BODY THE SHIP IN CALC STAT MAKE US TICK FAIT TORT HAN LIGHT SPACE PHONES PREEASING PERUVIAN STYLE RESIST FROM THE DAWN OF TIME ALLEN ANIMALS OF SYCHIC POWER FOR HIRE



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FIRST

By Gamey Williams III

 Good scientista don't begin with certainly, no matter how opriddent they must appear on grant applications ? House which want to exclusionate activate involute framing the story of dispanses. 4 Regradory sing activate adtectaints want subarried into gradient activation of the bottom connect for prespecting the start startific asymptotoms fram automates in special of the transport opposite of count special opposite of the transport opposite of count opposite of the transport opposite opposite of the transport opposite of count opposite opposite of the transport opposite of the transport opposite opposite opposite opposite opposite opposite of the transport opposite opposi

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CONTRIBUTORS

OMUICUS











on our lives And in Clocks That Make Us Run' (peop 48), autor Lass Hits menals imagned They re capable of influencing 00%Ldb and sexual provess. Chronobus contrabelieve that understanding team papaulture will efford us greater control over our mental and physical health flor celera relicate that the effects of some drugs can wary, depending on when they retaken 'Today' Hits says, were on the wordt. Tuht dessage more effectively, and

he work in a laboratory. Some of the most prolound mechts have come from scientists working quety in their rooms, with nothing but pendi and paper At the instaute for Abraham Flexiner declared the institute was to be " a haven where acholem and ate. This is exactly what the place has become This was Einsteinis intellectual # Chev

the superstans of heartheth-century science intelloctual closer and how their surround Omn contributor Edward Regis, Jr., pad

Differs that pan beyond our property to send to the stars-possibly to exclusion be picked up and interpreted light years. Phones, on page 102, Charles Stretteld that the speed of light Sheffeld says. More to human sectors and raciation margine

ingenuity to solvage a croppled nucleon

at Three Mile Island, an army of workers is robots, will have to temove the mancied writer Paul Bagrar telens readens into the the walk/rful eve of a meson control center awasothe | says Bagne 'It seemed we had tapping who the ultimate spanon of exercity sature the gene to its bottle-for a price " Angelos Times synchcate

In Adapto' (page 64), this month's first fiction offering. Beny B Longyeer presents hope of escape Longyeer who has written Campbell awards A collection of his work. be published this fail by Blue Jay Press And Tooth Fairy on page 106 Carol Car chiscribite a buzerte waccuster between an clered hapless psychiatest DC



Hittechs is instant-feacing induction in handle objects as inspire an eggs declause is sensors denied an obspo and required pressure to after genstivity almost equal to that of a burman bared Nainty two decodes ago. Hitachi began turning common science lobon into starti ng industrati last. The daviee. The company's finit sonomanipulator a key component in fini development of relat robots to eliminate the instructory, davigor and dirty works of manufacturing.

Your mechanical right-hand man

Today the results of Hatch research are in use all account qua. Record welches using metrocomputern and builten as noon to delard well here automataly Sonzy-earling motols tapatities of nemembering up to 2,000 nataruttons and performing RP offormat painting table. Robots on wheels for transporting perts and wenthouse tools.

in fact we are constantly coming up with innovations and new spokcations. One of the least A vausi-tactile sensing robot with multiple arms and seven carners 6y86. developed to independently assemble home appliances such as vacuum cleaners.

The best of worlds is yet to come

Our veson of the future includes robots with antibosi intelligence that will learn from their own experiences. Personal robots that will take the chudgery out of household chores. And much much more

We dilike you to share in the benafts of our specific research, cowing this rest porce alon of lasers sonsors and other electronic devotes. For mproved builetes efficiency for a higher quality of the Two goals we ve pursuad for 74 years as part of our commiment to a before word through electronics.

WE BELIEVE ROBOTS FREE MWOS TO CREATE BY FRIEING BODIES FROM TOD



Relation Group Instant al Components Salta I, Server Diverse Hilberts Annues 1.88 Schument Annue I Marchen Mr. 1007 (1984) 56 (2010) Camelot and Middle Earth. Now, wend your way to Kaleva...the land of Taliesin... and the home of wicked Baba Yaga.

> TIME-LIFE BOOKS introduces THE ENCHANTED WORLD, You have never seen lands as fabulous, creatures as amazing heroes as hold or evil as unspeakable.

How other have your wordsred about the legends of tendoms where successors provided Water edves, geomesand aprints phy them magical powerbecause the Edvers of Tam-Live Bootebecause the Edvers of Tam-Live Booteter and Tam-Live Bootebecause the Edvers of Tam-Live Booteter and the Edvers

enchantment: Wizards and Wilzhes-a sumptionally beautiful book lavishly illustrated with full-color paintings and drawings, many newly commissioned from today's master attacts of realism and fantasy.

You'll meet the legendary wizard Gwydion, who had the power to turn toadstools into horses and forests into entire armies You'll be entranced by the story of You'll be entranced by the story of Baba Yaga, breeder of violene storms, who fenced her garden with human bones Your reading will abound with tales of talismans, charms, runes and indelles spells, pertuctles and other powers of wizards and witches

You'll become wise in the ways of Merlin, gilder of the glory that was Camelot, and even face the Devil himself with Faustus and glimpse the cene revelry and rituals of a witches' Sabbat

We invite you to camme and cryoy Waves and Wither REE for to those scene to the paymag ass's 149 (516 99 in Canada) plus shapping and handling Alterwards, you can unlock more of the secrets The ExcloseryD WordD holds for you in under holmes as Famo and Else. David: Add Reydows Dregars. Gants and Open

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ETTERS

COMMUNIC/ATIONS

Alternative Weaponry

I was as distraught and diamayed by Bany Lasts letter in Communications (April 1984) as he was by "the concept of laster vertices in space "

Fair from theatsmap to cause the "dentee of all marking", space executions offer the best hope for powder an allowance to decory amini-control and anne-reduct to functions which, hotpscully have inhaps liaked to prevert war And they decrease our dependence on a strategy of determine through nuclear establishor of determine through nuclear establishor.

Such associa-based without tables mission (AMV) (efform devices as the inverted enargy withouts of Lex/based Davies Tables) (Darle Charles) Regist high Perchar and the perint table based high Perchar and the perint tables and tables) (Davies of Percharace Composition 1001) (Davies in Obto): Supportion to approximate perint tables) (Davies) and tables refer on Elastin. At water tables) have to be with kale samelities displayed by the Sources anyway.

L'estiv e net such a contraiseren. L'estiv e net such a contraiseren. L'estiv e la contraiser estivitation de la contra la tra succession costa 4 sign Sentra la as nonggiussava as a buterprot cost treme son over publicances and high Fronten-ai trat high Fronter con do la prenent Alling I al au careja positiva bat trem con descui publicances bat de mort descui publicances bat de la care creencenci.

