walking in wordhillesenees.

He taught with true get to substitute a ure muscular-strength capacity and loss in conflicts and posificat medical means he

alumatum base. He added rubber elattic cords called bungees and a harness that base of the treadmil was pitched at a sight

The curs could keep it up for only about

fide medical researcher. I'm in the astronaut office I have no resources Utrave one room to store my records, but as space, I have to borrow?

contraction Thomaria Revenue But they loss "Kerven adds "Trasc a humph

Alter the treadmills list teel in some Thomas contacted Herry Whittone page Antonio and asked him to translate his de

it would gost if you went to a many arrow without #," Kerwell skys

The astronauts themselves carrie to recard Dr. Fill as they call httl as one of the 'ness 'Whenever the topic comes up at thought about reach access how much

Saw tomer extended line Alex. "Bill anproaches the human body the way at an cover or physical looks at a complexited

things. Maybe that's why he size teachabled

of expertise. Thornton decided to grapple with wit another problem shifting body fulls. were occurring within the body causing a As the phase moles NASA astronauts logs would shrink and weaken during spece fered from anome and carculation problems upon their return to Earth. Thornton wait

With remarkable initiation, backed up by treat These changes take place much more gested from minutes to hours after entry centarics, but conclusive evidence-in the years in coming indeed it would take the help of a US senator

Thompore meneration been't alward been appreciated A workatolic he has liffe per tation say associates if he believes in what

This works bent as a sort of one-mer show Kerwensees "He does his friest work when you carve out a problem, point him in

Fire in the herbit start and worki of NASA no one individual can take on every filmacasion "I'm not a bona ficle medical re-

Some of the moderal scenario at NASA have reserved his enclosed minit upon their. ealed hombre to lime his save.

trist because studies of blood pressure resident in internal medicine. He record ranacihe was peting out of date so he wert



i w cu

Summerse i almost web Samitada i ethodi testi social capital Hodi postabili hava a bargatin honga ha bargatin in Samitada bargatin honga ha bargatin in Samitada glovy with roong special like his infamous dury Muddar metal of heating the weandry societ But in that case I would in bahand hard all barget capacit face. In a sohard hard all barget capacit face. In a sotest capital society in the society of the society in a ubly in- the guy wind choos the Sampagine society and

Los of nang late twan really legislaw Sam shor ho shough way ho dropped high photower x decade ago. An averageon engreen for travely yeals. Sam moninghind high schemed nance car designs and applied high table is drov year 16 minute to ensure day he able computer travel the some day to able computer travel the some day to able computer travel to ensure and a travel and the step to work describe he cimped in June mains.

Total tellivat the "tergitmeted one right as helped threader televant terms gain right for oppoling, in the near turse near about care reliable consectioners and a whole ist aider But takens a dra man about intendiused every. They is since a being where they can get the parts. I don't want to atmose they are get the parts. I don't want to atmose the aid in tabipation and an about any section and a single and a single and they are get the parts. I don't want to atmose the aid in tabipation and the single and Som and get doportion at the time.

Have not about Service runs is month level when in the Low Applies basis human human some huf influence carefulgeower headsgings for Same a soverchole to high speed researced. Hose halogen light a lin an extra supply pilor new Passdoner and then admined the land of an other careful supply pilor new Passdoner and then admined the land of an after careful supply late the gate to the Lang at Smooth Human balls based gates to the Lang at Smooth Human balls based and these admines the

I was cursist about he line Fermi He was cursist about a gay who would dime a huge sides school bus them Berngelei to be Registerio as minor retaid 11d himit to cancel efficiency and the school of school of the school of the school of school of the school of the school of body when and school school of school of the school of schoo

Found out with no: No wonder they use aports cars above Brewly Hills to get the body pait another all those workshows and work/we had to deasametie if I pasked a hall mis from Hoths dog and hoted if. Then Tools a long body and hoted at the Mades work/we lived if hed had the money. Naw the took is that I working know

Guode the true is that I wouldn't interval Guode bag if she bit me buil i linew cars it knew you could buy a metium size banana republic for the price of the wheels in Hosts to guide for the price of the wheels in Hosts drive—and on his gass, since the bled armax was backing a twiyin read bid people darkly in stantight it was a wet drivem by Darkh Naber it a balls cope me of mayor teenty ever protocol A Bello is so widly exotic that a commotive can be sweld and pasted off by it this name instant

netect or lengt at the art out of a hundet leng. I akiled back to the his rang damn near clove away I maan look My 7shit was noped hom 5 quark report under be bas I had oil in my haz and my tough dd Wanglers were motified with stars Some of three loss had emoged from how Bertiling warrag same but they were years with escuthor obtains

Then igoimst i clusped mytookid verand found same saistry prins and a Bann-Aid i repared the rip lattened sessent over on the Band Aid, and stuck it on a gooker or my saise nearbind my their which we bruch and method to Hools same prepared to but my wey in

Aline
Andred ponies hurd you into
prish, huge
gum-bail itres singshot you
ahead of the
bright, bespokered Porsche,
and a twin-lutbo
rockets you down the drive 3

"Punk chci " cred a bigeweled rabob as I passed the most, and Host wolcomed ma without a twitch I was shown around like a crustic doubtion found underfeet.

One gargeous bland touched my shoulder and eyed ber lager in smaarment "Real gissaat" she manveled to her escoet. I towe it? And in a choer than-hou ploy she ap oaled a immar of cavet to ber Gwenchy.

In free minutes a docare obleaux richics had runed her rompos in the effort logic park and I was sharing a ogaritte with a brainfried brainal wondering weither the oroganows is miny drivi or in the categoe On sober reflection I know it was the opgoe and it was It half-hard's overage on size

Search I noticed that most of the guests stands a central unseeing grant systemid status than systemid and search back for the you anyoney. But not the guy whord general the Bable Horseneed Bay is constraint, which is cost around goth and support of Permit 1. got and income back and support of Permit 1. Up on the cananact blond. She let hen cophysic back who support of Permit 1. Bogh Her account and band. She let hen backhool six wint with a plasmum Promote backhool will wint with a plasmum Permitter and the support of the search of the search of the backhool will be the support of the search of the U-term of events. I couldn't biame Silvahrt the Batte man. Plat Machenety was one of the bury beautili people. A toroad pleasant line hare innocent blue eyes, threesens amits, and exclerify the revelocities to face. Sty Stations: He also fashed invockle tations that specified aut ours, from where I stood. Machenety salw it in neverse. I wonored if the looked at that there is a lot.

His seemed as mapticed in this nob as a longtrum among Herefords. Feeling that oggenete. I globel enclessly to Host and asked whet Machinery did for a living.

"fou could call him a lay pharmacologist pun intended said Hod. If it comes in shreds capsules or powder, he can get it for you."

Not for me I gaid

Host ampered into my face. "I beg to difer, he said

I laughed. All the moment I would ve grinned at strain wreck. "What's Machinery donc herg?"

REPORTS

That explains the Bella 1 sach

Bellowing is out " he frowned

Bells 1 repeated as in Bells T-BOD It s a Le Mans societ worth about a hundred thou, and I saw MacHinery hiding it bohind your bedge an hour ago

That hedge was no higher than my crutch Host flought about that while he relit his og "Something like my Dino?"

More like a Lockingd SR-71 I don'tknow why Maci-inony parked his swoopy brute out of sight but several possibilities come to end?

Im listening said Host

Note a sing from the op attend to my pres pap and call. "One Bly Gravien couldn't losses a Bella T-900 to the street the mee of the stands for the horsepower of tab the state well eight behand the utenand in table to percent detamote of a loss constructed. If the thing the could make indext 2 behand terminar the total metodol bener as have he could make a baser and on a gritmen poor. These Ples terms per schmool: who a heavy bot on a due more.

The heavest a commentation cauchy the heavest al commentation cauchy and commentation of the second cauchy and cauchy the cauchy and the second of cauchy the cauchy and the second cauchy and cauchy and second cauchy and the second cauchy and the second cauchy a place to one of the and there and there are set of the second cauchy and the second cauchy

I alled over been Machinery wordering why my het seemed to be roling on millione of I tile bitly ball bearings. Machinery was listening to Skishirt but acknowledged me with a nod, and now ha blue eyes held a birtle piker

Must understand my man that one down't take a modiled Porache lightly Silkateri was dowling

"Id never take one" Mac assured him lightly live only got this secondhand Belar vould probably think its a traitweight, but I

Silvative laid nextractions for my with a raised eyebrow in Macis direction

It was Silvahirt who adopted sudden concent as MacHipety eased his T 900 from under the foliage Every time Mac blipped ROMMENT insure about the toos I noddled Filigate in his serie the Porsche propert strode to the Bella and had some aqueed to carry ballies. Me

Why in God's name del Lacrost? Because never had a street run in apything agproaching a Bella. I'd never gone off a ski namp with roler skates and an umbrelia

into a Recaro and and and behind

its an intercom and Mae is binking his his headset as cool as ito balls. T could

cervon by which time overy chald on our

route is fully it with a head at every written. and Machinery says. In the perfect harpe three smokeys born a light afforces factor

While you take the blond," I said, plotted

You offer betche. Mac shorted and bt whout linching. As he aded her if

to fauri Sarris name."I need some batter inchesms he and but oberarie in up

6Fnaine torque was suddenly multiplied spring uncoling, the rear duals catapultno . us halfway through before Samcould even get on the whoa pedal

I thought about Sams emergency halo

Medikinery scribbled a Glandale address

"Keeps mu posted "he garned. You pre-

You Naci touch Sometimes they aut yell I like it better when they price

I ddit i and salated the sected blond

By the time Silkshut anwed on fool cuses but he had a div Heid ademetration vehicle on the way back or held have caught

dollars and sport the rest of my right bars-

lights the agreed to touch up the bue where a bereau nemer the onumped, sighting along reastly apportance sharest metal with an opposithatch and started mono nami

With a sudden percent glance from un-

bered on drugs A good returnl driver-

Walching Sam frether tesh part over instituti your callety of possibilit toosadi

Around the dead dater shib in Sams teeth He would be if I were a proctobast its

Thet s what verified disc brakes are for

That should comfort her hers. Gues like ing on tappayer macadam and you who

"Heroes? Aw Sam not really." He cut reacio a diw em brost bras previnter turning brown around the edges. I think the menhasabul inpolycoloh Wel-mwbe just a little Sam I mean think of blasting

The energy? Get yer trontal lobes overplay God with lothal weapons in public! Hell spat zapprig an imaginary barga turner

"Therk of it as withouton" he sharled itd rankly seen Sam so exercised over a point of racing ethics

I said. Well that sattles the question of whother you'l locate longboards for the gay.

Sam didn' krow what the hall i was taking about not add so, and i coplanned For around eladying the spriky gun and hain mutteed. You gotha hold close apentures, can I have particles shooting off just any old way. But nothing wentaxed—sh. Wharila Mochimerka addrosof?

I gasped 'Sam/ Not a letter bomb?

Genere a break ill offer him a set of halogars ha can trefuse. Simpler if i could install oni, row he'll went to do his own mode. If have to semate the unit. Save the son of a both some which he'll appreciate that

Thelped Sam clean up and then down the teely partial taction place these neurons asy producing what Sam might do for a telewinger Criwty For their mether, I don't horse with yiel addata to bornow the bus for an evening. If had inever would wells then level in revision—but of cause I did

For the next fee works, Sam and I were naccessly cooler toward each other Not their fitnospit level of him. but—works I have in some for more than only have an intervention of the level damp of the barrow national appeal to mail where Sam might think. I have a mind dimy own "to prove it, I was all the level anomable flow usand

Take for example the evening he asked to borow the bus once more as we set on the hugg episies statuce plate, choosinging fault from his hydropanic orchaid. "Licamo Sam Dich Lyou use i pot leet week to lead hose longbearm you and to Machinery?"

Dight take is out a the hangar' he read cryptic as usual "But I need to go to L.A with it Finday evening."

'A big responsibility 'Thedged

Which I mentall, he refinded me Rwrght wetsamp II bribe you with that of pauge you ve been mooning over

To yoer 1 diseat there was in MIG a page once somewhere that were Neiuraly Sam owned in Neissell Used Neiuraly Sam owned in Neissell Jacken I m. MIG and adding thety weight where he main MIG and adding they weight where he main microgrammed gasge 16 dis surport in the Western Homophere. I agreed quickly out to to a quickly (large 16 dis surport in the Western Homophere. I agreed quickly and weeked to agreed, weekerd in the city with mit base me the following standay. If he weeked to agreed, weekerd in the city with my base hand but weekerd in the city with my base hand but weekerd in the city with externed to agreed with termed to agreed with

Alter late of no yourworkt year i damned wall well. Sam agroed with one stipulation From the moment we left the city limits. "Bu don't like your yap about the bus. It's my responsibility youre only a passenger."

The tic of muscle under his pay stubble said had poshed registration as far as flay were going. I offered my hand and he shook, it and aad plassarity. Temperate, putz 1 trad to leage you down on the fam. Sam



WHERE EVER WE LOOK in Jack Daniel's Hollow, there's a bit of Christmas in the air.

Jack Bateman (he's the boss of our rickyard) is getting a nice gift from two of his barrelmen friends. And if we know Mr. Bateman, he's got

a gift for them somewhere close at hand. It's just another sign that the Christmas spirit has arrived. And, no matter where you live, we hope you've got it, too.



ON SCIENCE

Thank you, Sciencel

You have been great and most helpful in exploring many facets of that which exists We are beholden to you for our expanded knowledge, evabling us to separate easily from fiction and to separate easily from supersection that which we have come to know.

But one thing you have not done, or have not been able to do — and that is to fundamentally gauge the adequacy, or inadequacy, of physical being and the true nature and rationale of obtained teal?

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Now the magazine of he harve conflative/for the future Starward base of OME in a new Castan Bourd is brancy Case made of block that labels leader its bolt foliant and rivelikees (Clause mith Conflian indistrinky This some is entrobased with a gold OWE logs and he ach no case these a cyclid branker for recording the data

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Allow 4-6 weeks for cleinen

chose a glearing burgundy apple from the fruit pile and took a big bile. "Somehow I ve gette get megatorque to those rear duals on the bia." He markened through apple subo

"You diways munch an apple when yourn bransforming misched," I said

Hull of knowledge" he said, checks tull as a chipmunks

"Oh But there's no apple tree in your or chard Sam Where d you get apples out of reason?"

"The snake brings em," he said absorily "Go away and kimme thek."

A sched bus lise on a Friday alternative reservices the alternative of a cell-block not lised Som shigh pressure have to have the the list of the detre, graning to myself as the holded black the cruel serving them on the Newspary-regregation attempts to see clust where and i cells to see a unit we water done with our separate policy.