The real contradiction in all of the is that the liberals who oppose the policy of nuclear determines sho oppose the only mainter alternative

Tom Drunkleton

Oncu-Peacetul Space

I found James E Obing a antole "Origod Doarnorschill (Space, April 1984) why ritriguing Deapte the semantics of Soviet propagande, if seems appenent that the USSP here a killer scaleship program, and the Pentagon has a \$200 million weaponte-nocace program.

When people argue shout which came

first, this chucken or the egg, the fact remains that they assit emultaneously and one ponerates the other

Such space mesons as the Soyuz-Apolo link once hald the premise of datusing the cold war it is said that lockly's space missions fuel it.

Paul Holtmann

Rancher's Boot

Having set retid Roger Revalle's interview (March 1984) Lain theroughly outraged at his blanket condemnation of ranchers whole outfle graze on public lands

We are callle ranchest and have bean for five porerations on 38 sectors (soughly 21.000 ecres). Our ancestors solided bece lands in paneer days during the 1870s and 1880s.

We consider ourselves slewards of these lands and have carefully managed our herds through the years to beet munitian the status of our production.

We have toderal and state graping leases as well as private lends in our allothesis and we have not pollen not guicky -or even slowly - while conducting our business.

We are constantly monitored by the Burneu of Land Management and other agatices, and we found out years ago that if you take case of the land, it will take care of you

If Revalls wents to find the real willion, why not invostigate this tag of empone or who have of and gas leases on these lands? They come in, build roads, drif locations, pollute and sear the landscape, and then onne off and leave it to the renches to try to petch up the moss as beat they con

We are many our grandchicken on this ranch, and we tops they will contrue to nespect the land in the safet every as we have I know of no catter ranchers in this or any other area in our state who determe Revelle's attack, and I think he has about am much tupmers wring an article about catte ranching as I do writing about coerenginghy.

> Patricia Lyman Carlsbad, NMDD

DIALOGUE

FORUM

Cremin welf-comes appectablishers theases conversionally advanced and appeared to the read-ther in this open focus the second point to over the open read-the second appeared about the focus word in controllade to the hind of informal dialogues that generaalities beautifunctions and final the conversion expression have use mat monosistably theore of the mapsance

Stutteining Cure?

Whith happaned to me is baffing. For years I had been socially impared by a ervore stuffering deorder, which also took a heavy emotional tol.

In April 1980, il becarrie adoparent that i suffered tion the steep discutar naccolopy (unrelated to my stattering) My physician prescribed the sympathic metric average hister or pretry phenolate hydrochideste matweet in the pountry by the CIPA GETOR Concession

This medication proved highly effective against such symptoms of neroplepay an indden episodes of sleep loss of muscla tona, and sleep paralysis. Of course I was pleased

My pressure turned to exultation when I discovered that my elutiening had subderly created as well I am speaking of a discrete change in my speech pattern. from stambling over every other word to favores, underm anaxiation

To make sure of this seemingly incredible connection between Praslin and the rikicosi improvement of my speech. I skipped one does I once again lepicid into humitating science-riga

To the shock my doctor had never heard of using Risian for stateming 1 wondered whether CIBA dErGY had ever received any other reports opnoaring bonefolial (Frota the drug might have on speech disorders 1 whole solveral Wrighty ubinatical letters to the firm but no one responded to my currents

Could this mean that the suffaring of stutterian is trivial to CIBA GEIGV? Does the company legard it as a subject not worthy of interests?

Robert Rogers Dumbar, WV Forum editor Leslie Epsileen responds. The efficits of main/pathenistike hydro enfonctio or Realer and casmody unger messigation at the Kalumazoo Daki Gandarion Chino. In Kalemazoo Daki Gandarion Chino. In Kalemazoo Daki Gandarion Chino. In Kalemazoo Daki Bergatario doos nated a suer to be internisted in the effects of the diog shat the transaction is not allo user morecleart

Riskin in beng Betabli an cikakasi web solah nan minana bena ngapataban Su ben Antelher a alakasi ben-yebat higa solah nan solah solah solah solah solah pipakasady alakasabatay so hapannah pipakasady alakasabatay solah solah solah pipakasady alaka solah solah solah solah pipakasady alaka solah solah solah solah Riskit dakasa solah solah solah solah solah Riskit dakasa solah solah solah solah Riskit dakasa solah solah solah solah Riskit dakasa solah solah solah solah Riskit daka solah solah solah solah Riskit daka solah solah solah solah Riskit daka solah solah solah solah solah solah Riskit daka solah solah solah solah solah solah Riskit daka solah solah solah solah solah solah solah Riskit daka solah solah solah solah solah solah solah solah Riskit daka solah solah solah solah solah solah solah Riskit daka solah solah solah solah solah solah solah solah Riskit daka solah sol

The une of Realer to correct studiesing has yet to be explored

Informan Treatment

Your interview with Dir Robert G. Headt (April 1994) was most enighteeing and schsably treed. My fourtient yeer-old son Thomas, Jr. was timulary mundiered on December 28, 1963, while standing in less at ANODravid's instituents in Woukegut Binot. The killer was a chagnosed achoostnews

I had read the article on April 21. 1984. after attending the murder Irial and Istering to leatmony from psychologists and psychiatests from April 36 to 20

Dr. Healths critics worry about the possibile influminin treatment his patients receive. But I below that not exploring were averue of treatment for these patients closes a classerwore to formly teends and innocent bystandars, who electric viceme of schorephrevia area.

Encourage Heath not to be deterred in his search for a cure for schatophrens His critical are possibly among the many doctors who hospitalized may some murdiers 36 sectable limos

> Thomas Degan Sr Ketosthe Wi

Bad Blood

In Mate McCushwork single: Commo Gener (Costum, Mater) Malkh ine sitike Mai, beir generi cen be passed from comma garente to here checken and her them generi coute (or can coute comma laceture) in these checken it is much more likely that the property to emeret action is caused by the overall perception and influence of the primate perception and influence of the primate

If we believe that original bohavior is made we must then believe that a person has no choice but to accept his or her criminal activities. We know that this is not thus. If it were it would be impossible for certines to reform

Centarily some chemical inicialarioss can cause spotty orminality, but to try to spotly this theory to the whole range of commit between a refer than

> Dan Oskley Charlescon IL

Religious Futor

Littingsy object to the anciens of exitingsian that have been appointing an your registred tably. The most neuroscitage assempted of this type of proportions in Jamos Commans. "Represent Suff. [May 1986] A better too for this poes of concernation and the second second second table based of instance with the second second second second second second second endowed tables and the second second endowed tables and the second second second second second second second tables to the second method statictory.

Once is a magazine field allogically exists for the advancement of scentific and entrick crastively. Budfers of history knows that milgion has been a bar to both scence and the arts. If we an next to philotophers and atheats everywhere for ancient like Gormen's to appear in publioptions dehield to programs

Now than 200 years ago, Social philosophie David Hanne destroyed all rational argaments for God's westerno-Mens only dwinty lies within hermail, and his only dwinty lies within hermail. Just generations Reason is the only bese proceed men.

> Jeffrey Governale ChicagoDO

DIALING FOR DONORS

LIFE

By Daniel Kagan

young mother sits devastated Congress in her arms a Implifully ill toddler sags weakly, dark

Since the 1980 introduction of the highly effective immunosupprises we down emerged as an important method of lochays. Ever, kings or heart have latest Unfortunately though, there aren't last year when Dr Barry Jacobs, of International Katney Exchange Ltd. would becan brokering katnoys sungacally

Mambers of the U.S. Congress and a since it is flegal to sell people into slavery. cultivend Jacobs and a segments of supply to meet the demand of watery better fine the costing volutiony matren

In fact, some purformers had boater newspaper ads had been appearing unemployed man asking \$30,000 in Detroit a bartkrupt butmestman named

In the schash of publicity following the ods increased dramatically Organ trans-13 CMM

INVICOI were mundaled with maximer. around the country also received calls.

'Most of the people who call about sating an organ are not capable of giving introlet Arthur Capian who also receives poor and will do snything, including kiting in order to help their families

Despite the large number of patients www.atmp.organ transpiants--- from per 6.000 to 7.000 wetling for kidneye alone-



could be allemeted by salvaging organs

But physicians and health professionals often houtare to ask bereaved relatance clonors. Peeks would like to see these professionals make the doate request regardless of the family's emotional state Richt now the job fails to the elde conce of NATCO coordenators

Arthur Capien, who is on staff at the Harthous Contar --- a private instructs that focuses on the study of broethicssuggests two prematic alternativos

The first is called presumed conserve policy Reversing outlant practice letwore responsible for carrying a nondenor card

Capien. "but most polytopres acknowledge ristwo this one called required request

system is that people don't make the required ' he explains, 'we would arrich. Date iners at the state invalidation of about donation at the firms of death The family could say no but the volunter

Compressi altro hars been working on the problem and has two bills in the works that will, among other things, se establish a national registry of transplant soon be compare to an end DC

PSI FOR HIRE

By Daniel Kagan

Harry New hardword years ago in General 20 Oncide with a Day's with a litrarying concern. Anyone not enced the countisture gold to the tompation colliers could be the quasianerm actour the been parses the quasianerm actour the paralesses, an orcepterenced approximative who would describes to the groupspards what where would describes to the groupspards what we would describes to the groupspards what we will her images, put than into we rea, and they than to the calent

In other words, the Dephine Oracle was a business, a consultancy on future events theth-for a loa----derivered psychically derived precisions on alters of asses france was political, and personal fortune.

Today in Sen Maso, California, a businesis partnership apply rained Dopin Associates as dong what the original oracle did utkering calent per derived proprioritizations for to single departner with they also turned a union much

The three Dept justimum, projectal Reset Tay, provided with Heart Internet Tay, provided with Heart Internet Tay, and the Internet Tay Internet Tay Internet Internet Internet With Bymen of lapareness as a flandard Mark With Bymen of lapareness as a flandard Mark With Bymen of lapareness as a flandard Internet Mark Internet In

When the Display painterup polytophene with 1985, here into uncertaining walks in product the movement of shree taskes by using proception and sworks werking. When and Harany would and thermitohene us in obtenet harany would and thermitohene us in obtenet harans, no commonitors and growing balawase them. For each task Whetes to while in character a common capacito in prevent on a display factor was a marked. This segment was done over a market. This segment was done over a market. This segment to dotted impreventing the observation of the object impreventing the object. that price change would be delivered to Harary's house Targ explans.

"These were low conditions—up, down, more than twenty-twe cants, and less than twenty-twe cants, while might say to instance. It alwe is going up more than bothe Ovi it is dropping more than that, the bothe Ovi it is dropping more than that, the esticolated object will be a compose "

It was likely to be add as the intermediary between Harden Harary and White Twocket awy to Henry, Ce Monciely were going to give you isomething. What do you see? The might say. Take isomething and looks like a periodic Thon I would also White, What have you got in hom to hou? And he would not think one of the objects were a periodic

Twould then ask White what thet means, and he might reply. In this case, it means after a going down more than tworks two cants. And then I would cast our broken and spec. Set intern"

In December 1982 Delphs made rate streat-Juans predictions with this method Then broker tradied on reven of these and made \$100,000

By the following spring, they had discon-



Invest the practice. Instead of predicting once a week, they tred it more often and pot poor recute. Having begins to expension differentiate. Having begins for expension of the programmer. Has remote week proving a balance of the images carries prediction.

Details has gone on to other projects. They are currently working in ob-based of and pas properties, and they re vorking on a three yeer consulting contract with Atom to devolve computer games that incorporate out based damerers.

In Depth is of progressing work, a of they compary come to the partnerspip after these used vactorials to the partnerspip after these used vactorials and the partnerspip raid of Depth Than Uses remote vaceing after the them and narrow the defining after the them and narrow the defining after the partner beset and to use constructions and a structure to use and the partnerspip to assets in many structure constructions after the structure to the construction of the structure to the constructions after the structure to the constructions after the structure to the constructions after the structure to the structure to the structure to the structure of whet it the value to the structure to the struct

Bo far Delphi has done several auch preterennings for two all companies. In each case. Two soys, the fostcasts he and his colosignass made were conset.

Of pooles are created influer, but he data contract long form Databatia contractor above participation of contractor above participation of parte factors, a feebra usida in mery par expension and the angeod in a abode liver up game for example, nandom targets might page up (V knowing "akine these will appear and presenting for thom, a sime player can dem loss parts).

These will be dell and action games with psychic daments," explains Targ. "The premite is thet you will develop your psychic abalities by playing the games if is live an ESP teaching medium."

The first gaves, due out in time for the 1984 Christmas susser, is called *Mind* Risca after Torg and Hatary a new book of the same name two other games are scheduled for selease in 1985.

Butteres is dong well. Wans supporting three families " says Tang. And if there is anything Delight Associates has already shown if is that "psychic functioning is silve and well. People are melling money with a, and Deline is supporting raw? Do

PANNING A PANACEA

THE BODY

By Joel Davis

copie have begun to set them file candy in health food shores and pharmacea across the country werner. Catabios site by the cash register, offering the promise of good health. They may shore the bing use signify, but offer weath critic their purveyons.

Annihistik obieselov veň, apocho apot tehrál ni 1000 a pohlagovano petrago, ol disubé Nébel Prote veno Linza Piaureja body Vésenio Cand the Contreast Contra ti al wol Anne petra i danem Cindi più another body hat danem ti al age rabose ol asochetia acci algo hebod ni tile tradmenti and cuno di aurea.