Sim soldy Youneversee a windup bus before?

Thought t was the world's biggest music box. I gibred "Where'd you get that humon gous spreig?"

Held taillaged ha anemosa coi of tail self from the olic courthouse dick toere he stati. Noe it was lead to the box tome and codes around the class stati wetcus lausting it lined to a contend class ha raggester titta would grip the tomit or keep the spring wound when Sam pulled cable. Would tight the of barge a garma be tary would tight the of barge a garma be tary of the starting ires it woulded

But how would he wind it? Engage the spring clutch and clive backwards swhile hit said. 'Get in and we'll give or a rudge.'

Sam openied the hanger door pocketing in the black hole and backed the black and and while finding with cable reacase. Engine tongue was suddenly makpled by the thige somig uncolling, and these was case callspatiled as in a whoele halfway through the calan room before Sam could get on the whole pead

"Near, the encourced, I tim ready for L.A. ratific Darter if he waket En route to the only he would his gamo up asweal lines, their spring, if an Correction Darth matter how that we wais going, when Sam pulsed the coble that oid buc careened ahead anoining all our rems. Sam bughed is ut. There waant any law, he used agained getting up to the here en milleconds

I fall pretty good too because for once il understood the situation fully in advance. On, yes me and the capitain of the Tdago

I never doublad for a moment that Sam watted to the PM Mackinery Buch Mackbioiness you put the word out, and thenhe pit back toyor. We bound the Clencistis shou Heinerkoon Right Away which specialized incude dath - fores installation of skey party Especially carb without logible sonal numbas. Hermitely taxed in a good todh. hichted at a part of careful the party frag waidd mere or at high it is in sonal and pathod his gut as if it were money "fourthe clude sent those longbeams Mac picked up," he said to Sam. He pay you?

New! San sad regarding his stogle Maybe you stok aroun, Moo he night show Ne kouble. Herrorook added pudghard pain dows. It waint a comment, tun a command. Then as an electhough: The return address on Mach package—you work for that Sprayle out!?

1 em itst Springelle outri ' Sem said, whetepon Homendos entre carcias just radeted a whole new outcole. Handshekes el around alugsrof Well Turkey in our cottee, abit of whetehing for Sam subograph. Hernendo might be crooked as a drunk's gyntikeres but he knew whos who in auto sond hatev.

Presently Jus remembered something, Hernando mumuned leaving the office for the bowels of his warehouse. 'Don be shy about the whisking.'

Saminasched for the bottle I said through a yown Sam it's late Shouthint we try acmeptace cise? Who knows where he is?

"Hemarab does I figure he's on an extension phone right now, Sam replect pound a cuptur of boost down a greater trap I learned long lepithet when Sam does something wend usually its for good noson. And sometimes its use wond

Histinaido insept taxia a levi minutes lotor ventod a loket involta atti thi duli levil in the bottle then strugged and poured again gimming His could always theig shout the time-heard Sam policialed logithar ()go time in moving histophilati () and its not during in policy policy of the lot its not during in policy policy of the lot its not beins account of the time a Couldey won Sabing, when a familiar vice puned from the office docray.

"Broad-set 80 me who year head week PB Macheney and to me seeing callen into their own. Sam stock or just sub-tarbacky in Macheney took it waard Sam sub-tarback Macheney took it waard Sam sub-tarback me Beltist new Halogorn moreseet (iso serpedo Labar in the strak more. They is gooth and at My ayass. Mac a canned: "The inmutation suprecised to one hollowe spread between the types.

Sam paused. "You didn't follow the instructions?

On sure To the moron " seed Nac. and they both conied. The Bells squather were four our bias a little and showy outbar like its cheer while the box made Sams statement straty and practiced—and maybe packed with a supmare or two

These lights had a price. Sem seed

Net put hands on hips, and we could all see a nuclear handle in his reactand, as he snearce down at his tap of Sams belomy petr. "Money stight right now' he said, adding as he looked Sam up and down." adding as he looked Sam up and down."

Noticolog to collect a debt sonny Sam risplaci. Re least you aren't overchving your knobborns anymore

I never drive over my head pops Nover did if never well?

"Good this you know your imitations "Semtrici from and releved borze-faced collies in

Socken softly, lazely "They're beword

too long belone. "I think your park slip's showing deand " he challenged

brik slip run for ten years. But we can atsi do # gramps These days its a barga run "

"I've never had to issam that " Werc said

Then it escalated internancia made it worke by telling Sam held drunk too much. Sam oleverg with anger, said around his thick. driving a bloody school bus if Mac had a Desseron

Man thought the was booze talking until After a two-remute inspection under the busi Max admitted it mobil ust be possible to best a Bella that way For 11ty yards

reveal for a hundred vields, given a ktie two bundled varia then a tui mile while trand to untounois my tapp. When Pat to-he couldn't hand the bus own because it was clearly marked municipal property

a sozzled horse wink I get to start in the lead And help gotta take you for balled

"Here's a good-luck charm." Sam said from his acket. It's heavy he added, and in my condition that seemed massrrable

med to talk Sam out of his ident watern

So at two in the morning I strapped into Pat MacHingry 6 Bella sigain and let a hand cold keynel of schmity take root in my brain solo Mac, and shouled over the Bellius growt,

Crazy cost Mac yelled back. "Chevy did tool. And with that he slapped the Per

it up awhile then levered the tolding doo same this bet was I couldn't even think of a than a Le Mars Bella against a lumboring valies school bus for a mile. Unless that big

spring held untapped macic

Then with my helmal cotom sat patched into Macis, I saw hen lear in the dim phoschurk," he grated "What do you row

"COME ON RIG SPEING?" I shushed a most active new Anvi survivientive come co-

"Holy mother macuphia Machine," Mac paped as the covice remember of hurled of There was no moon, and Mac's normalidity on lights bound into a gray log of the smoke the bus disappeared around a tots band and Mac pursed and anisphed on the long Nac upshifted in the turn, there was the bus up sheed meets ackness, and cong the helfs dappers. We server tigation an inchi

ings in your legith thes to have your synapsian to much Mac beenly made the turn onto Chevy Chase, and the bus maintaining its lead delayed so long 1 didn't think Sem could constativ make it. The broad volce but siewed shaghtoned just ahead and Mac culled left to page, and the bus exerved to

Shut the gate on me you old besterd Mac crated By now weld done a half mile

"Lame on big spring" someone velled

Now we were into the taxaly stuff SimaAlex, with cum bells scrabbling for one hundred alumnum stallers at the back RLAss-schery-CLANS as Nac bottomed heballhousing in the next harpen. Then up

he wan't artira passed On one long the gum bails trying to pass. And every where that Bala word, the bus was sure to co-aviali un brench sheet biet Mic prepare for the turns.

When we how/W/ULied onto a shareht woli i bodevanti i malanci se won relatro a mig." I crowed maybe a little loud because at that noni Mac reped year his

Not in my headset, but Himp the cookpri, ramp) is come est my kinch (BCOMmea, BOOMMM up through the cogs onto a broad right-betrax

And I watched the tach reside seeilo pad next so tractil state thruster in 10th http:// highest open Now the song of that engine a helish how as the tach readle reared the

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Today there are no new lands to be permerturaty on the business maps of the world. For the first time in con personal power and achievement do pend upon some strange qualitieswithin they own natures. They dow understood Do you know what at counts for personality-how some fersely to do this or do that You reset

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LAURELS (AND HARDYS)

The Nobels and the Pulitzers are out of the way, and so now it's time for the really big awards everyone has been awaiting



The pages (15 km) to reflect on the paid yeak and hence house declarated man and women who steadhedy actuated to let decesso datative, and the thread of material houcoast, keep us from isaging. We are provid to report thet 1905 marked the severith straight year that unbrided sileases was another compared and

I not the year that Manne cardidigat Sau Coren with a Schipper Disco least and prevented his petitish meaning the second second second by the second resourch as at Harvard, writing under a SSC000 contract how the Depart resourch as the Harvard, writing under a SSC000 contract how the Depart come local opposites by the New E over come local opposites you have E over come local opposites have a second per and Lobe and Pape, tanked the year and Lobe and Pape, tanked the



part sp for mankind." The judge for this year's owards was Frank Kendig, Ornn's founting elosculve action. As usual, the only part of the socrat selection process he shared with us were bis response account, heat a candidate for an award, the Nobel Fraze in fotom.

This page, the 'Kot' of produces' the sulskerpe our (shown A/D, Evris embered solar system (right) Opposite known from Invernant, heidald ducate för right



GEO JIVE

Tightes your BMA better The could be the by our fould have having of information of generations in the BMA gaps of funcany and the second second second second to have a second second second second to have a second second



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A less is not just a less according to Connected public-health consultint Or-Hears H Neuronn (Boctaves social lessing con spreid diverse, it "Larriso with it some degres of nisk mid has became a social host historiti" Thresped doctor's suggested hysperic alternahtwer the desp Japones box, he I alm expran. Or aut cholony your health.



Stepfical about a SDSD blood tool tool that promoved to degrade a pomovia strength lawy to more than 107 substances, FDA movetapator Frank Calidan sant Bio Haath Cartest a sample of owo blood Natawy dd the company not mooptrow the blood are commaniar, Kdiagoood ho darer na being allergic to yogurt, cotdarer na being allergic to yogurt, cottage choose, and cow's mile.



To psychologial Claudic Stocks, the mile of harman kindness in 930 proof. Testing the official second on Testing bio harker, heighter sign for an end of the deska and officers up to four offit and a He then asked the groups to help do some borng proofsealing (access who were the mosthelpful, (Carproofmade signs Stope) study is help do

LAURELS (AND HARDYS)



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ACHOO\$

If State Representative Find Williams has in why bickwarp your needs in a Mescan resource of the state of the state of the tab. Detending a propulated mode biowing bars, he said. Twice can create liber and hartness in the name of public safety, than we can take care of the now Idonset in that memoria. Wilds safety, than we can take care of the now Idonets in that memoria.

THE FEEFAL

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TESTING

If you have a landercy to say plack and given that a level days, the back trave, in you are dark. The good more it you may be local layer to become an about have have the back to be the same that and have have an about the back to be an had have layer in the balancestar of backman in Jahn Dago, paper, and backman in Jahn Dago. The about the balancestar that have have backet to balancestar and balancestar and balancestar and balancestar and balancestar balancestar and the layer balancest and the laye

Opposite creational surgery plar kdfp ywr ywn hogo, dyany drawlar (mear leff). This page para liwa far trobby (above keft, cheft tale (center), 5700 anwitte (keft). JOGGING

back and did physicals and the whole smarth for one year and brought himself right back up to spread. Kerwin says. And thats not easy when youre pushing kty.

Thermion too took pike in the pertermance. We and it must be took pike in the perterdont agree with the idee that people have to peduce believe the age of hwenty-six. There is no metical evidence of deterious usen in the different systems of the harmon being until about the age of seventy-five."

The interg pack of his theory has been has one startly level which the sign of hithy Boh Theorem and Di Thomas Mokers who preceal chesis on hub at his in the body when Theorem was added to startly an organy packets and body and body and packet syndrome approximation and has been added syndrome but notice had board at the syndrome but notice had board at syndrome but notice had board at board board of the stress.

Like eff of Therefaces mugat beaks hunges to generate was decaded by an ore Butter balaw through non-balances was pelied by the balaw through non-balances of Dr. Sam Posie decator of Meckal har search all drames fixed beats through nonalong with Dr. Nammis Theapard and Dr. Name Dr. The decator physical good laboratory about the status of the status atomic to the transition of the status atomic to the status of the status of the atomic to the status of the status of the atomic to the status of the status of the atomic to the status of the status of the atomic to the status of the status of the atomic to the status of the status of the status of the atomics to the first first of the status of these

First we had to define the thing . Thom, ten register: Previously, their rouse had been ruled out as being too complex and too enpensive. But Thornfoot had not too be used meeting a sterg of marchidegreal tests at a roasonable cost. As a result he bogan to define this determining eventhome.

The cutrinities of these modes immediate spacins care on August 30 1988. Alter nearly a 16 year wait. Thortton was to be come his own bail theil subject—wind the does person work to by repairs. I had been commod in the weer allward to his he would appead up the discovery of the cause and outcom for space indom software by years recalls Commander Richard Truly, who amend as captant of Challenger (151-56).

Though Thomics wasn't cagnally scheduled for the IT-Tuly requested him as a last-minute passinger. "Having observed the symptoms of space molice syndrome (pail for verning disclassis) from many thatsands of miles. Moore says "Bill was trially getting his larg opportunity to experience them hersall."

The physician soon became a patient. Of ocurse 1 get ack. Theil was reely most loturate. he jokes "it would have been a mar 20 ceale or disaster (Lihadn)."

As Commander Tady encoding 11 bioting the paragoan choice the bight pains of the head collected, pain the my value of the head collected, pain the way to prevent—or event track—space another pains scheme in event track—space another pains the event track—space another pains the event track—space another pains the event track and the set of the pains of the set responsible for direction to which are responsible for direction to any cubic condition in all cases of the straken are used in the big direction to employment.

The orly constantly reliable indicator of space motion syntheme in all people is the vitual attencies of gaztre molify during the course of line syntheme. Thoman says He is convinced that the "best patential inversafor understanding the condition lies instackying, storated and bower locates."

Can you see what I'm getting at? The upshot is, Men and women who've spent several decades in space may never be able to return to Earth as physically normal humans ?

Tocupit te has experimented with mediciators area have proved efficiency. All rait T seemed logical to try agains that were initially they appeared to werk well the intest's are now caustonable. What his administered desages of copolarmic dedevine thermatic flequently used medication for motion solvers on Earth, the results were not encourse in el encourses in

Therefore in each of the statused the statused specials of successful free status and status and not mostly the trapped-for sequel. School used to conduct the that mostly special sequenments in space on tast and monifolys (a plant the statistic the status and monifolys (a plant status), this lister care halos spectrumout of the state of the status of the school spectrum test and other status of the school spectrum test and school spectrum test and spectrum test and the status of the school spectrum test. School the sequent

But just one month existent in April, Thomton had cause for calebration For years. Thomton had locked to the perfect volumtier to calect information for his striftingbody-fluids theory. In fact he had asked Moore to construct a listiciang plothysmograph that walk all koll we existen to record changes in leg size during orbit. Moore "bought some party hose went up to the [NASA] saving shop asked how to work the sewing machine and kept on persenting.

Afficult the special tocking had been won by astronaus on exiter insteams the data collected wes, dall incomplets. Then along came uses the most extension and complete medical records of had shifts chang spacetiget, says Treaters who is shill ansknowled to

In the interest of special medicine, Thomton haid also assigned Gain to montor a number of other physical reactions to space taken Sensors measured a variety of body response. To thist and any electrotise surveyed brain works, and stethrocopes include bowel scande. Use Thomton the Mg three-year old Republican also becare sizk-with scenarios biospica.

Corr is gualat to peed Tombin to I is gualated. I next mail a non-doload publication of the term tom consistent to the publication of the term tomory one publication to the term of the superstread of the own upcontrol present. But that Staturday Insventifie the last toring the chara from Garris models appendents. "I couldn't believe it "Garn organ " Are you comp? Lasted them the used I publication wat is look at the use! gut bask from gaze 1 bayl to see I now "

Ever minipla of the astronauts health Thomton has began to apposite on the long-term effects of weightlessness. The measures new employed such is clark exoccas will have lifte effect on these menand women destined to spend decades prinage even flare whele loss—ant space.

You see the longer the period sport in weightestness he explains, the mole siginfrast the changes in the masculashinal system. This is particularly true of the lower body where there silkely to be loss muscle tasks development.

The lower body may tever develop sufloaent steergth in certain leg muscles and the lower back. This makes him leg bornes with rollakely it's muscle mass. In contral will nonake slightly in length. They say well come to reservice the slender muscles of our actioned relatives.

These charges will replace on the locky's other systems: A decision in muscle will meen reduced methodeam fact will result in a stripsing in the size of the heart and longs, the adds. Those humans born in space will provide the size of the heart is not lowers in the outwortmath of our og. His powers and heart provide some of the powers and heart provide some of all thes. A Nets and women may never be hearts. The add the size of the size is the size of hearts will be all the size. Nets and women may never be hearts. These the hearts provide is not hearts.

As long as space physicans like Therrien are caring for space crows however the future of humaning is all but assured. "I wate to get soft space," says Ken Cooper, "Bill Thariton would be my doctor. DO Marion shepherded six personalities in her



BY JUDITH HOOPER AND DICK TERESI



n. January 1964 we wole a stort article in Cononsum about multiple personality reacher (MPD), the basere psychiatric syndhoras kowin in the variancial as "staff personity" "hou may know it as The There Faces of Ele synchrons abor the 1967 bost salier Seveni weeks white the strole appeared, we received a well-waten and hought's later from 14 M Galoga,"





PAINTING BY WOLFGANG HUTTER

a self-descriped Truingle. We work baskthe terry five year old Massachuserbs worran behavior the pseudowny M. M. George e an amagan of her these magpescienties. Mark Monca and George-Manos is not her real ream-letter poper adde have been changed to poster her userby But her the as multiple, as vertical by her psychiatric is a particity sel

Les thirty being praies cells, and if there bears mission to the second second second second second for the second second second second second second for the second second second second second second contrary negligeneous on the less the second second contrary negligeneous on the less the second second second contrary negligeneous second second second second second contrary negligeneous second second second second contrary negligeneous second second second second contrary negligeneous second second second second second test and the second second second second second second test and the second second second second second second test and the second second second second second second test and the second second second second second second test and the second second second second second test and te

Like most multiplini. Manne haa been turing more haadka ak, bucking multiplini ak, bucking multiplini ak, bucking mulba akadamasaan take marka capata isi paterta auada attarpini, paagopata da au terethini mataga paterta akada attarpini akada chattare hona. It a many-faced be appated on the out-strain and paterta and hene of the attarpini attarpini attarpini attarpini attarpini taketare attarpini attarpini attarpini attarpini taketare attarpini attarpini attarpini attarpini attarpini taketare attarpini attarpini attarpini attarpini dentarpini duckide estandamasa by watay dentarpini duckide estandamasa by watay duckida paterta attarpini attarpini attarpini attarpini attarpini duckitarpi duckide estandamasa by watay duckitarpini duckide estandamasa by watay

Psychiatro Frank Huites disconnoil in train trutipie large/uni a varia for depresense at the National Institute of Mergin Heath (MWH-) pum scatabit, unseponave to treatment. The hash texe patients algorind rounds as classic exemption of the algoring drouge as classics of the scatability of patients of the scatability of the scatability of the scatability of the scatability of the patients of the scatability of the scatabili

That was 1979 and over the peed tow weeks

Putramment on to study some 100 Texes, insponsible analysing than toward as well as their provides. When i got into multiple parsonially disactic: I got to investe in it lessonially gave up everything state, he says. He and no soverkers at It the Milli and St. Exablertia Hospital. In Washington can now root that the attendo solve mode a multiple are increased and more autoenous. This anome association

Puttan working with NMH obleague None Buchaum began his studies by analyzing the online waves of term mulpile. He exposed each personality to fashes of light and their using electrodes attached to the scalar imascurate the brain's electrical enstorem political an existed referring.

In each multiple we studied at least three different percentiates that were capable of cooperating—usually, the core personality, a child bersonality and an observe-corepolisive personality. Putram explains. Bird we tested each personality at loss the timos. For controls we used mornal actors, who

Like most multiples, Marion had been through more trials than Job, including commitment to a mental hospital, sucide attempts, drug treatment, even an exorcism

maky imprined bang dillement people His leads advoced provinsibly from latelate advantabilitationa loinatin nausoscinolita advant situs www.p. of electroinceptelogram (EEG), potensi odini chango much timo one lengeno descrisibly to advect But this Spela Jobe, frannati, and heng in stabilitati ma golo mucho patient looked to diffuenti peoplem nauso patient looked to diffuenti peoplem nauso patient looked to diffutionation and the stabilitation and the stabilitation advector tabilitation and advantage fragmant. Make helitation advector much pot herman fragmant backson advector much pot herma fragmant backson advector much pot herma to datave backson advector much pot herma to datave

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"Wi now know of a thousand cases," says Putnam." So while its a nare disorder it may not be as rare as we thought." Bighty-five percent of the victoms are women. "Bit," says Putnam, "I suspect that there are many unrecogneed has makings a to commergation optime locations they used in your label optime locations they used in your label optime locations and the second second second label optime location and the second second location and locations and an experited as represent the location and an experited second second label optime location and locations and location and an exercised second label optime label and an exercised second label optime label and an exercised second label optime label and an extension and personality in the data label and label and label and an extension of the location optime label and an exlation of the location optime label and an exlation of the location optime label and an exdension optime label and label and label and label according to the perpendient who leaded according to the perpendient who leaded according to the location optime label.

Many multiples, however, sturite through that picks of salves incomplex.costly working as corporate lawyers, secretarias. IPA presidentia, or derites—incognite over lio thermisities. The first init may be dod pages in the temporal steam. decutioning memory laptes, perhaps the "Wileful Zone exoperation of walking up in a strange mobile scene with a perfect torange (in not manoid loon).

One day in 1979 I woke up—or rather. Mary woke up—at a motor room with somebody Manusca was involved with Logiled my psychiatrist at lour A is and used. "All upts, what is poing on here?" He said "Okay it's form we laked."

Lukrey samewhere betwel all the personals, which may take years to uneart in the maximum in brough the compensation with the standard of the standard with the petant back to annulate unity presides like at the standard standard standard standard how buskly recompensations in the uniter data organi. But despite her myscal desnotioning to harvam and may function uptable informations are may function able to home and other personale.

May visit a menicipal rect a good when a modelina single Monae was the mail wager in the burnch, the had a beautiful the three default categories, was sheed in three default categories, was sheet default, and the second second as default, and the second second as default, and the second and the second has been and the second and the second planterine obtained a net to socie he d put main informer: bicause I had a litera a three image Model and the second the second second and the second which was the forced a main of planterine obtained to the second which was forced and the second and the second second information second the second second

Adapted from the took The Three-Pound Ligvente by Judith Hosper and Dick Tenell Copyright & 1989 by Judith Hosper and Dick Tenes In the re-bishted by Martin Morphiles

This former National Security Agency chief, who now heads the Jet Propulsion Laboratory, says 1986 is a bonanza year for gathering intelligence about the planets of the solar system



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Laboratory (JHL) in Prevadence California JHC is parentary program is angua bity the orionwing measingsace of American tochnoogy the information that links into its computers a two-links into an its computers and two-links into an its computers and the into the intertion of the the an entropy massial development are UPL targety terminages of adflation where the Amery in 1608 and become a Molaritera target of adflation where explane, IPLs american based on option, IPLs american based on the target of the intertainty of the target of the intertainty of the intertainty of the american based on the intertainty of the american based on the intertainty of the american based on the intertainty of the option, IPLs american based on the intertainty of the intertainty of the option of the option of the intertainty of the option of the option of the intertainty of the option of the option of the intertainty of the option of the option, IPLs american based on the option of the option option of the option opt

PHOTOGRAPH BY ED KASHI

tary space program. The lab built the Explane 1 the first U.S. sateline in orbit and the helt JPL was the home port for the Rangers Venus, and Mercury, the Vikinos that landed on Mans and most recently, the Vovaceur Vostagers is now moving in on Uranus and Noptime In the last 25 years JPL has behandling research, development, and speceflicht activities of the U.S. exploration

A lew years ago, however, JPL was in trouble. Serious cutbecks in covernment Cornet were clashed in a cleaperate, last rector Bruce Murray reluctantly decaded to solicit work from the did boss, the military signed to classified research for the Depart-JPL went to an untikely candidate a man who spect most of his adult ide in intellabout them if he wanted to Lew Alien a for sector of the National Security Agency (NSA), and a leading expert in the mittary space

No scorer had Allen taken over as dien: began to lift, new projects were approved optimism swept through the lab. Alien reshuctured JPL efficiently stressing technic cil importion and achimement within the monetary confines. Today the lab, busier than nus, and data from the international fleet of Halley a Correct/Voys and captured theough JPL's deep-space arternas in California Spein, and Australia

Lew Alen, a tail, adid mun of safe looks comfortable at the helm. His gray suit, taslored shirt, and thrope of hair are all well progreed But the properties doesn't stop three Aleo is a man who is in record of is an important factor. From his incretieting preter not to discuss to his continual use of the third person improved—one trinks away Allen directs by purporting to be less be absolutely clear but not necessarily on him As he says. "It is probably an indication. dear vewof where I wanted to go but rather had a very clear understanding of the pres ent that was exciting and important to me? guided Allen from one major accomplish-

The only child of parents long separated. entrund West Poet. He was younger than many of his fellow cadets but bright and demint a clane, and in tiving he found diamous, cated machine," he says and make it do what I wanted it to do under demanding per-Point Allen was assured to the Strategic Air Command at Carewal Air Force Base in craft. In 1952 he entered the University of linos There he earned a doctorate m physics after completing a thesis on high-

6One works hard to protect intelligence methods, knowing all along that the one throg that can undermine you is a subordinate. Then to See espionage occurring is discouraging ?

receipty photonuclear searchors-merchors cles of light. Then at the Atomic Energy Commissionis lab at Los Alamos, New Mexics of thermonuclear weapons theal-penerated ruciest weaporni. He also studied by effects of high-altitude nuclear detonations for ballisho missile defense

With the pelices hartor that seems to ien tells the story of the Los Alamos scienbland, 'he secounts 'we'd place a bottle of stan our Quonset hute, and the plue was it you wented a dry martin, you'd put your very dry merter, you'd put your glass out for five minutes. The vaporized vermouth equid allegedy settle down in the tallout, and vola. of course would be the sightly racioactive 100 years

By the party Strites, Alien, now messionic

the DoD's Space Technology Office. Then tor of score systems in the Sevences he entered the intelligence community becom-Intelligence Agency Six months later he was dector of the National Security Apency NSA considered to be the most second of US intelligence organizations supplies in telicence to the CIA-and as Alen discovtously for a time!

Aleris NSA apportment came at the height of Watergate when every intelligence agency was under suspicion. He was the first NSA director to ever appear before Abaud's Government Information Committee (committees investigating US intellgence activities) And Atunug he says gold under his skin Mrs. Allen receils that during pictures of Abzug hung around the house reduced from the Air Enstre in June 1992 her

scuba dwng, skydwng, and ballooning with his famely. He is curck to anticipate conclubatve character. The ahaid when one aaka these kinds of questions it would show that being billed with a few elements of escape. what you are doing then declicate yourself is important and making a contribution " Ron

Once As former NSA director and decute to the detector of the CM, you can really keep a secret, I magine Alen: No sectul

Oms' How did you escape the overwhelming pressure you taped as head of NSA? Aler. My man purpose in life two been to

measured not by what I did but by what they did. My skills were less in beating an awesome responsibility than in ensuring that an organization worked properly I don't think I py sol never needed to escape

Omn' During the Seventies, what was the Allen While I was to NSA the mentionloss into the intelligence community was under dia Congress which was enthusseboally seeking to find tault. We had to be poopernielicence capability The difficulty was delaving our appearance before Congress un Iracking down unexplained aerial phenomena is articlal business in France

AUTI-MATTER

When an unidentified is inpangle on the Unided States load extentlies inspantly distasks load extentins the alleged spatege as shock or training the unidentified spatege as a hock or training the states of the inset as the unidentified spategers as a training the states of the spategers of the unidentified spategers and other the states of the spategers of the states of the spategers of the other spategers and the spategers of the other spategers and the spategers of the spategers of the spategers of the other spategers of the spategers of the other spategers of the spategers of the other spategers of the spategers of the spategers of the other spategers of the spategers of the spategers of the other spategers of the spategers of the spategers of the other spategers of the spategers of the spategers of the other spategers of the spategers of the spategers of the other spategers of the spategers of the spategers of the other spategers of the spategers of the spategers of the other spategers of the spategers of the spategers of the other spategers of the spategers of the spategers of the other spategers of the spategers of the spategers of the other spategers of the spategers of the spategers of the spategers of the other spategers of the spategers of the spategers of the spategers of the other spategers of the spategers of the spategers of the spategers of the other spategers of the other spategers of the spategers of

t eli began in 1977 when the Cantre Natone' D'Eucles Soltates (CNES) which is a roughly equivalent to NASA established



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In one incident decussed at the mailing by investigators deformed vegatation was discovered in the

UFO UPDATE

2020 2020 2020 Misure to An distance in Advances (2014), CEMIN, Tennis discussioned and the distance metagole ICP reports buildings, the distance of UCP spinregistration distances of the distance of UCP spinregistration distances of them of terms. BUMAIs in the same double service metage. The incruming who also spind simplement area physicismes and wanted some shole simplement area physicismes and wanted some shole simplement.