The exception of whits construction a megalation is in honory over the processmentation of the honory over the processtion do mitigrams. A low decision, it ensures to all or mitigrams. A low decision, it ensures a megalation and an implementation of the prolearning on the process of the prolearning of the process of the prolearning of the prosenses of the prolearning of the prolearning of the protein of the protei Industand millignams of C each day?

Recent Incluge on the effects—or lack thereof—of vitemen C mogadosee on humans, however may distress those who even by the vitemo's healing properties.

The example Pauling claimod their tea and his wick bill both and an oncourse glasgo within the Caboos, other investigation also the University of Neccessite Meetbook Contentionagements in cause. The both and contentionagements is access that both and advertised and anticipations, protection inderesting and anticipations, protection inderesting and anticipations, protection inderesting advection and anticipation probability larger than more than assessing their advection and an assessing and anticipation inderesting advection and anticipation and anticipation in the advection and anticipation and anticipation and the protection of whether the advection and antial advection and anticipation and anticipation anticipation and antial advection and anticipation and anticipation anticipation and antial advection and anticipation anticipation anticipation anticipation and anticipation antic

In other words, this sense of well-being occurs not because a person is taking megadoese of watmin C, but because his body is now working to cancel cut the assorbio-actic coefficient

Another claim hocurally inade for supplemental vinimin C. Interproves at lease performance. Patient and Judy - Drilleal frem et Vrigina Polytechnic vasitue and State Linvenite, decided to test this frecty on a Docup C man adei twerte fee to intrinsight, who were of similar happt and weight, None of the men recruited for the exploration twear availability of the regulate ceanage program. In one study, the part ideants take within 300 milliogram of C or a photobility Associated and provide 1000 milliograms of C in tooth cases, nothing exploration to subject knew who was ophing the total compari-

The researchers found no significant ofference in the parformance of those propile taking accorbs: cold and those being trialled by placebo

Taking supplamental vitamin C doos unter a grem doesn't hurt aports performanos, 'says Destail, 'but it doesn't improve performence either.'

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More disturbingly some scientific data indicate ascorbio-acid megatherapy may consucciously as



Klamm G. If a touted as the comman cost ours dut too much may cause problems 27. Cheel

SPONGE POWER

BREAKTHROUGHS

By Phoebe Hoban

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Paint now most submovables are borneasly imited. They are powered or their by betternee that nocase lacauent realinging or anthemed to a sufficient allow always that provides a life support system As a music, supmersitio favel favel favel been restricted beet in terms of time and diseastice. But when I you could run in classifier other common internal-combustion engine underwater? Them expects before, the observiced would become the next formation.

"Imagine if you had to explore the continental United States with just three or four jeeps," says John Oraven, a pt. Own Unversity of Hawkis polessor who formerty served as orient acaental on the Nary's Polane propert. This where we now stand with accessing sphe exponitions four this will change the ensure nature of our understanding of the seatable and, for the first time, maily open up the ocean orienter of the cast.

Bo for the begins obtained to developing a practical undersafer engine has been the lack of a recoly surface, abundant oxygen source. A typed internal-certisation engine askally consumes neerly eight ames as much engine as tue, and hamporting the releasing, bully anygen supplies a strab. Indicate

But the hemosphangs advest that basic politianity transforming this ana shart mit a withaily endies, on elds advest excises when advestar is perspect through the hemosphangs, the hame detyme reduction (under which advest advestment advestar) under whith the secondary advestment advestment advest advestment advestment advest advestment advestment advestment of semillanian of tradholar basic of semillanian of tradholar basic power engine for tradholar basic



The Antrosponge -a spect-ape (up/ onl)

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Advantuese Conversion a Ban Transson non-experiment from Inor and 31 million for the sight as the boostnemask tagget provides the Newski to design an arging his as compatible with the innordenticidigy of all goes account or bands the sight provides and the sight provides the sight provides the sight provides the sight provides the all goes accounts to pain a working all goes accounts to pain a working of grant sources the provides the sight provides the "This could represent the provides the present used to provide the provides the provides the present used to provide the provides the provides the provides while the the provides the provid

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THE ARTS

By Michael Bishop

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There can be no sould that SF has begin to BHARS have not readers in iscent years fease Asimova Founda both Edge. Athen C Classes 2010. Otheres Are and Robath Ferniems Prody have all mede The New York Tesse bear police fail. Yes of Head images shelly for the field has not been for theoring.

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Lord of the Falss, Galdergais has book published in Table enclosure, and intelligence international more and intelligence of English schoolbege who have been shrined on an unintelated occurs instead at the beginning of Work War II aborptus extendible as booking similar bit he conthey takes ket. They rappidy disclosure that and the beginning of Work II aborptus extendible as booking similar bit he conthey takes ket. They rappidy disclosure that as a monthous an another they apply disclosure that as A chilling rony of the book is that beyond the island, these boys perents are lighting is taivage war of their own—all in the name of periods.

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Catching makes his sharpain stetement about human miture and technicopeal programs in his say. The Amos Subarrity (1950) Bused on this haveful drivey Schoolmary, from the articloop Schoo

In the Bredbury tale an emparer of encient China executes the exector of a



William Golding: a Nabel for accence teasor

System machine and dealtroys has device for feer of what officers may do with it in Soliding server set in the lind cantary A.D. a Bortish attrater wends the memory Phanoxies to China to keep imm loom devicioning a setemative and a perform device and the set of the set of the perior the object fear meriting perior the object fear meriting. Perior the object fear meriting and potential to mease even the most welmentioned products of the threadow.

A intermittip cass the emperet, for anything powerful in the hands of men, Phanobles is like a strarp lende in the hands of a child Thran is estimal wrong wrong with the skernship There is nothing wrong with means infel gence. The trouble is he repute.

Both Galaring and he urbane, pages emperor accept the Juleo-Cristen doctines of humanly a Salarin rease in his essay Fabe, Geleng summarzes he well experies without undestanding histoph trade years without undestanding halt man probable will as a bee produces honey, must have been blod or wrong in the head.

In 1984 Desiring published the Spine A million studies and the desire of a medianal clarit. No handle studies and the studies of the studies of the studies of the studies amboon. Such the Arrendon and Bowle and Arrendon and Bowle amboon. Such the Arrendon and Bowle ambool and the Arrendon and Bowle ambool and the Arrendon and Bowle and Arrendon Arrendon Arrendon and Arrendon Arrendon Arrendon and Arrendon Arrendon

In the sease, Ce the Choic all die Week Gebing weeks: "Due transmoy, or casses yor for hera bageline in a full more abilitation of sease in a submore thank of the sakes of known (them and known in the power to sease to an another the casses of the power seaseming about the sakes of the power seaseming about the power to be seasement to be about the power to seasement to be about to be about to be about to seasement to be about to be about to be about to seasement to be about to be about to be about to sease to be about to be Is This a Black Hole at the Core of our Milky Way Galaxu?