Eplowing its menopie, GUIVN has worked closely with French police to log some 1600 UFD reports over the peet it years. The majority. Valacco emphasizes "have been explained as rature phenomena or sincest. But thity-leght center take still cuording menos.

Spuried by hose question marka. CMSI nearby sootscreet meetings in Phars and Toulouse to discuss GENN's research and to exchange information with loving UEO issearchest. Among the topos covered were available. - restlict oburryeade www.e.e. r program.com + toportery, andred and them aburred a www.French public contention the damaged plants, and GERWA asked positive to existence the vegetace. Their Indiana, "This plants had out 50 million cent of their chloraphy? Researchers who unable to explain the deficit or reproduces in normal plants.

We exchanged distabilities containing details of here cause and humands of others. Hyrek comments, And were appred has when the French have a hid cause, thay's target mit it to us and well do the same with them. UFDs ere a global pharomenon, end the sund of occeptration is attormodaly important it we are to undershind what is going of

Why haven't other governments totowed Finnces teor and exabilished official channels for UFO investigations? There are reports that his USSR has a program small to GEPANs. Valueco answers "But in general UFOs are not considered the domain of governments because they alon 1 even as mitiany or exactly transits."—DeCRNY BAKER



TOURNELOF THE CAS

Jack Selectors withmess Massachusets withmess one August morring in 1998 when he saw 4 cross the basy now the senser welfle photographer for the Nessachusets Division of Taylanee and Wickle says "Theats atsolutely no question II Wisk a moutain from

The moving in table is also moves an exception in the international activity attempts and exception mentions are may provide a transmention and may provide the service of the provide activity service in the provide activity service in the provide activity service and activity is service and activity and service activity and activity service activity background provide the service provide activity activity and activity activity and service activity activity and activity and activity and activity and activity and activity activi

percent of the overwitnesso percent of the overwitnesso percent Reporting reatisers occupants occuld be minibialism, anyly biological Robiett Downing who in the last Sevendos conductivist an externive methodical of deations out get treports fromber U.S. Fertial Derived Taut from well publiced peoples windle injustified peoples windle possible of boolieve what how have to believe what how have to believe what

Anches wishing belogging regions, included coupling regions, for the New York Department (In Interprete the evidence Memory Accessing) is Reverse thousand of the State of Memory Accessing and Frances Accessing and Accessing an

Brocke desen Lakpus Instruction averages have been averages hereal desen finit they are members at a beseting population of the destinationationecrose. More popula have pot occugars here you would believe the says if and some either reported on a left finas.

But Downing theils that, the qualities of the existen cougan is still open. All we have relative tend out for the batteries is that fit is very difficult to locate rate eluxive ammats in withernees areas. Javante Clark

NUMBER OF STREET

After a silect in sea belied to be choses. Maryou we have a chose of the choses we performed and the body was polyeous with body was polyeous with body was polyeous and handwed with Aftaza as up in his collini and asked to handwed with Aftaza as division was not handwed with Aftaza as a division was not handwed with Aftaza as a division was not handwed with Aftaza as handwed handwed handwed haloo balani.

Mutas first deal when he was there pays old Alter being waspeed in blank vata and lowered time to a grave. The child accentrated and was haured back to the surface their act the age of wenty win Mutag data grave pays haure to act the age of sure analytical to see days Series analytical for set days Series analytical word languages to being time Onge ages - and Mutag vata Series Swart Onge ages - and Mutag vata and sure to be the set of the Series Series - the Series Series - the Series Series - the Series - t ground the aflegooity segained consciousness and lossed open his confin's lid.

Could Mutatas I deaths' be inseed to numingurell probterns? Neurologist Harbert Karp, of Emory University Medical School says that's not I kirky. T can I boncelive or any ogene conciden attecting the nervous system that could smeake death for any pondo of time.

Tradesci, says Karp, this sounds more like some like of set induced state. Through conditional time mg the yoga some people can dramatically rectude their heart takes and breathing patterns. Mutata may have accompliched a similar likel youn if he ween con-

But Mutate has another implantion "It was a case of motive somety by the angels in teaven. The recordly told the Daily Matter. These appeared to be a review over why I was picked to dei and some singels decided to rount mis to Earth."

STREET V DEADS



ANTINMATTER

NAMES IN COLUMN

When the author with the Receiptor in to stress 700 COD points is expose at the requirement of the explosion of the stress for the second of the the stress approximation of the second of the second approximation of the second of the second approximation of second a

Mones faity dreep is departy widey respective to nonparapsychologist bo cause of his rightmen living samsperse. If aprenen living would be liver to come back and do rightmen service Propels are boompressed by ender-inforcement.

"When I leach classes on perspecticlogy, Morris adds," I spend about the test third on fissial and eleception That gets the true belowers out. I dirather seech a class of sectors.

Meets increases and closed skepto himself. He's: "about eighty periodical conversed that whet is gonerally called ps impresents suspicious of people who chem to be 100 periodic contain of anything.

Morris who began his work at Edulburgh in December is currently studying the



research between humans and machines. He is also replaying a variety of bech repues that may develop and more revealed ability.

The missiage that Monts work life to communicate to the public s. First, instead control the provide state of ways we can decide outside the can decide outside the can decide outside the state of the state outside outside double Second Under whether the double Second Under second the double Second Under second the second the second the double second the second the

Fusion the distinction setwise means and and subside works, between subject and object worcome."

ollergeist activity while outplier ant englagest in ellert ow "

Pater Underscont

CIBLERSI

A reprocess recently approaches University of Pestharph language experi-Ses Gey, Themason whith an invasual measure. Three of in subject had been regressed back to excluse resamations the clamed, and they were able to speak in the toropase of these revicus layer. — Beightman Gabrie universitäte what they were applied these revicus to here table Could Thomse per here table of a feat work and appache Could Thomse per here applied and the antient applied and the antitrans.

Thermission agriced and other leaving to intern of the stopped, will think which they were stopping excited to a lengast? Tak which the targuages were contrivily analyzed Thermission found they were composed of meaning res sound a poperwhy based on each speak ers in new shorts on the park sound composed of sound to other target

A workan who clarined to have lived in Bulgara for operaged, old use scree Sundal hat are common to Surgaram. But offerwese, it was phone-bally pretty much the barget bulgaran some times and gotten an index of how the barguage sounds Thomas point somes. So she could also it was intertained

to make sure ne woman was not speaking some other tanguage frait could have been spoken in Bulgana a censury ago, Thomason even gave the subject a word light red used her to tambite the vocabulary into har past-life. tatici jace

looked for puterns in particular with numbers Thomason explains. But there weren tany And Inere just aren't any languages the door it have onlinerer

Arother subject inside the was the enclatmation of a Gashe speaking mesowait longht from Namanaki Themation's verdet? Gashe is an trish-tangwage, but the mark taken to be also and pooled of French sounding model dones and works that spennad to be derived from French and durch Lan.

A woman who appeared for express to the life of a in notoerthicemum Appoint square withis under hyproses square mastly Progen English according to Thomason And the few words sho ut bried 1. Apliche word ob wouly not hom any bona free timpulate

Says Thomason That to conclude that all three of these people with speaking garane gibbenah



ANTIMATTER

CONTRACTOR OF A

A mappi problem to partimychologisk is the uncenottability of the phenomenal textpect can do will on an EXP test and day and poorly the relat even though the constronts of the tests team relations of the tests team relations in the earth signomagnetic team

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of data. Adams lound that in the 24- to 48-hour period before as occessful bests geomogratic-keld measurements vero generally low Before unsubossitu/ tests howover measurements tended in be both

Anothel approach was seen by Mohaik Revision, professional polychology individual revision and the Lauenter University, in Canada enterthe approach is subdy crists apparation. If which is an individual subdivity second of a feature theory measure of a feature theory measure of a feature theory measure of a feature theory of a measure theory to an their several single theory to an the several of a diversity for all their several single theory second to their several single theory second paragraphic activity was being paragraphic activity was being and the several single theory several single theory and the se

Indicate or the extension of the analysis of the system of the second se



Address might have been more than a fictional character in Activitian legends. According to histonian Nikola-Toridoy astherio (17he Ouest for Menter), stari Brown) he was also a teal figure who lived some 1.400 years ogo in what are now the towhends of Scolard.

Being his clear to a short Well balans and hadrough tooolis "Staty says that everal mediation may be served mediation may be been and the performance of the performance too the performance

Botto says hall by suching heas opportunity in an end of the second second second second second in Bhat where exercit with the second second second second for example in the poortunity for example in the poortunity and examples in many second second in the Catabase Forest and examples in many second second in the catabase Forest in the Catabase Forest and second second second poortunity and poort

Although most people

abbolide Menn with King Anhur Tolsky doubs that the two ever met it's possible but unikkly. Anhur probabily Red at the bogning of the such constrainty some seventy-five years balos Marin I think the two bocome contracted because Merin Is closely identified withite riskels had consider withite that's mit consider withite that's and programmed

And was to select any with a set of selection with a def Torong was writing and def Torong was writing and def Torong was any def Torong and the the Torong and the the Torong and the the Torong and the the newly for unpart of the the newly for unpart of the torong and the part enclase of the torong the torong and torong toron

Where the bolisska Merin routed as a field-and blood min. Tokiby also insight that the solestick is a synthol of mythic proportions. These are parallel between Merin and the stammarsocicuts of Setura. Tokinen logands the stammarsocicuts of Setura. Tokinen logands the moment have radionaltion of Setura. Tokinen logands the moment have radionaltion of Setura Bakers

"The whole of life is but keeping away the thoughts of death."



INTERVIEW

CONTINUED FROM FRGE BD

the congressional staff to that we had resutance that the inquiry would not expose our intelligence capabilities. So the difficult aspect was the work that went before the hearing, and that were often actimicates

The appearance before the Pike Commibecoparted wheat much versing, and the presimilarly process did not work well. But i might have been bacause they verse paties in might have been bacause they verse paties at most bacause, they verse patient at most bacause, and the hearings verse carefully constructed as that they definition day durings on millipince carefully definition from the versing proceedings.

Alter: One works hard to protect intelligence capabilities knowing all along theil the one thing fisit can undermine your works a person who is a subordinate. Then to see or cumptions where expension occurs is discrutications where expension occurs is discrutications.

Orace four managenal style at JPL has been compared to that of an ace poker player who holds his panda player to the well

Also: Well people are hard enough to presume that they paint hadom plane and under that they can't are it is a very faitering manufactured rig. But it as very faitpeople the term necessary for the term object to the term of term of the term of the term of the term of the term of term of the term of the term of term of the term of term of the term of term of term of the term of term of

Omn/ What is the special significance of the Unanue/Voyager mission?

Aim This is in encourse about which here is to other, encourses. The same that the problem is block that is in here work about Ution is hough it way encould get a based and the same that the same that the market way and the same that the market way and the same that the s

Repairs observations have helped calls by the very storage behavior of upper monitor load and two storaged behavior. That we now realize a the result of total loces that used the growy asset as a newgaler of the used the growy asset as a newgaler of behavior. This storage to the growy of a plantimum the calls upper immum a powerful ab the occurs or a spacecent in a powerful technique and Woyapir capitalized on I fully JPL developed the technology and has exploted it recently in other missions

Once What steps will be taken as Vojager approaches Neptune in 1989? Allen, Wrill occurre the aperture of acter-

A cuical appeor of the deeping of Veyages and other J-Represents in the comprise center of the developed and the comprise contransists in the developed and receive developed of the product of the developed developed of the developed and the developed developed and the developed and the developed developed developed and the developed developed manage special developed and an developed developed developed and the developed developed manage special developed and developed developed an last at very comprehensive (of the del Usion information will be less than of Lonce. And ell comprehension of the first provisioning the ell comprehension of the first provisioning the

 Asteroids are interesting because, like cornels, they were formed very early in the evolution of the solar system, and they haven't been altered much since then ?

capability of the ground network Ossel. Do you have any nightmares about togager's encounter with Usarus? Alien No. I think its marvelous we can do

bese timps. JPL's here to execute a program of tandamental scientific value. Skil, if it wan guardy the science rutarn we wan after there might be often chapper ways to hand science. There is value email including chama and exectament, which somulate beside and exert free magnatures.

These splicectals are separative and precertly shore location in level of them. Blacks an externation monotone bits paint hely were the most consolvative in agreement prefoces possible. The next percention attesing of explorement design and and and appreciation of the second monotone explore adigories provide in the second monotone adigories and consolvation and explore them were and consolvation and explore adigories and consolvation and explore address and a second monotone and address and a second monotone and address a

Alien' in May its in the trial contaction stages and percention for messambly. The craft itsell is usualizability more compare that twosign moders dans may 3-1 has even built in white managemic space and the Johan moore, provide languagemic space and the space provide languagemic space and the space and the space languagemic space and the space languagemic space and the space space the space space space space space space the space space space space space space the space spac

There are several types of astractionbose not in slicate and motals as in Amphrites and topose carbon not. We hope to the Sorral Paralacease mission. Attended, along with comots are interesting because they are object formed very and in the anot been altered tracts formed very and they have not been altered match anon.

Ormy What about the Lilysses project to study the sur?

Alter Like Gelleis (Usses goes to Juniter auge In plant and guest of motils that (Use and the jobic of the Like III. The loss of the first and the jobic of the Like III. The loss of the like the like III. In the like III. The like III. In the III. In the like III. In the like III. In the IIII. In the III. In the IIII. In the III. In

Carrier (1996) going to be a sury year Allert Nerry motor Will sam the Nayawa and the Nerry motor Will sam the Nayawa and the Nerry Nethor Touching the Nethon State of the Nethon State Nethon State of the N

Our plan if approved, in to by test by a type-P parbonanceus asteorod, and then to rendezvous with Tempel 2 as much in advance of its perhetion passage as possible (perhetion as the point during orbit when ain object is object to the year and not fit when the two vors When the comet is purescent, putting a paretrator or probe, into its numation of the comet in its pristine state for proaches the sun, heats up, and the volation ing away from it in the heat. We d continue making observations at the way around the ference before and after pentielion By coniserned by the Hatey's encounter the United

States has an opporbuilty to retain its **Own** White planed

server, using the spacecraft Mapper cated missions. It will though Mars has been tus of #s more votable something of a mystory Water in the late example Clearly Mars but one sees very ki-Mapper play?

observation have

radiar in Puarto Rico. The other involves the deep space network. These observations planets. Versus is not like Mercury or Mars. and it's certainly unlike the earth. Now the mapped Verus augmented observations mide by proand-beend raders. Altroach the show the plate tectoryc activity that comretps the partir's surface. By taking the res these characteristics. As we learn more about the planets we discover what a unque body the earth really is. The grounstances

Onry, How much of JPL's work is Depart-

Allen Just before I came here, JPL decided to accept defense work up to about one thed lense work has not increased rearly so where they are coverial weys to underwhy don't we observe the earth as a planet? We've much to learn about the earth by stepping outside the local observations and oceans almosphere, and land masses. Un-

Owner Whet projects do you envision JPL

Allery One of the most excann of these fuphere was too detee neath The Casern molecules, so we've stages of its evolution Geeny What pro grame are being ration of other solar died light-year tadus

Alon The BAS as-

a betteteid cize-handling and chipley sysfem called the all source analysis system studying the earth as a system rather than

Allert For teacturing waters . It has been studieng planets on which, not counting the make in situ measurantents. So we verefied



a great datance in space. Because the sun action (the separation of two objects in the

STIFF UPPER LIP AND ALL THAT



Englishmen hier imperturbably with their releatlessly wet weather. But they also invented the trench coat and the rolled umbrella Aod get along just sammingly:

Linflacoable Englishmen still dress for dinner in climates so sweltence that the idea seems self-punishing. But by sayonog a tail, iced Beefeater" and tonic, they manage to keep their cool.