N A BARREN platn in New Mexeco, 27 emerges of the Very Large Army made takacepe have network the heart of the Malk Wg Garang for the first time. (The core of the Galaxy a normally networking starts) The resulting images show entervening starts). The resulting images and entervening starts).

three curving streams of gas which appear to be rearry thro a manipatrom at the center. At the very core, pulling everything in, there seems to be a supermassive "something —perhaps a block hole.

Black holes are correctue — hypothetical bodies in dense that the graphy field around them does not allow light or enything class to encoup. You likey appear to cost at the core of all guidades. And peritare classifier

The mass of three Suns crushed into a space smaller than this period (31

When a large star has sport its rachar fack it biase sport in a colosist explosion which we call a supernova AI that (crowns is a sing, hat, bared out core. Compressed by far own grown, the core shrple, becoming driven and driven. If the star is hower then these bare, growly could be its sentence. The star is hower that the period at the cord of this sentence. The star is heling off and a black hole is the result.

As incredibly destructive force? Yas, but astronomers think the black hole—or whatever it is—at the core of the Miky Way may have been there from the beginning. And it may hold the secret to how the Galaxy began as well as how? I might end

Are we alone in the Universe?

Approximents have recently discovered bands of solid particles onliding several other stars, including such noted eye stars as Vega and Provide the sense on surrounded by rings of endicively code, small solid material perhaps no larger than parts of stard which may be the staff of plannism same only stage of constans. This asystem of planets we inhabit may not be unique after all

There are billions of stars in our Galaxy clote—so somewhere else in the Galaxy there may be a solar system like cars. En perhaps the most exciling indication yet that "method is not drem."

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SEAL SURVIVORS

EXPLORATIONS

By Paul Raeburn

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"Is a high-risk Teph gain strategy," swys flumey Le Boot, the loading authority or the elaptical seals. Only a tew makes belong to this class—the beedes—and the entrance sequeriments any way high.

Le Boout a protessor of toxingy at the University of Celiforma at Santa Cruz conclutati his Biotowick on the elephont seels on a windswept spit of land called Ana Nawo, a law miles north of the university. In 3755. Ana Nawo became both a battleground and a nursery when explaint seals, for this limit time this century, diagood themselves onto a marriand beach to breed.

The receptarance of the element energy reception is compared as considered in the second second second second fail and the second second second second other and the second second second second other and the second se

Elephant seals can weigh up to thread tona and neach a length of 16 teet. They are not only the langest of the perspectsthe territy to which soals, sea hors, and wa'tues's telding—they are also the restort. In codes where seals have



Once on the odge of extension elephant seels are reaking a compack on a California basish 32 Cales Bibliotid diversi and surfars, elephanti electrine benchi bibliotidi bibliotidi elevity inter the offering parmaria could biotratificati a levit allow the has test indexer relates to the test of elevit-bibliotidi bibliotidi and elevitimistication of the offering and the second bibliotidi and the offering bibliotidi and the second bibliotidi distantiant and the second bibliotidi distantianti and bibliotidi bibliotidi elevitements based bibliotidi and the second bibliotidi distantiantic and bibliotidi bibliotidi distantiantic and distantiantic and distantiantic and distanti distanti distantiantic and distanti distantian

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STARS

By Robert Freitas, Jr.

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Autonomers who have been observing the Red Rectangle since its discovery in 1073 are still at ocide over why it has its detinctive areas and who selar machanics and at work in falloos

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The field current explanation of the reading is increasing a structure structure that during is concentrated in a flat, their discussion of the structure of the the discussion explanation of the structure of the discussion of the structure of str

The rectangles central stars (HD 44179) are so brilliant their anyone can see one of them with a good set of binoculars if he knows where to look—near the southern as Deel bodie of the constaliation to Versienre (bruinorm) Attractar (bru can be and the spicial on 1985, the notangle—10000 threads the second second second second second neinh another (bruch, calarrad, based without a large methy based a visual robub, or a gar of surs, but a visual robub, or a gar of surs, but a visual robub, or a gar of surs, but a visual robub, or a gar of surs, but a visual robub, or a gar of surs, but a visual robub, or a gar of surs, but a visual robub, or a gar of surs, but a visual robub, or a gar of surs, but a visual robub, or a gar of surs, but the second stars persent, sibet in coars, throo in succi stars a present, sibet in coars, throo in succi stars and the present and the coars, throo in succi stars and the present and the to super robub (or jub present) and the second stars and the present and the super robub (or jub present) and the succi stars and the present and the succi stars and the present and the succi stars and the present share the succi stars and the present share the succi stars and the present share the succi stars and the succi stars and the succi stars and the present share the succi stars and the present share the succi stars and the succi stars and the succi stars and the present share the succi stars and the succi stars and the present share the succi stars and the succi stars

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Red Rectangle Haw many stars to the hole?

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HARDBALL SOFT WARE

ARTIFICIAL INTELLIGENCE

By Paul Hits

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CONTINUUM

THE MEDIUM IS THE BOMB

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What do encrusive power to the concern stream is dealed, any an answer to be received on the concern stream concernent power to be an answer to be a stream concernent power to be a stream of the concern beam of the concernent power to grade an present power to the concernent power to present power to a stream the concernent power to present power to the concernent to the concernent power to present power to the concernent one concernent power to be an ender the concernent power to the concernent power to present power to the concernent power to concernent power to be a stream of the statement of the concernent power power to present power to be present one concernent power to present power to be present one concernent power power to power to be present one concernent power power to power to be present one concernent power power to power to be present one concernent power power to power to be present one concernent power power to power to be present one concernent power power to power to be present one concernent power power power power power power power power to power to power to power pow

To be according to get the first screening control to a P angula. The according to the first screening control to a P angula the according to the screening control to the angula screening to the screening control to the screening control to the according to the screening control to the screening according to the screening control to the screening screening the screening to the screening to the screening screening the screening to the screening to the screening screening the screening to the screening to the screening screening the screening to the screening to the screening screening the screening to the screening to the screening screening the screening to the screening to the screening screening the screening screening screening to the screening screening screening to the screening screening screening to the screening screening screening the screening screening screening to the screening screening screening the screening screening screening the screening screening screening the screening screening

4 million

CONTINUUM

BEARDED GIRLS

While vacationing in Britanis East Anglis region, Dr J. Habert Lacey came upon the statue of a young off with a beand

It was a village christhy momorship Sant Unouenber a ninth century Porgaguess awn? The interreget workd bit manage to workd bit manage to been duelersmake. I a been duelersmake. her father, the sing of Portupal impress thet his place had board used, endered her couption

A payethethic increased in enotional nervola, Dr Lisoty of BL George is Hosphil Markeet School, in School, hypothesized that this legand may reprosont an eity case of extreme anonce a

Linklin to converge her lather that her logally say with Good and not man, La ory speculation the distrested princeas were into neckeon rehused ward into neckeon rehused ward in her backty is a way out of the university of all her backty is a way out of the university of the lather provem by silowing her to grow a backt

"Development of body, and occasionally fixed, hair is not uncommon among advanting empowers and a contempt of the second contempt hair to believed to fixed temperature regulation in the absence of watequate subcutaneous tat bases."