The English, you see, believe in keeping a stiff upper lip in the face of adversity. But they're equally good at keeping adversity. to a manageable level. Which probably explains why they invented the trench cost. the rolled umbrella, and the Beeleater Gin and tonic.



cluded a form of coronacraph, a mesk do that perfectly because of oberrations in rations. With a specially designed mirror, they ot charges coupled devices. [OGDs are sets of silicon chips containing a treid of 640,000 senacra called poets. Light strikes the provis pixel registers and stores electrons in profind a small signal By exploiting the high dynamic range of those sensors, they were pitude signals. This is really an extraorch rique by a factor of ten, we should be able to resolve the image of a Jupiter size planet ready close to having Earth-based techriques sufficient to see planets around signed for these measurements. Within the rest fea years, we'll be able to make observations of extrastellar systems what Terrile calls occurrstellar systems. We haven the

Granic How close are we to sending a spacecraft to one of these systems?

After By any present technicas of propusion the leight of such a masser of the technicas and the sentencinary lang. Amesser of the technicas and the scope of human magnitude to beyond the scope of human magnitude. We are publicly together bears but and technicas public together bears but and technicas about the kinds of assertations you can make together with the propulation systems analytics you mght as well finds storad parametric basis with the propulation systems analytics you mght as well finds storad parametric basis and an and finds storad parametric basis and the storad parameters.

Omm: Do you trink a thousand-year mission should be pursued?

Alian: Absolutely 1 just don't know how to do t

Ormal, What about extratemental life? Alian We've made observations of controls

Also, where inside close video is dip pologia, different estimation polytomic biors we may be gotting a bottom handle on the quadation of whether the work close polytomic biors whether the work close polytomic biors whether the second polytomic biors and the work of the polytomic bior work of the solution with not expected to be universe we observe billions of a sizes? Or is an commercipate comparing the biors polytomic biors we observe billions of a sizes? Or is an commercipate to be a size of the solution of the work of the may be a size of the solution of the solution may be appendix to be planets with commercities a similar to court? In the top is not planets the solution of the response to be appendix to a size of the solution countibility puttions of the solutions of the solution countibility puttions of the solutions.



planets. Especially if there are opportunity to destrem much of anything Where doing SET (Boarch for Excitatorisstinal Intelligence) but if has strated character of observing anything when one works cut the platetis in actived One any quadrow whether SET is a specific endework or an excesse of scientific exploration of other solar systems scientific exploration of other solar systems could lead to a bother inderstanding of conditions contactwer to the formation of Biatoms. Another solar systems of the Dome, Another solar systems of the poten-

After These executed at the source phenomena in the second secon

Onval What kind of perspective would such a mission give us on the solar system?

Alan. The men scentific coective of that measurements using the wider base for paraliax life apparent change in posteri of an places) We now observe the distance of essentially a baseline of about two AUs. At one tracend AUs out you can moreve free. We also don't know what our solar system looks like from an outsade perspective. Observenors of Bete Potona ("ifty light-wate dust and other corretary type materials are like viewed from outside. Certainly we know Icazaid by surright reflected from a depshaped cloud with a mass of about thirty milico toos'i thet are within our solar system. cotion of astronomical observations. If we Own: Wouldn't it be spectacular if JPt.

Addent is work to great the strategy entropy in artificient and preventions in an entropy strategy like to stree JPL a loggery of a very atong retroval interactory, tothed by the very best people in a state entropy. The tother entropy and secretific bases and uninitialized in their interactions.

Ower But to launch a program like that would take a thousand years.

Alien' That would be great DO

TANGENTS pushed through all the way what he same as

Gyr.e. Paisad 'Can Lolay with the Tron-

In a moment. Be patient. So what would

shape an angular object. 'It would look like aides or like a box it would look like a

I don't Bink so "Lauren sad. More ikely

How's the work corning? he asked 7.4hv

'ts insted Tuty sed its upstain

Loan't say this makes me happy he said

Now I taken an emportant bit of work for

there it would take at least a month to see if

it's feasible A lats riding on this. Palar Hadyum deeped his hands lookher in front of him looken even more pale and worn

"I get right on it. Tuthy cond





Laborarub Mariatak rynes in lab tests to to an prof Cer man

NXX as much

the of the arealle at

mast sensitive and most selective radar detectors is the world Sapenbetereelyne system is superior to ner superbet units to neek-teg out and alerting you to police rader up to S using away ... pround curves or over talls. It's very reliable for sver the read pretect

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MORE GANGE Superheterodene detestar is extramely reaching I denote tropp agains more totably it even poks up the

COMPACTI Juni 25 # 15 × 35

MORE BELETINE Frank storyes are reduced by narrower band andance sids in "pußing se" ridte big bits

SWAT SWITCH For OT. Oby or long fanor highway sort

MURIE ALAMMER When reduct regimt to experied the red LED will whit was written 'NA' until moor spani at below delectrible reasons up this as the radia source is approached

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TION OF STOCK. COMB new autho and to housdate limited

WHY IS THIS RADAR DETECTOR SO GOOD



rield her. She climbed the stars and stood in

Who was that men?" Pal was asknot Tathy

I work for hern Turiny seed. Hers empans me most of the edupment I use here-

That was my expense, once

You mean like fenceral that sort of

Much more complicated ilm alreid " Tuthy

Thracht ret Don't worry about it Let a called up another routine on the four-space

Pal thought a mothern "Kand of world

On incurspece That's easy itsusticoks then shrinking again it a harder to see what

Bure Reft and light Dup and owwer Whatever the directory are called "

had noticed Lauren in the doorway. The

Pal cestured making two wide swinds with shoel depending on how you look at it Like a balloon stung by bees, I quess, but it's

ethy "You actually see it?"

Sure Palased birt that what your program is supposed to do-make you see

Tuffy nacided flabbecasted

'Can I play the Tronclavor now?'

Lauren backed out of the doorway She 12 CMM

momentous but beyond her. Tuthy came used such language. He was clearly awed

polies out at your their is similar to rotain or them to reverse left and right-right eve becomes

6From the kitchen came a hideous crashing, then the sound of vacuum being filledrotedor setting they teeth on edge?

Musicel you mean?

'Has I suppose he's remarkable at that too that if you take a three dimensional object and rotate if in the fourth dimension is will So if I were to take my hand- He held up owwen, if would come back like the? He held his left hand over his noht, balled the

"I didn't know that " Lauren said. "What

fourth dimension. Ana and Asta to puests

ment. T and part taxes n' she swid

Nother can L. Tutry admitted. Our car

thedral organ and wah guitar combination

sum? Lauren asked Tuthy didn't seem to

just weiked in here, You brought him in by

hon-ocent it out to me? Turky asked the

Pel sourced it's a fot bracer. Where we live is sort of stacked up with other places

Booause I m stuck here. Nobody out there

Tuthy's mouth worked "I thought you were

Yeah There's people out there too Well

Yeah They look really wend They stand tce us because were so small compared

The net land. Pai and many management Next I II draw the duo and owwen lines to

The boy shaded the shapes to make them

gets and it's kind of like seeing tyings in

lef and stared in open-mouthed wonder at

Think you're wasting your time that's what

Do you ever thirth how it looks. Potor?"

"I know a lot about you Peler Where you come from why you had to leave It will

Krephm away Hockrum advaed

caim stanng up at Tuthy from under her I think you can do it by the end of this week-

I know you re hare riegally. Theoris on m





Martery throas in the towel







Nake tene: Instand of teckcalling/that kat " 'Get out of here " 'Two clays, Peter "

Over drines, Tufty explained to Lauren the exchange he had had with Hocknum. The finite tim buggering Pail Unspeakable bas text Livel away work for bitm accent.

"To better talk to a jawyet ther, " Lauren said. "Youre sure you can't make him beorgy stop all his tractie?"

"I could solve his little problem for herr in just a few hours. But I clarit want to see herr or speek to him again

"He'll take your equipment swir

Turthy blinked and waved one hand though the an helplessly. Then well just have taxook taxt, won two? Ah. Lawen you were a tool to bring me over hare. You should have left me to ref.

"They uptored everything you did for them," Lauren said bifferly. She stared though the kitchen window at the overcast sky and woode cutside. "Ru served ther hides cluing the war and then ... they would have shid you up in perior."

The cone lay on the table near the wendow, betted in moming auti, corrected to both the miniscoppidar and the Translaver Pal arranged the score he had composed on arrange allow before the printedeer. The like a Bach canon," he said. That if I play better for them I kina a wind of counterpoint or over-hybrin that III play on the dup part. of the speaker."

"Why are we cloing this Par? Tuthy asked as the boy sat down to the keyboard

"You don't belong here, really do you Peter?" Pal asked Tuthy stared at hm

'I mean. Miss Davies and you get along deau—but do you belong here, now?

What makes you think I don't belong

I need some books in the school library About the war and everything I library Prepers and URV I flowed a follow named Peter Thomton this picture boked like you but younger The books made tim seem like a time?

fultry smiled wanly

"But there was this note in one book. You disappeared in 1965. You were being prosecuted for scrapting. They definit even mention what it was you were being prose using for "

"I'm a homoseaual. "Turthy eard querity "Oh: So what?"

Touren and I met in England, in 1964 They were going to put me in prison, Pal We liked —bue dech other, is she smugged me into the US through Gaussia.

But you re a homosemail. They don't like woman

Not at all true, Pai Lauren and Like each other wary much. We could talk She told me her closans of being a writer and i talked to her about mathematics and about the war I nearly died during the war?

'Why? Were you wounded?

No 1 worked too hard 1 burned mysel



out and had a nervous breakdown. My lover

a man kept me alve throughout the Fortes Things wore bad in England after the war flue the deal in 2601 His parcela came nos settle the easter and when I contested the settlement in coart. I was anmated "The lines on his loss deepened and he closed his syst for a long moment. I suppose I closed here a long moment. I suppose I closed here

I don't either My take don't care much. I don't have foo many hends. I weant aven born here, and I don't know anything about Korea.

Play Tuthy said, his face stony "Lats see if they'll isten

"On they il leten" Pal said. "It's like the way they tak to each other.

The topy ran he leges one the keys on the hereisen if the tone, connected with the topological threads the introcendular to the advanced threads the topological the rap basegies and creating variance. Large and later hereight no competition, repetng basegies and creating variance. Large the competition in the later topological threads the threads the the competition of the stopped and warrang the hards. There topological and warrang the hards. It topological and warrang the hards. They topological and warrang the hards. They topological threads the threads the topological and warrang the hards. They topological and warrang the hards. They topological threads the topological topological threads the topological topologica

Pai alayed until dual, then estudiantly wert home: Tuthy stood in the office until midinght latering to the timry sounds issuing from the speaker core. These was nothing more the could do He ambiand clawn the hall to his beforem: shoulders stumped

All right long the Transitiver played through its perprogrammed selection of Falls compositions. Turky by an bed in his room law doors down throw aurents more welchrigg shaft of more high relies across the well have be result in loar-drivensional being have to taked to drive?

kow far have I come to get here?

Without realizing he was asteep, he dreamed and in his chains a wavering mage of Pal appeared, gostung with but amit as if averriting eyes wide if m oriay, the boy said without moving his lipe. Don't worry about me. I mokey live been back to Kons to see what if a ker. K a not bad but / New to but new.

Tutty avoke sweating The moon had gone down and the room was petri-black. In the office the hypercone continued its distant, moure-squeek broactost

Fall rearried early in the morning, whething disported selectors bern Mozarth Fourth Violn Concents Lawns operand the fourth Color for him, and ha nan upstate to part turby "Litty said before the mornisor replaying Palls alwatch of the low-demensional beings David see them now?" he asked the low-

Painocide Thermony establish he bay Painocided There's closer. They reinterissiant Maybe we should get things ready you even think what a four-dimensional loot part would took like? Turty considered the for a moment. That would be most interesting " he said. "It would be solid."

On the trat floor Lauren acreemed

Pai and Tuthy almost tumbled over each other goting downtains. Laven stood in the lowing room with ther amic consend above her bosom one hand clamped over her mouth The first influence had taken out a section of the lowing occim face and the seast wall.

"Really clumay" Pal said. "One of them

"The music "Tutry seed

What in hell is going on? Lauten quered her voice starting as a screech and endropies arbitr

You'd berter turn the music off," Tuthy elaborated.

Why?" Bal asked, face weathed in an excited smile

Maybe they don't like if

A bright, fitmy blue blob tapicly expanded to a clameter of a yard beside Tuthy wriggled, from their sal is rightly varianed

"That was like an abow" Pal explained "One of its arms 1 think its trying to find out where the music is coming from 78 go upstars."

Turn it off? Tufty demanded

These sense from the kitchen came a hideous hiel saars. From the kitchen came a hideous hollow crashing, then the sound of viscoum being filled—a revense pop, anding in a hiss—followed by a low frequency workdom has set feer hield on redue.

The vibration caused by a four-dimensional construe scraping across their threedimensional "floor" Tufty's hands shock with exclamant.

"Peter" Lauren befowed all dignly gone She unwrapped her arms and held clanched foto out as if she were ready to exercise o start boxing

"Pain attracted visions. Turty explained He turned toward the stars. The first four steps and a section of floor spun and varshed. The rush of air nearly drew tim down the tole.

After regarring his balance he knoeled to feal the precisely cut concave edge Below was the clark basement.

"Pell" Tuthy called out. "Turn t pill"

Tripplaying something new for them Pa shoulded back. "I think they like it."

The phone rangi Tuthy was closed to the extension at the bottom of the stars and insinotively reached out to answer Hocknet was on the other and, agreeming

"He'l cel the government," Lauren warred

Tuthy waved that off 1 know what's happenetic Theore knocking churks out of

How to find Parker Brothers Clue VCR Games without being a detective.

We have lats and lats of Clue VCR Games (and ather tays, too), and we'll give you good service, and a convenient loco fran in shapping models across the caunity if you wont o Parker Brothers Clue VCR Gome, toke this clue and shap with us

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fries space into the fourth. The fourth of mension Like Pal (ays clamaybruites This) could kill us¹

String before the "borotavier" Pil happin layed in new mobily "lufty agroundhed and was abrughty blocked by a thick groen celture in sogial actick and with a semice lenture it obstabil and discotted an act in the ar A soction of the celling a year wide was beded cut of three gases fully in her Medi as the semicer of the celling a year wide was boomstell, and have speculed all over it within cities makes.

Turty edged around the havy toroamately and pulled the plug on the Transiever A cage of zeppelin-thepati brown eaurages enceded the computer apon, elangated to each the ceiling the floor and the top of the sonther stable, and then populat down to try strings and was gone

They cent see too clearly here. Pai said and sturbed that his concert was over Lauren had climbed the outside stars and stood behind Tafry. Gee, Thi sony about the damage.

In one smooth, burling motion, the Tronclavier and oone and all the wrining associabed with them were peeted away fail if they had been stock on labels hashly removed from a file surface.

"Bee Pal sed his face suddenly regis terring alarm

Then it was the boy's turn. He was resound more slowly with greater care. The last ting to verich was his head, which hung supported in the air to servini seconds.

I think they liked the music The said with a grin

Head grin and all dropped away in a dilocation impossible for Tuffly or Lauren to follow. The norm sucked air through the opendator. Hein guelfy signed back to normal

Lauren stood her ground for several mnutes while Tulhy wandered through what was left of the officer, passing his hand through mussed her.

Perhaps hell be back, Tuthy seid 11 don't even know "But he cidh't fman. Caudr a stree dimensional boy survive in a foundi mensional voot, or whetever key dup—or owner?

Turby did not object when Lauren took in upon hemail to call the boys froster parents and the police. When the police anived the endured the questions and accusations also cally, like animolosis, and taid them as much as the know. He was not believed in eccled, interview, take which to believe. Photographic were taken.

It was only a matter of time, Lauren told him unail one or the other or both of them was aniated. Then will make up a ptory." her suid. "Shall beithem is work my laid.

Twill not "Lauren said. But where is he?" Tim not positive, "Tuthy said." I think here in only braunaw

How do are knowd

He told her about the dream

But that was before, "she said

Partiably allowable in the fourth dimension, The explained He porned vagualy up then down then strugged On the laat day Tafry spect the early maning hours builded in an everceat and behinde in the defly office bisying the pugater light and again therig to vesition and and kate. He closed his eyes and signified and keeled the tread, intertwined his trigers and drew add liftle graphs on the monitors. built was no use His brain was hard wead.

she must put all the biame on hm?

Maybe t will all blow over she said. They have no clear this evidence in offning

All blow over he mused gassing hishand over his head and grinning ironically. How over they il ower foow.

The doorbeil rang. Turby went to answer it and Laureo followed a few steps behind.

Putting it all together later she decided that subsequent events happened in the following otder.

Tuthy opened the cloor. Three mening say suits, one with a briefbase slood on the porch. "Mr Peter Tuthy?" the tailest asked

Net 1281y acknowledger

A drunk of the door hame and will above the door vanished with a roar and a hissing pop. The finise men looked up at the spaignoring what was incossible, the billed men returned his attention to "tighty and cominued. "Bit if is our duty to take you into comtody who have information that you are in this country (lengely."

"Ot? Tutry said

Beside him an irregular, filmy blue blob gritw to a length of lour feet and hung in the air volsaitig. The free men backed every in the models of the blob. Pails head emerged and below that his extended arm and hand. Tuffly leaned forward to study this amonthine. Balls fingers wachied at two

It's fur here i Rai said. They're friendly I boliave you: Juthy said carrily

Mr. Tuthy the tallest man valiantly parsisted, though his voice was a squeak

Turty generate loads at Lauten Sha gave him a small fraction of a nod loarely under standing what she was asserting to and he took Pal's hand. "Bittem it was all my faut," he seel asan

From his list to his head. Pater Tufry wile peeled out of this world. An rushed in Halt of his bases lamp to one sole of the door chappeaned. The INS men returned to their carr with damp parts and embarased, deply/worred espressore, and whout any further questions. They down away leaving Lawren to contemplate the quest.

She did not sleap for three rights and when she did sleap Tuthy and Pat variad her and put the question to her

Thank your buil prefer if here, she replied if a a lot of fun the boy insetted. They like motio

Lauren shook her head on the pillow and avoke Not very fat away, here was a whoting innyknitorsound followed by a deep vibrition. To terr to sounded the auriaare

She took a deep breath and got out of bed to retheve her notebook DO



SAM AND THE RANZAL BUNNER

board keptits distance and the heavy block letters covers, coupers became unbearluated by Mac.s new line "Goddamn big spring," about the time we passed the tech

The smokeybear receded behand us so test 1 wondered if it had been my integration. We were closed output two transferd

was cold sober, helplessly sharing this me-IOT SENT

I did have oswer I treet God, but His late Buddha, and Moroni to be on the sale side grated the plutch with a nose like J. Arthur Rank's gong struck by a chandelier

Machinery pounded on his dash parel soblens, but had enough sense to brake snapping oft all but his normal driving lights

I took my linst breath in quite some time and asked Map if he was okay. He suit sat incitoward us in the sky was a spotlight fuzz. on the proval for funny little cass. "What it was

His clance held a pathetic hope "Bay

Sh Weil Lh yould en that Mac I tank I'l take me a little stroll 1 um, waant here.

Relia 1 don't know it anyone saw me sourry across the freeway in the clisterit lights of four

tart, waving an extra pink signas I climbed test, mosting his basso chuckle now and

Tident of course it i could shared be a



I saw you! As soon as Mac ticked on

Laser hologram. Sam smirked 11 made valeo recordings from behind with the bus on my him a unitable, and rebuilt serve being furred the bus made dot adoways. Made

Not you, you d have your eyes closed

Patiently legal the reed "I lead down a

let you beo go I knew Medid thak theen long

So why clicinit he see that image the first

Because the transmitter was in Spring

"Sure you did We passed you within May

"Legitel You went of in another chrection geels of Ito---bebbon I db

Other of the major challers toed to make Parplay long Basically, all they had was one Bicsipsing found near catatonic on the line again. If the owner was footbacky enough to come to the cop shop and claim it. But Mr tion in a small room with extendown walls

I showed the aracle to Sam who ead wed all been inesponsible and that none of a who working the wrong hences \$ know that a silv, but that s what he said) The more he the hancer at the business end of a proom nagging question. While eperatrica I called "Sem you've got to tell me Whet'l you do with that Relia pick sto?

Frame L'he shared back Hell lye but better stut than the Bella. And I will accent

MARS OR BUST!

MARSCAPEr This racky stretch of Mars' surface is coated with film i.co. There is enough water on Mars to support one million people.

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Trease free anotes and exclusion from solving in the 21st each or WII the be root a third water that is the splicit, or the action in the set of the factor with sain grand or and the SNOP. The set of the set of the set of the The Young late if all present mission is a constrained and the measure in second a set made late sing. The product water water and and argoin is constrained and made late sing.

the groutest developer marker fact ever undertaken, the on-quest of the aniverse

Contract Tomorrow's Columbias - and Magellade here dyour here a start them on their any low in the bar of the start them on their any low in the start them on the start them is the start of the start

Perhaps the children you help won't go to Mars after till. But all of them will have to five in tomorrow's high-tech word. Unwear we do someting about it an appailing 80 percent won't be able to cope. They are graduating from high school today weekliv literate in scionce and technology. They won't be able to operate the computers robots and issues that will be standard equipment in just a few years.

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PHENOMENA

The postario dipensitive photographic dipensitive di



GET LOST!

An inlend paradose this offens thill of theoremy. Send prisme boothes. Co histing for poil or sends in young thy our poil or sends in waters memorial for the specified of their respect field the points and the choices are respectively.

DUT JUST FOR A FEW

Derive haven to prove the functional and we change so will, nonional to be ordy for a low a a more well being on the gamma, furtional and the second second second design of the second second second second second second second second design of the second second second second second second second second designs, revealers designs, revealers designs, Neur Dorogins, revealers designs werter Neur Dorogins, revealers designs werter Neur Dorogins, revealers designs of the second the second second second designs of the second second second second second designs of the second secon MENAGERIE

disks i have a charge to be as good as Manca was / (sat practice

Therapets who reat multiple other for themaseus in calabous with different childless — even in the service service childless — even in the service reservice regression and the service the National Institute of National Service (National Disardess and David (National Disardess and David) (National Longer Calaboration Antipolity (National Calaboration Antipolity (Nati

Chematipa has there we that all particle Order notified the provider of the control of the control of the single of the control of the control of the control to the single of the control of the control of the provide the control of the control of the control of the single of the control of the control of the provide the control of the control of the provide the control of the co

Fortwenty egitr years of my kiel was amneed. When I was youngie (didh') notice it, just thought everyon in built bese moments. Later as tings got more traumatic, there was those and more time I would make (just shooght i was cazy.

Mays, the one who was lime the majority of the lime data filters whould the other personalities Market interval and Mary but not about George. She was ammess when George cames of George lime were writing Hers the one they call the limit, or the brogs, the one who has all the memores

So there were at these things that heppend, but is an observer if us to local kiele reast acting strangs some of the time. My mother were Weiered that i have a local control succes because she soid called for help. Hell Heas used doing is to get whenhow The port is Mary would by to control succes and Monce would call for thelp. But an coninder would pat tee that this person took a booth of olds and then called to help.

With a battery of sophializated tetts: Putnam and NIM+ psychologist Harbert Wein gartner determined that multiples memory occuts are well compartmentationd. Perpossibly X may meanities ratificing that happents to Y which 2's contributiontly assent of Y but not of X and as on Braux beleves that MPD may be an autherne case of \$200-cbpendentisaming information encoded dusing a given popular/polypolypolypol duke is bettiretreaved in this series state (1) other words? I your implicated your waller while crunk is outplicated of the colesis may be file beef each to back of phile colesis may be file beef each to back of the colesis may be file beef each to back of the colesis may be file beef each to back of the colesis may be file beef each to back of the colesis may be file beef each to back of the colesis may be file beef each to back of the colesis may be file beef each to back of the colesis may be file beef each to back of the colesis may be file beef each to back of the colesis may be file beef each to back of the colesis may be file beef each to back of the colesis may be file beef each to back of the colesis may be file beef each to back of the colesis file to be the cole of the colesis the to back of the colesis the beef each to back of the colesis may be file beef each to back of the colesis file to be beef each to back of the colesis file to be beef each to back of the colesis the back of the beef each to back of the colesis the back of the back of the to be back to back of the back o

What causes a personality to gold in the tappace? The cause and chilery assume a transmission of the second chilery assume a term were beaten, cur, burned half was and of were to patients, burned half was and the even the tables and the second second and the even the tables and the second term. This account of the second term beaten and to have to bear with call have seen to half the table patient for therease. and the even the tables are table to the term to an and to have to be the table therease and the even the tables are tables and there as the call-happens are tables and the tables and the tables are tables and the tables are tables and the tables are tables there as an of the happen are tables the tables are tables and the tables and intege alter to the tables tables tables are tables tab

Which was is, the Topper server sets or "If and I was may have been been been father-me phot who always haleed a per father-me phot who always haleed a per model haleed tim applicit the beer pyre! who could protein the apart in the beer table - address the method was need anonther was Bacegore in public me way from my alignative. Then Mary was born a the means that the two kinet was been another and been and be to temporary had of the body. I mean actually have in body who had be order.

Manica, whice was been when I was then disappoint when I was six and stayed gone until I was fouriers when she caree back to help out Manica was the domestic one, the chierful, happy one. She was the one everyone kind best.

Uniformaticly is with very early to perlempt/Dumpingsrepring and MPDs not cannot in aday. Tabot belevel there are noy matchains that work "says Prasmin, Neugration as thertoshing process is called can bele years. Thereagy trikes the form of an intesperity enclosure in group in which the second buried defilies are coupond into the says in tradement." Purnam sequence in ab other the preparatives to methor on exchemisme in the set the preparatives to method one exchemisme.

² As to Marcon, as of these personalises boot the Units open to stage of the He for 30 years. Despite her potocom of neich marries (these of the personality markets appear under her pationality) markets appear under her patient in her by a boot personal in the other bailing batterial her and under the other bailing batterial her and the stage and thereas a ecconsolated angetimatedexes subcode storage and the thereased and the storage and the storage and the metabal bacterial alter cancer states. Recture 1993, where here observe merity where the term bench on the merity of the term bench on the te

These were six personalities in all, Mary, Moreca, George Depther Gamp, and me There was andre a fruidational personality, Namp, but she never really developed reto stylling. She was a noticitien to a cer accodant (and) then she was integrabled, so we dont really count her

Both personality was been from a crisis, in a senalational delinear inschemannen flucture in a senalational delinear inschemannen flucture in a senalation pour can't hande and you heyohen pouset in the being someone wie who can offwar i was capad at the age of any flucture in and streed me. Many, the host percentility who appeared after the mail off Motory, work 15 steps, was also bon from She was not a shapping person. She generd weight as clearistic ageant men. Al one point the allowed the body to senation.

Monrola "cost lates homesmeller," was canated when I was threa, when my alogication satisfied molecting me. She was the one who hall in lowe with Edde my se hashand, and manred hen. Edder she had a beri allius with a gay who semanded her of Edde, and the well home sevid back as followed.

Disphre came out in 191 She was sexual revenge. Knews have then had treated ne vory badly, and then when I had waget and men started paying attention to me, Disphre was there to get even. She was the sockcive aphrenin-year-old same She to one my cament hubband foll in love with

A major disartia higgpined in late 10 that caused ma to faol vary abandhisid and Griny was born. She was ou years old and an ophian. She ackady alanted out as an rfant, and my George personality adopted her and raised her to the nee of six.

Oncal web or a cost accordent entit flagt and were referent injuntes, and a fractional per sonality, filmous was born horn that All she' do al ally them in initianal pain. The practice was thought is mainted to die My docter foraight is workfahl be a groot dets to other grate her with all their pains so she headed Nervox and them integrated her.