Saint Uncumber, according to Lapory, also seems



An aucostant way to get not of a socker. Grow a beauti

Is if the psychological profile of the analysis on intelligent upper class young women of high moral standards, silvad of actual security and the obligations imposed upper her by high securit status

Her biety struck a sympatisobic choose in gets hnoughout medieval Curicos Lacey explores "The only with could use by tencouching on changing them see. Science became nume. Others live Barr Jones of Arc, assumed a manti-attee. And others live Barr Use of themeses."

Although their elevision of is no longer sought, as lists all the subjectifs ocertury the was known as the period sough from unwanted suitors, or wwas waiting to "uncumber" themselves of difficult husbands

-Darvora Halber

whowar _________

CHEAP FISH

Triad of paying high prices for tah? Then grow your own

Michael reprinty, of the Profida Instantia of Technology By stype you can nase the as 50 cents a pound Hermitin technologic students at the Jaween Beach, Forrisk, college how to da useful has an internet technologic attribute to garden somethy has at histo or garden better, table or garden some hops histo, which can be becapte

Debugging poets old concrete bedyging poets old concrete subbit lakes or even oporter bondt wullta. A waterg poet IT beer in demetor and 3 first deep helde shoet 2 obd gallore of water. Hartman aleys enough to mass top pounds of their na growing ceason. That amount of water also active as an effective heat are, preventing resid changes in 20th patient changes in

The field are ded rational



Contractional hast darms like the one above any sourcely high 166/r /bill you care make your bard as a sound need or nonline tank

up table scraps, pulverced bempost, and even yard infimma, scrastmos supplemental with commercal two load. Some people ausport a type above the tank to attract bags, when then tail into the wolfs, when they are esten by the fet

Pair we particly varworld dial we or sixmartine-depending on the location, et an merage weight of 0 is to 0 rb pounds. Fail garden is in Fonda and other warm most call garden is in bit again more crossing on get in two forces a year The cool avages cris odilar pre pound depending upon the ratio of cerrareent hall boot to arrange

Hairmon todu bi surges Hairmon taka off some of the downings of ten gendering touget low-cost politiken fras high nutrition todi while making use of othermise weeted produced the weeted produced the students and here surprus hes students and here surprus hes students and here surprus



We associate exercise with pair and sweet. A new method intertunately unbroked, would eliminate such unbleasantnee

EXERCISE WITHOUT

Want to exercise but

don't want to work up a sweet? Now there are ma-

In clinics opening across the opening you can wra yoursalf up with electrodes and let electrical pulses work your muscles for youno swoot, no rocing heart to falgue

Developed to provent, muscle disgeneration in peralyzed pittents, electromuscular stimulation uses weak electric stractis to make muscles potentiati

In normal exercise, the bosin sende an initiation signal through the nerves to the muscle cousing it to contract. In electromuscular stimulation, the brain is humased.

A machine delivers an electrical pulse directly to the muscle making if jump involuntarily. The sonsation is very senier to being next to a nozzie in a Ja euzo ' savis Lawonce Acper, whose incoreanage canes in Galifornia and New York have attracted many movie attracted many

Arbitios nave tred 4, the Sonats used it on coerroneuts during the Salyul Rights and NASA will conractor it for the list topsoe adaptin There's anly one problem with record one problem with record agent sum whather it works.

Hessancian has yet in the result in has yet in the main is beneficial, some for the inspective muscles of persystems particular to the University of Montion Environments of Montion Environments of Montion Environments of Montion Environments of Montional assistances in the correspondence in the correspon

TOBACCO MERINGUE PR

The surgeon general has determined thet cigarette amoving is clarightous to your health. Builine clich? say anything about eaching cosmittee.

In fact lobacco may be one of natures facel num lobal facels according to Shuh al Sheen a plort adhedges at the University of Kensuay. Working with retrieved UCLA broing et SG Wessen, Dheen has davet apped a plocess that its movies most in the lobacco lobacco laaving on obtaile obtain conten

He has elso come up with a recipe for tobacco monnoue per

Been uses young plans ony—thay hour fower oses bubblences than mabee parts—taxvabing them when they ro about inse-high its do coshes the lastes to astract tobacco use them heats the bacco use them heats the heats to crystellism the whete process which can be transved easily from fail

To prove that the protein is teary as well as practical Rear where a practical rearrigue pie, made from rearrigue pie, made from tear prevents of ablation leaves, for the Newspoper Food Eblates and Whites Conference, held recently a Leavengton, Kestudky

Case cases and a compact to a relegant and News was among those who sampled the tobacco-proton pro We were skepped that when it was mixed with water and beaten it looked just like egg whrias," she sied " By its off, it tasted fuzzy But as seen as sugar was added it hasted watch, ike reguter menngun"

Shoen points out that the pretex countains to tas or carbotrychoos "it also accessed to it is a good supplement. for people with leading methanictions. And if would meles a good food for peoplemente a good food for peoplemente a good food for peoplemente a good food aromain. Stream poles

I we also chans that the protein contains nearly splice insotroe, in the five parts parts of the second parts of whole terming of parts rehind to lob account add in parabolis and while potetions that we set all the time "Balana poets of the second the parabolism".

-Shorry Bakes

If takes a very unusual tand to latertaike the analysis of the covidus '



The surgeon general news/ conclusted a teste test

CONTINUUM



Musical The cablest pools records a layor to manhout

SUBDIVIDING A GORILLA

Mease, the grants, is one of the Phasedepha 200 s most obershed senor obzens A resident of the 200 since 1005 Massa is not only the works a object living roor/sime pirmate source of an entry of the hold of the average ite source of anothes in the wold

Zoo officiale attribute Meanin unprocedenterio korgony to veternary care protector from infortane decessa (he lives behind a glass crabburd), and a controlled office first would be the prote of any health food nat brever's yeast whole-grate bereast infortane to statement passes of vitament and mensate

For the moment: Massels health reems to be remark aby good. Withough most of his tooth are gone and he has such predictible aging problems as anthreas and a dockree to muscrie mass, the lists physical allowed his heart functions and blood pressure to be extrarable contrast.

Still no one copects

Next The one was account of the second one of the the period of the second of the second of the the period of the the period of the second of

The payoff for all this scalarly may will be an increased understanding of the applications in one of the profile of located will when the main the first, capped the President accords book any designed that the scalar book present of the scalar book books of the scalar books accord who will be accord tom therease books may be capture animal. The screaming on the scalar books are may amount to a resuming of the scalar books books on the scalar books of scala

Tudge a man by his queepons rather them by his answers '

HEAVY SUBS

Which he was a young boy playing in the balhaud with the loy auchane. Henroe Lippituz links in upon the uses Planes and Nerwer there is an intervent there is an intervent mer submarkele oralit, could have superflok hulls and could probe to the despirat could probe which or and could probe to the despirat orality order the mones water pressure

Lipstruiz now saty-four racia setted Bittah Arways alay as will kinky commonse the side bittah package bittah Administry the Parna gon and eleventeer. The warmer-hear-water craft is an also alwaid of its time upphatiz anys "and it is bang grounds, just les the Wright probatic arystane.