I'm unlike a lot of multiples in that I don't have a whole slow of pacele I knew a get who had miteben personalities, and I sol down with a pace of paper and worked out all their stillholds. Whose I got manned there were there other multiples there who were all patients of my docts. The white's pacture taken and we called it the multiple exprove. Between shot as, we figured out there was the try leap pacifies in this pacture there are the try leap pacifies. This pacture

One psychiatric tokime that anyone whi believed in multiples was deringed. Men of us have had paople byto secrose us M mother level to being in a overlighte.

Before I was recognised as a motphwas classified as a shortphream and an other time, as name-deparation for the distance on main-deparation for the distance factor and a distance of the distance of the factor and the distance of the of the distance of

In 791 works up I was sitting there is the office with the doctor who looked tensiler to min. I thought some tittle kell had comine to boctores that's what is sounded like, a hit whenpering it was Monora whenpering to me i just situated stelly and theiling at to the poor where I could causy on convertations with where I could causy on convertations with where I could causy on convertations with and the to be a source of the ours another the title source of the ours another the course of the ourse the title source of the ours another the source of the ourse another the ourse outset the title source of the ourse another the title source of the ourse another the source of the ourse another the source of the ourse outset the source outset the source of the ourse outset the source outset th

By heatend and I sheed workerg to gener in September (1985) I couldn't alford's thengest, and he such he was wheng to be ny lay theispati. We used all he relhend I altward plack all the supportions in general from my theospatis. We had chart of all the major incidents in my life, all the major incidents that had be deal with

On highbourner Langemänd die look het personalitation in mexica ender integrating (antry lieft and working back to kitonea. We would be aanaet Some Jonese en ligand al would be aanaet. Some Jonese en ligand alwep and wolke aa the next morning rete pained. Tookin to think india too way. We appeal di bat i dani memotore much of a . Noorenfitme laber konstantieve within .

When I got to George / just broke down and could Hild been there for me to meny timos. But i realized later I didnit give ten or. He stall a pert of me

One registring defined by part space in the set of it was doned by their staggistics in hack to de it was doned by the staggistic in hack yet but when yes lost of heights pour and the was and the stage of the set of the stage of the back of the stage of the stage of the back of the stage of the height of the back of the stage of height of the back of the stage of height of the back of the stage of the stage of set the the stage is and for the back of the stage of the stage of the the stage if was back of the could be in the stage if was back of the could be in the stage if was back of the could be inter in the stage of the the stage if was back of the could be inter inter the could be inter inter.

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HEATHKIT CATALOG

Ban y BigChild T- Hoch Grown, Der Cab HY
Bernen Reurs, Bifligen - (152)

Lyon always inter when George was in the norm "the walkin' reventions hook was been could sense it." She'd just say. "He George "See Lyonwas George's lower and that's omething that does happen sake of invarient multiples. George chilosof install as a mail. Therefore he had an is retered in women. The does have have an observed in a does have a mail on the does in women. The does have a been as class. George had a walk hard a me dowing as George Complexity.

Anyway after that incident in the car, if looked et her intri soid. "That wile the Loot angry! I had never gotten angry before When Lgot angry (if let go and George would take over. That waim Liny rolls.

George was about anger And destruclong protectors immerse He had many unlike. Once he grow up to logo forcines, ha staged functions for a number of years if its a vicibile app it a more acceptibile for a buschen years do to have hamper tratective. So he staged fourteen Mithe was discovered and my therusers argot ham hydrolocula.

There is a furnicisus solo to being multilipie MU Daphre personship liver to possipartyring and durining with lipies. Charing the policing float (Ind) put them come pering topolicing float (Ind) put them come pering topolicing float (Ind) put them come pering tothe multi-solution and put the sense. It is ben that, and put to the sense of the float put the com-weak during the sense. In the come daphene beginness to the sense of MI rate post of the sense to the float put the com-weak during the sense to the float post of the sense of the sense parametalities (put to could') could and whet float post of the sense of the

Gray care out glace yield and feeling sky. Sie was could up in the subflict char starug around in a wij Mel suggested file oom was maving serund her. She feataerd on the shart where she large her four stuffed media file start where she have kitoma kitty ammels. She looks amend and these kitoma kitty kits, and there having showing increadul and these heavy lartes i got more anneals they flexing part.

Since I are integrated new I have all the momores My habbard and I had hig or over Year Several threas to nearballize them i he would gree me what we call a volume control or the pairs, and I could observe the scene with no commitment and their term up the volume and get closer and closer, until I could accent the whole them?

I broke frag pagetaries may have been a hotpade honeset he may a kir of different notines in was aneway abused as a chair work? and the week hotpade abused as hotpade abused in hird be beening me and his boot an languno, alternal handla dies hotpade sich and handla was also hotpade sich and hot ne week house at the hotpade abused and hotpade abused hotpade abused and hot ne week house at hotpade sich and a hotpade abused and hotpade abused hotpade abused and hotpade abused abused hotpade abu

Take autrices I may by to use my stepfactor, whom J harven't seen in years. I am driving of going beck to led the house where I grain ap, where all this heapsmad Soc logically, liview that that house in a new ittle house on a new little streat in a normal too. Detti oily But in my mind it's the Amityale honor for and in an bank to not sur personnau

It's hard being integrated There are so many staatom when you wish some of them were accurd to take care of it. Rulin totally espanable for all your actions now

A doctor / once worked with sect that in a sense we are all multiples. To his seven-yearold he's 'Deddy', to someone else he's 'Doctor's' for your det we's a multiple the roles are a liste more for keeps

A fee months will be a convention, we gat and most before the Maccin with most set and the best most most most set and the set constrained and the constrained and constrained and set to be a constrained and constrained and constrained and set of the properties of the set of properties of the set of the set of set of the set of the set of the set of set of the set of the set of the set of set of the set of the set of the set of set of the set of the set of the set of set of the set of the set of the set of set of the set of the set of the set of set of the set of the set of the set of set of the set of the set of the set of set of the set of the set of the set of set of the set of the set of the set of set of the set of the set of the set of set of the set of the set of the set of set of the set of the set of the set of set of the set of the set of the set of the set of set of the set of the set of the set of the set of set of the set of set of the set

 Covin the other autoritiency give of these satelline personana-like the ability to consense in them if Research to perform Revtain the same of the unserper permitted read-nearly them Multip secondars and the same of the same of the period of the same of the same of the period the same of the same of the same period the same of the same the period the same of the same the same of t

But imagine everyone does have this monitalities Migale you, los harbor closed parties in valous dogiased of valotats an exclusionary a hystoric a long close with modulorary a hystoric a long close with the domestic provide an attemption the aberrain tables strucging to be born the aberrain tables strucging to be born the aberrain tables at the born your pace which gives to bornage down with the docidal hereof. This downpare in simple docidant hereof. This downpare is not doordant the structure of bornage down with the docidal hereof. This downpare is not docidant hereof.

So tar no electroanophilogram ha postror emission tomography scati has poponted the nature, no entework of nounces, that encodes the 1° Coexcesty, the all is a globol property of the trans. – C hall is, its "n° our gray matter at all Eleministhe age of neuroschnological imacks salthood rematers a deep misting CO

ENCOUNTERS

NTHREE CONFRONT PROG SE

tence and the monument marking Ground Zero a vector could well active the undulating separate of datant and not know any tang unusual had happened here. The only tangs of the historic 20 kilden explosion is a capterised in the ground, a mere dample same 11 feet deco.

Postly explains that the Carryon Dailob mataor (named after a small carryon near the strip was about 100 feet across That is small for an asteroid. Although it is the largact in the Linted States. Motion Drater sinct a world class conter.

Perments of terlarger one work on Earth, the Resideated structure in Germany which is about 14 miles across Like Maricourgain in Ortains a adable 44 miles formedge to obje, and the work's targets known impact crater. Viedelant Dame in South Almas, with a claimeter of 87 miles

The Datio Caryon meters ensitied muhe plans (Coryon motion ensitied muindum muda ther mark of the land. "I you had been there the day if taggened "Roddy assummer the day if taggened "Roddy assummer and the day if taggened "Roddy assummer and the second second plant looked like a stort in the carly evening "Intertion of a flew second shall care a stort because the there are a second second and assort the there are a stort of the day and assort the there are a stort of the second second second sectors metal of the second second second second sectors metal of the second second second second sectors metal of the second second second second sectors metal second second second second sectors second sectors metal second second second second second sectors metal second second second second second second second sectors second s

That nearing body an asteroid on a cellister course with Earth, would have been timeleng at about 15 kitometers per secord—about 35.500 miles per hour. Both of us are looking up nto the blue, trying to petail it convergione.

It you calle have slowed down the motan. Rody continues "you would have seen an entermose how will in that and a large shock wave at the end. He same as you see on a ventry whiches with buffers philographic in modilight" it all was happening initial silence in these seconds the meteor was taveling batter than sound

A fraction of a second lase." Rockly contimute, the thing was just above the earth's surface. If you looked at it you would have been blinded by the loft.

Ther, at the zero is loading objewould have touched the ground' in that instant the motion would have pathed as incriminal shock wave, with a touce influere of simes normal atmospheric pressure into the auth. This temperature at the point of impact would have been so high—some 6000° C—that rock toueried.

One second into contact the meteorite was no longer a coherent body. Body says "It had tegmented, meted, and vaporoved. Liquid took sprayed out in a gant conte shaped plume, and the orater walls were ceaterid back with an unterlevented lenger."

The asteroid blow tome 175 million tons of rock out of the earth and sort a mushnom cloud of hot gases folling into the sky it sinuck with the fonce of 20 million tons of TME 1.020 times as careful as the Tody with bomb and the equivalent of some of lockay is of iron and indie! Today they appear to be prime candidates for interplanetary mission

We decide loview the point of impact At the visitor center—the place is a popular tourts attraction—I sign a relicious saying (wont hold them responsible II i all maset on the way down Tikin Hiskoldy and I failure at out i mule shall to the creter floor. The trip takes sloug 20 minutes

Designary learchs and sensitiving over bockness we make to be bottern [Below bockness we make to be bottern in Applic serves down to Mattoc Coller on teal runs) [Down here the 'ull implications' of a statetical impact with Earth Down keals Al accurst us is sockard while? Down the constructions of the tower the sky (Court descine state) kably, down one well, afth accurst and the tower the sky (Court descine state) kably, down one well, afth court one of the tower the sky (Court descine runs) and the tower to sky (Court descine runs) and the sky (Court one) and the low of the tower to be sky (Court descine runs) and the sky

The method half carried cut his hole was the remarks of an startist that survivadian by through Earth's atmosphere. Meteors as patobly committed is faith say attranships as patobly commands of the obtain systems origins (altowed ham has an attranship). The low types of introductions of other marky on here sure composition, and the san

A compt is roughly equal matures of ice and rock, and others around the cubir edges of the solar system tar beyond Pluto Most correts are small, with diameters cancerd between a hell make and a mile and a hell in maine wade) By contrast, an asteroid con sets of acted rack and usually is a creature the asteroid bell between the orbits of Mars. and Jupiter Although the Greek root word name asteroids form a moliny collection of time point, and arriess works that wander assund the sun They citier in size booth ness, and color and come in all shapes There are scherical ego-shaped, and ob thought to have their own satelites. Some rotation and like full-flexitand planets, with corods- days -that very from these hours to several Earth dates

Archer d'Iterés à covern Ite vec barre es it her chesses With the vecp size and allocan haiss, contest have a terrates la parte à extrement and laymen willes Buil asseché? They are larger universit of buil asseché? They are larger universit of the registrates a vector of the size states and hards have proceeding the siterior here detective bein registrates a larger to are grouped by the about of the model of schemes free integlinettes before the generative states and and the formation of the schemes integrated in the model of schemes free integlinettes. of ron and noise! Today they appent to be prime candidates for interplanetary minas. They have also been thought to contain valuable clues to the partoridal matter of the unverse. Asteroids have even been formally accusad in the extencion of the dirosauts.

Some sperifiert nav specialite that is half of instructive combining half and inflation all the chroasure. The data and vector reporthorson up at to the attrocythere by one or more such impacts. The yagus, could have been datase everyth is bring on all "atterorigit vector" immar to the nuclear writeraperied all athrones look and dateses kibeing on exchange of massives--Proceed by Card Speer, half Einter, and others

The clust come ion the decovery hat not all the asteroids stay in the second bell. Some settorounes now belower hai many have been tagged out of a specific part of the asteroid beil by the gravitational teld of Jupter. The orbits of thesis displaced salkesis when become alongated to the point had here cross the obtits of other planets.

 The fact is, the improbable has already happened often enough. Some 70 craters are thought to have been gouged out of the earth by impacts from extratemestrial bodies.

outs included. And when planet and asterod arms of the same place at the same time is can run your whole day.

Although it has been bur scote and seven years since the earth has seen that lived of day experts say we should be prepared for asocher one. Set presentation is one good nasach for lasping on eye on the skes, but there are oppositions (oncerns as we)

Tan adrocal wend balam nitr his Models East and it wend't tocognized for what it was "suggest burnnon the of MITE Lincoin Laboratory. Then mght be a problem Some of these rubons shoot first and adk questions berr. And the Panetary Somoo Imaturik Chapman waith. "An underpoted mpact could be mstation for a nuclear attekt, with finghtering consequences."

Assets, one saterial replact may have been matalening a substantiation On April 9 bible an omnow multiteren cloud sp-9 bible an omnow multiteren cloud spstantiation of the substantiation of the self-term Other of them. Jappe Arc June 10 by self-term Other of them. Jappe Arc June 10 by Stantiation of them. Jappe Arc June 10 by Stantiation of them. Jappe Arc June 10 by Branch Arc Face Bate, at Archarage, Aratylees faund and—amel geolution of Technik underweise welzpons totts"—the dood sumannol a mystory A yoor loter an anche in the pournel Netwo absolution the plume to a meteor exploding as 1 ponstrated a cloud deck. Thi our exploration is correct, wrote geophysicial Anthe Charg and James Bernstil, the plustic apparence on the right of 9 April may be the first close encountered on assocht with

Proparing for such encounters is a real problem. We noted to anticipate them well in advance. Choice an astende strains that almonthe actual calls and the subtrained actual calls and the subtrained actual calls and the subtrained actual calls and the subrates have is resonant in 20 seconds of the back-and programs. Alternative defenses depend on an astend early worring systems and some astenden early worring systems and some astenden and well and here and second actual the submeted to back and them.

The world champon saturation threfter - the a wide margin - Benory Horn Dennitry sciences at California Annual Annual Sector and Sector Annual Annual California California and sciences of the saturation of the sector california and the sector and sciences of the saturation of the sector california and the sector california and the sector and the saturation of the sector and the saturation of the sector people would have given up in that these sub--sector the later california and wide--sector the later california and sectors and the sector sectors sectors

Assential humang is not just a matter of peering into a telescope and wating for an object to move across the Jaba – anthough this would work if you were endowed with spectacular eyesight, an infallable memory and inthe petience.

Traditionally the way to do it has been to take two potents of the same patch of sky at mislenalid a lise minutes and han compare the two photographic plates. It is a tablocal pensitiving process, but his a how Blainor Helin has found her Earth crossing advects with the lat (1) years

To develop a new comparenessation motivation of decovering them is being testicated, a techmain decovering them is being testicated, a techmain decovering testicated and the select and decovering testicated and the select of the the quest is in Tuccon, about 300 miles and and the Meter Classif Turnes. Not 300 University of Anorea astrocomen Turn Gehmes and alm Sociati a group colled Spaceweathers of using Turnes.

Eleaner Hein and I are not competing/ dentel explant. She saveshter at ooten tagthreas level and covering a large part of the sky, and Tim covering a large sites of sky tooleng for satular clated. When outflood with a new 2006 by 2048 CCD (charge-coupled device-a large othera accutements (Schröde opector) to be decovering an average of ten Earth-cooperts to decovering an average of ten Earth-cooperts to decovering an average of ten Earth-cooperts of average with well.

Spaceweich is housed on Anzona's Kitt Peek as part of the world's largest collection of optical takescopes. The 6 700 koth high mountain, near the Mexican border, bearts 16 reported observatory domos. Near suronto the desert foor there a sense of coclement as the astronomers day begins on lights are turned au

Cennels is a cracksneck observer, an old hand from Palomat Yerkes, and elsewhere With red Vendyke goalee and mountain chriber's short pants. Gehreis would be at home in the Swas Alps. When the clouds block his view to the stars, he likes to at high up with the telescope and relax. I "Come on up valicantfail all the inisvertors and the he describes himself as the inspector from Fila Rend an nutrout of carlination somewhere among the sand and petroglyphs to the west. Tonight the inspector is looking for

Setting up his apparatus, he explains how it works. At the focus of the telescope is a their transforms images of the sky into aleotronic data and sends them to the council to for storage on tape "We turn on the CCD and scan the sky for about thirty minutes' Gebreks says "Then we turn it off mean the tracts one from the other, canceling the m ages of evending that have? manag-ell have moved-comets and esteroids

will collect data and store them on table. To morrow the tapes will go by course to plan Argona in Tucson who will run them through

Up near the open aperture of the observ atory dome, silhouetted by stars brilliant amount the blackness. Gehrels feeds coorcinates to the telescope. It twists and turns on its cimbals as if it's wred to the sky He frat looks for reference stars on his video terpet mits aphts Satisfied he hits a button the solt right ar of Sonahin Meaco

Many times during the course of the racht he will ornest the process. Jocking at differ to land, new comets to look for old ones to pulles a button and the telescope dome computer tapics in caracters

Next morang at 10 oclock Jim Scoth takes the tacks and starts loading them mip is brace of Perkin Elmer computers. Twentyfive years old and looking berely seventeen Sooth wrole the program-1500 lines of instead of manually comparing one photopractic plate agents another Scottra proelectronically superimposing one scan on 113 CMIN

the fixed stars-are canceled, and while a left are the threas that have changed poston between the two scare. They are then deplayed on a video screar

I ask Scotli if he outs excited when new screen "Usually not " he answers." Most of them are sust man-beit asteroids theil you if's a new object or not until you run an astrometry program to compare it with all the known asimads. Pwn thm 6 may not be several times in the past but rever been re-

The tapes are finished loading, and Scott runs his data-reduction programs. The mo sky appears. All the tweet stars have black been automatically canceled-"subyacted -- by the computer But one particular biob of ight has not been canceled is

We found some asteroids that I though initially write on a collision course with Forth And Two asked myself. 'Now what are you going to do about this?

it a new chect?

No. This is a faise prophysical offich, are Surbuieron, aber Treich, and scron Scoth 2006

The next picture comes up, and there's another uncarobiad blob, also a gitch, And that tokows But the fourth object is real

"It wild lively famil' Scoth alors, but it real object. It takes expensence to make the identification mouch Here's where a human chooser caff he eliminated."

be a certiler-venety adarted in the main belt certaicly on dancer to Earth. If it were an Earth crosser then it would be reabserved on other molitis until its profial characteristics were well-known Toget an accurate orbitone that would predict a possible impact with Earth-might take years of observations

Primarily asteriad hunters werk to under missions to the saterock, when we will be exploring and mixing Pase orbiting mother

lodes Saving the earth from killer mountains priority, but all of the sky hunters have concolleron course will Earth, and I ve asked muselt. Now what are you coincide do about

For the moment at least, there is nothing There was, first of all Project Icarus, a stu dant overcise for an MT systems-engineer ing class Dreamed up in 1967 by Prolassor apronautics, the project challenged the sta equivalent to a 500-000-modaton bomb blast unless something could be done to prevent I After considering their options the class decided to launch a salvo of H-homb writ heads at the inhound object and database them near its surface, causing loarus to awarve trom its course

More recently in 1981 NASA held a conthe threat posed by errant asteroids. A group of some 30 astronomers and space apersize-and a few weapons manufacturors' representatives-also thought that nuclear explosives were the atenuit. The according swes was to deflect, not desiroy the incomincitionly Shattering an extend rup amalier chunks could create new problems. According to participant Getrels, the effect of

Nat every scheme has included driving ing asteroids so they collide with Earth. In 1971 the late Samuel Hemok an magnative to the NASA publication Physical Studies of Moor Phreek Henick clared the orbit of the asteroid Beographos was such that it mott collide with Earth by the war 2000 His reconstion was that as the one-kiometer write borty anomenhed Earth in 1965 we ought to split it in half with explosives. Then we would gude hall to Earth to a finely tured mpact in Central America. The benion colision would carve out a crater canal linking

To Herrick Earth-approaching asteroids were not threats but opportunities. He ponted out that such a dian would bring biments like platinum and cold to Earth "Un an adequate program for discovery, observalion and determination ' Today Holm ing those very programe.

Hertick's proposil was published polit humously, eight years after he had submoted it to NASA. His contemporation had according to one of to it was "outrageously movative and "premative" DO

Omni smarties, riflemen, the commonest noun, and a tower of cloar boxes



By Scot Moms

The Dime-Mega I Q. Teat which appeared in this obtains in April 1985, turned out to be an obtained popular feature Softer about 3200 readers have start in januaris to the 4-8-team isol accognoso by the Guinness Book of Month People's be the Protest I Q. teat in the world. Readel K. Haalin, author of the test spond events and reports the Solowing results.

formatin nargodi ni naje i todi ni ni bilo ografiji kva Tilo disklubu ni ti se obcine todi ji kva Tilo disklubu ni ti se obcine todi na se obcine ti se obcine ti se obcine todi na se obcine ti se obcine ta obcine ta obcine ti se obcine ta obcineta obcineta ob

The integration of the test in the test and $\delta_{\rm c}$, the origination of the test is the test and $\delta_{\rm c}$, the origination of the test is the te

These readers source 44 on their first attempt (some improved their scores to this level after a second- third, or fourth try at 12. Devi



the bits, but we are counting only first, alterniphi, The tast to do that was Science. Gebrate, particular of electrical engineering counting and the science of the science of the counting of the science of the science of the publication is well-innear to the science Taylor is advantation in this science to the science of publication is well-innear to the science of publication is well-innear to the science of publication is well-innear to the science of publication is the science of the C population publication of the C population was been as in which their spages care be amongoid of commentation content.

The endotric intergramment person is accessed accessed 44 or the faith try water with the Linearchy of Coburado in Boldair II. How have a subset to access the with reality and, exercise and a combined with reality and, exercise and a combined with reality and, assessed to the water allow as the partial to iterative the values and the partial to iterative the advances of the partial to iterative advances and the partial to iterative and a subset of the partial to the advances of the partial to the partial to be even again factorial to iterative iterative and the partial to be advances a partial to iterative integram the partial to be advances and the partial to the parti miestone etuded film until college. As lor becoming a norinerid. Roster now works as a bounter in three local bars, a male simplear in one, and a roller-ekating cocktail waiter in another.

The they discourse was a support of the Hamouth spanner of New Hamouther He has a PHD tom MIT He ways he found a well-eval cargo of chore on an explane and got to deal by the tool bud couldn't evaluation much time to shall also he data heightabus adjourned for the summer "The total. Boowno Sharouru within he data heightabus adjourned for the summer "The total. Boowno Sharouru within he data heightabus adjourned for the support through in pone time height gover through in pone time is a possible adjourned for height gover through in pone time in the support through in pone time is a possible adjourned for height gover through in pone time is a possible adjourned for height gover through in pone time is a possible adjourned for height gover through in pone time is a possible adjourned for height gover through in pone time is a possible adjourned for height gover through in pone time is a possible adjourned for height gover through the height gover hei

The regular distribution of scores and the fact that on here is assess many one problem significantly more than any other other significantly more than any other labeled plan britlen's account and generative the there is a strategies of the source of the score product any source of the score product the scor

CAN ANYONE SOLVE THIS?

Onn Competition #10, the results of which appaals in June 1800 was for unceived problems for which proces should be drived over Prese. "December 1999 Our first currancy adda was from Dan Shine, of Concress Who offered S100 for the solution to a nagging, unceived methmical problem. The first concret areaser was from Charles Ruppile of New York who wern its more junct all publiced an expanded version of the aduance in 1991 Jonne' of Reportant Mathematics in 1991

Shife recently wrote us with a similar, burnote of Hout, problem N rifleman as destroluted a random spote in a bounded logoti on a plane. At a signal each owe shoots at and with his nearest neighbor What is the spotest mumor of informer lof stave? N is so large that the fraction of referee near the boundhor is reachible.

This packleim was first power by Nobert Ablock and appeared in the American Machimatocal Monthly (AMM) in 1967 Almost two decades later it is ntil rancived; and thet strikes up as unusual for apposite that is no ample to pate

The one-of-transact arrays mit mithout the second second



THE MOST COMMON NOUN

 In Ruters and France before you find a word that is most commonly used as a noun and to soly ninth in Carrol et al find the most common noun, but both holds emerge on the some word.

What is the most common roun in English? Since this is the sort of question that deserves some time for thought, will save the answer for next month.

CI34R-BOX RECORD

If pick from your W. C. Falck to model and the second Technologies in concerning the second second second metabalance second second

while unset is before the method of the set of sing a liter a 40-box stack will not be 41 or 60 or 50 or any such single addition. Since rise beam much be added a layer at a time, with support boxies to hold them up, and all of them beamond let and upth to keep the center of gravity over the bottom support, the next number to by will be 68 COMPRECIDEN.

JOHNED HUR

In our "Sevens Que" in October question 16C we seel that Weldy Schmarwss he only one of the organital seven astocrastic in the Mercury Generi and Apolic programs. As aeventil readers noted Que Gresson disc partopation in all time programs, though altragicities in 1867 prevented him form wer thrug an Apolo mosso. CO



LAST

By Parket Bennett

Of: Dew has
brought togethei 200
astrophysicists,
astrophysicists,
who share his
vision of a Hatepless
universe to form
Lights Cartfor Carriet Halley

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Piere to ha soci, D. Devidas iscupil togethe 200 which y sicale, which has add baches who glass the value of the Haleyees unieses. They're finited a group and Japas Cut for Creat Haley (JCH). (rights be contested with another, cripericetos is repairs as Cark See to 11 Maley? Const. Device cut to 201 Events Unies cut to 201

"The Dark Blues people want mapp often to turn out their Rytts to make wearny the tograph wearn' Daw explains. 399 went to output the total out "

In the members of USCH are pertinational take and fair lay with all the "Raleybeloo" autounding the comet. Their Alm with sport Maze generations comet mania. "Intrody, this giving all the other comets a bad varies" says Dow."

Derth Steen is just oan energinis of calmid heard, alsa LOSH nijnihow zanis og energinis heard, alsa LOSH nijnihow zanis og energinis heard of the steen also alsa steen alsa steen heard of the steen also alsa steen alsa steen heard of the steen also alsa steen alsa steen night of the steen also alsa steen alsa steen night of the steen also alsa steen alsa steen night of the steen also alsa steen alsa steen steen alsa steen alsa steen alsa steen alsa steen steeten tool.

Dee pays the exclusion Halley's hoop's par be reespured just by looking at the media in line office its ports to a priner handlads of magazonic and nonspokers labuleg the context

"At the brackers basically a big, day growcall," Devicorplane, "So far the publicity has been farmers visible than the actual come?"

Waters yet, according to Devil, of the accessite transitionary from the activity site accessite transitionary accession accession accession of the activity activity accession accession of the activity accession accession accession than accessication accession access

Beader spang take georgians at the Haling hype, monitors of LDOH takeve there are many other valid reasons for dealerships of control

According to another LOCH member. Rati Salgar- the relializing and objective is to existing the two hardsmelt of the sciencific contructive As an ertiplicate of Permil, so he has had institlend expension.

 "Loop Linew how the scientists field get any nick done, stats Sagan. The phonoi krop or inging with parents of dualitation where to income table (P. Trinket op) noise? Shaking I use is prete of expressed terr or something? The II (MAL-make or MALmake? I have an analytic pt. Look, how should it know? The the (incom?)

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We we been toking to the Pandagmi for some data novi, and they're very increased mixer (stappade). Somorely, which like to use Parley's Conner as trease processor some classification weapont controlly under datasement," says Dow. That way we consider the status with one status - or, utilized with one injurisency their blad.

Not only would all be an effective priodeal test builit, would allee ensure us autoud pticus in the featory backs as the ration that their stopped Halley's Comet."

Where pullary of locate are anti-analytic according to Daw, officials from the State Department have dispressed contains were the of planate consequences of lanthar starwards leating; since of shockes of bonding up an object our place and the Stover Union have super rolliant to deverse.

Dev however, renaris updaumed in his etippis. If worse correct to worst word (DOH is unable to enablicate the operative have an attemate pixh," he says,

Devicely if the 'constructionage," a

partable-basers downor designed to harfle millions of elsimove cleaning againing at the commit all a water d alown unbit of a loo small to be seen from Eerth but big enough for sciencific aback from Japase

Etter way Davi wont stop until the complex lowest out of sight- And while in his option both optices have ther advant leges. Dive tau a classifizator to Wetch approach sould be first index acceptable?

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