Today a bucyant submemes (which have belies: arise and threakin metallic xults) can't sately submerge whys 3,520 leet ()upstatz says instead he recomments sinkable hulls of their concrete

Of opera of heavesther week on the would drop to the bottom once it adopted interveng to unheated. Tending runner/ (consisting of a series of rolling) could be used when in port, capanuts says. And it sees, mitilation inthe would insiste the certific pruses on the surfice.

The crift would have wrige (data a set plane) and would either be nuclear powered or would carry gant battery packs And becourse of its set if ty so operato as any depth to percent any any depth to percent any any depth to the could current ever and outlight any and as we — Ene Monture

Without are always short



loday 5 submittee by log hangy bays a civilon thereout

2 DMN



Drying out occa leaves. Chewing the leaves has been a michtion for centuries, now kerosene and acid hear entered the sectore.

FREEBASING, PERUVIAN STYLE

In Peru the chewing of coca leaves has far centuries, been as common as the driviang of coffee or soft drivia in America.

The small amounts of coopies in the leaves provides a constant assume of somulation, enabling workers to perform alreamuous and bolious tasks in high obcious tasks.

But expositly this ancest hater has been on a new and introduce form. The leaves are ground and model with exposite and subtro acid forming a subtro acid forming a occasine operation which the occasine operation is highly opposite and forming a peake produces a headbeather produces a

The petitim is cottane suitate also produces what Columba University marciogial Gabriel Nehias calls the ultimate addiction.¹¹ In Light America whate an esimated hait million young people have tailes pay to he habs, addiction can load to weight loss acute marcing averheas, helpatnations, and addent or even survival behavior. "Its worse itan heroin addiction." Naties says, "because heroes addiction coas net necessary lead to mental desease."

Consortad with this gravity pobletic. This sitgravity and the terropial is a start at the terropial is a start at the terropial is particular to the consolt of the terropial developed is terror of bran surgery is which at of the consolt parts of the con

Nahas, who incomity werk to Paru to investigate the operation teels that the treatment may be as bad as the disease. The operation is not amobilized, and it's done with a bare knills, without any procision whatsower."

Nation concedes that the minicipate results of the

operation as in a be favorble. "For the test few months, the says, "about half the subjects stay free of pocarie. But as time goes on, more and more of them as beck to the divid

"The only real cure for the casheloro " says Natios, "Beams to be to go to Chrie, where chug control is so shict that cocarrie is simply not aveilable "---Bit Lawren

"hysical laws are not "husing" --Fran Lebowitz

"No matter how unlikely a thing is, if it happens, it happens "

---- SCENESUW LOW

VERBAL CUTS UNDER THE KNIFE

You're out cold write a argoal team works on you neethetized body. Then he surgeon says to his isolaagues. "This is the works pone chill ever."

Or portrapis a nurse makes a disparaging remark about the condition of your vitals. Does such surgical benter have any effect, on the arrestratized patient?

Theories interventions of them is revealed to the theory of theory of the theory of the theory of th

In one recent study a apport massign ensity. Let apport massign ensity of amenthetical patients to rub new and affer they await of elevers patients data in fact rub pare raiss attrough twy couldn't notif being load to do see And when fernant avait anothetized escret ban the other that we manth which bencerved warmer than the other that exactly advantage.

Because the ansistence of the patient server is boin such as highly suggestable state. Bennett serve, carvies suggest ohitcher, which geet on a merry convention geet on a merry convention and such the movies IV sortes MAPSYID, a busy methods prosection. A suggests inglate organization the patients ended in the patients ended in the patient endowing. In dary so



Loose suggest los says a psychologist lork patiente

CONTINUUM





AUTUMN AND AGING

grates The leaves lose their

-BULLAMORT

ATOMIC BEANS



Scalup beans may be belier. Non madiating them

permets have been sitecessful in eliminating appreof the offending supplies according to Affred C. Ol acru a research chernelit with the U.S. Department of Agriculture, such sugers are only part of the posterior.

may be appointable for earling to tackense caused by beens but the fiber portian also contributes to the poptien. One field may present unknown make over though the boars do not become radjuschwi

Hadason ober 1 septy make the sugar disppart, its says. White media to be investigated as coacily what is happening to the sugars and other compounds in beam when they are making including/cal compounds that will be nearby outso mote problams that the sugars.

DO MANY TIGERS

As recently as 12 years ago the majastic Indian tiger was in sad shape. Its numbers had dwindlod to 1,800, down from 40,000

So in 1972 an atarmed indian government isspended by launching Project Tiget, which util makely sail acade 15 natural sensitiones as the exclusevel demain of the imperied

The program has have been to successful. Othcale cosmale that a necessful compared with the the terms with a second that the terms with a second that the same understate safe affects. The type is safe own for a forth of the cow has is string on this own for a det mak in a search for more jurgle maker.

According to Chandkibhen Singhi desixoor of a tiger neservo in Corbett Park, in the foothelie of northern Index's Strivelik Mounterne fee tiger procuber has grown so large that the animals are now killing one another. Eighteon togers about 16 percent of the parks population, have dee in intramutal battee over the tast seven years.

For main this \$301y is 640 works. In east Individe Keil district 112 people have been killed by 5gans seco 1076 with 21 dying in 1083 alone

Hearandra Differenti vello varia Project Torre importenti provina programma della programma per ante transmissione per ante ano transmissione per antenna antenna antenna per antenna antenna per antenna en alterna antenna



Opens are encounted a resolution or analysis of the resolution of the second areas t any only of all all especially that T12 who have carea

KISSING BUG

It is carlied the kasaing bug (charchie of ionabloce) in Later Amarica, and its trie is responsible for one of the therd World's most inscicus health problems

For when the bug bossupsative in the face (thus the issuing appetition)—it defocates while the wound that has intected as many that has intected as many as \$20 million singlow-shed exercisions (tarmers or ourney tok) with a one pang, apresents table meating appearing table meating and the state of the second pang appearing table meating and the second second second meaning as the second second

The measure initial account in the encoder of the e

abcentary charts decrease can cause chordens of the intertient and explicitly on more set or the heart that can produce singular heartboart or cocentry intulheartoy When the terptions. Catallos says. It can lead to sudden dealth. The heart simply days breating "

he people effected with Chagas disease ultrately

CONTINUUM

many Liano a new heat-

mato-wheet-oow supering on "wheet ranches

-Rick Boling

chamber mit 1 savs SPI

-Sharry Reion





Our moods, health. mental acuity-all are under the sway of

CLOCKS THAT MAKE US RUN

estor: When is a 2000-calone meal latereno? Answer That depends on what time you eat it. Or Franz Halberg, professor of laborationy medicine and pathology at the Universty of Minnesota probed conducted a few years ago Each day for a week he fect are volunteers a smole Ime-that consisted of 2 000 identical 2,000-calorie meal as supper for a week. On the broakfast only ectedule all six people lost wacht But on the support weight. Even the remaining two lost more on the breeklast Dr Halberg's conclusion A calore is not the same at breakbad as £ 18 of 8JCD91 We t at Harvard Stanford, MIT the Linversity of Califor timing investigations are increasing our understanding of the body a complex system of clocks and reveal-

PAINTING BY VLADIMIR VELICKOVIC

Ing that these thytms can influence everyhing hori moral heads to every produchinty. In addition these discoveries are seening such new thytms isclences as obscreptions and the addition addition status with solid hints or addition without with a with food through within you like intellection may be nearly as inpotint is the methodent head.

For example, L'assa, used, in resting, Parimento Baseca, derucat la daty an accacitari, hyphres of late an mela when rise administrated or contain incurs. They anthre symptome of which incurs for the state of concertainson, and insuma when melan al worther point in the amends' body option priorities in Vialam and some of the second synthesis and some when bernom

Furthermore, studies at the University of Arkanisas and the University of Minnosota land support to the theory that in some cases, croatean rhythms can influence the directiveness of treatments.

In one that Lawsence E. Shaving probeser of anythmetic locates at the Lawsenby of Arkinesia, instead to the Lawsenby families of 26 and advanced to proceed to groups of 26 and advanced to proceed to any to all of the Taster program. Notweet its resolution of the test of the test of the locate of the test of t

D: Within Historeky, assessment polyases of biocentry-more and period by a the University of Minimization Ecology at the University of Minimization Ecology at the groups of cancer parters. Euklying the first phone for two part study, the alternated them find in work of the data of the second poany. Sim chosen is considerable of the occe in 168 floatly is sectors to the drugs of control of the Study is sectors to the drugs of control of the Study is sectors to the drugs of control of the Study is sectors to the drugs of control of the Study is sectors to the drugs of control of the study is sectors to the drugs of control of the study is sectors to the drugs of control of the study is sectors and the study. The memory, Sim and T is appared fast these could believe believe the drugs.

In the second part of this ongoing study. Dr. Thisthesky laggled three variables—this thind the ocker and this retrievals as which the drugs were administered. His goal to see whisther response and course are also functors of when you get heated. The Indengs have been execution:

We've's had sen of the line tracker or anomconcret papers pay on a remission. The says Theresalls could be attributed 'party to the an important part of why they've borg to will. We there any they they've oberg to all with the says that the element of the says've counterful pay of the element of the says've counterful pay of the says to be says of the says and the says the the says of blocks cannot who we not been beened with charamberg and says and the says of the says of blocks cannot who we not been beened with charamberg and says and the says of blocks of the says of blocks cannot who we not been beened with charamberg and says of the says In related lubble, Dr finned Has, other openhops with Strate-Remain Water gravith Theo Terr Care Interaction of the gravith Theo Terr Care Interaction register, assessment term the yorks of the an increased strate in a general gravity of the an increased their is general the care is a strate of the increased strategies and the strategies of the the restration of the strategies of the the restrategies and the strategies of the their strategies and the strategies of the their strategies and the strategies of the their strategies and the strategies of the theory of the strategies of the strategies of the strategies of the strategies of the theory of the strategies of the strategies of the theory of the strategies of the strategies of the parameters of the theory of the strategies of the parameters of the theory of the strategies of the parameters of the strategies of the strategies of the parameters of the theory of the strategies of the parameters of the strategies of the strategies of the parameters of the strategies of the strategies of the parameters of the strategies of the strategies of the parameters of the strategies of the strategies of the parameters of the strategies of the

Early data suggest that some of the patients who suffer from depression may have an internal circackan clock that simply turns too fast 9

to the clock/depression theory

For the paid 100 years, as entries have been publicing potents on the autypact of ontaliation hybrine. After sum of the constance obcobined popy-training all constanted shut we to see all what there of the day applicacitization areas and theread on their failing of the training shares the characteristic paid to the forming, when the characteristic paid when the characteristic paid to be better more was thought to be better

Since then interest in chronobiology has been cyclical with knowledge in the area nonsering rapid's within the past decade

Affood, acentrate time yet to index stand all of the information of encoding dynamic twy do know hat each not of the dynamic twy do know hat each not of the memory of the information of the dynamic memory of the information of the dynamic two memory of the information of the dynamic two memory of the information of the dynamic memory of the second of the dynamic two heart table is cyclical, as is not concernented wholl there is the dece wave cyclic two year models, activity level memory method stable table type of the dece wave cyclic two year models, activity level memory methods wholl there is no cancel methods. All of those systems operate independonly featible processing systems and indextensive barrier of the next increases in what may be one of the next increases and one processing the systems are seen of a first barrier of indextons or clocks Some of these are call underfailed, others have been incorpressibly free activity, but their locations in barrier been penning.

Scientists believe that they have located one of the key transkepers in a tray classp of cells in the hypothalamas, just above the point where the option narwes creats as they arited the trans. Called the suppreducational rubitios (SCM), it caus steeping, weiling, and other scoving patterns

Researchers also suspect that a rumber of regulators is elsewhere in the brain, in the activities denotes and probably in the liver These operate functions from homone setretions to body temperature.

The links between this return instants from inc the costal word in or called 24th peters (Comman to tick operation) there are even update them in the aret is serviced to and can even update them. The arets can be min war to can forward the tick operation of the tick operation of the tick operation of the aret is and observe through a min or of aretime to the before through our main or ware in tracked before through our ware is when it is not before through our ware in the isolation perform to be and the or a show it for all down and ware interesting of a show it for all down and ware interesting of the show the foral down and ware interesting of the show the the all down and ware interesting of the show the for-

Our pocessitions will also react to a treask in a daily petern—traveling to a different tame zone or intergang your work hours, for eaempte In fret, chronobalogista call arthrease as a typical cause of chronitection am

Ching ong tirkis is not soc adhesent youn lying tom bityo to Now York in both cases, the internal clocks are get for one hystern but the bady is moved to a place or condition hat receives a citizent and in hythma. As always the clocks react thomselves and this usually happens when there to por days that until then, the worker's body matmixes with equal baby.

The most card Lo mote the works while the mote most card Lo mote the works while the comments appropriate the second se cooci lend of fabour that comes from elema tion, and it can impair job performance

might find a valve that is supposed to be closed-and open #. Workers suffering from

Testilying in 1963 before the Committee on Sciance and Technology of the House of ers make up from 15 to 25 percent of our workforce minduartial cities. Those on such other hospital help, workers in many types

Restructuring work shifts to take tinang into should result in prenoved production, proinunes and a reduction in absortionam 1 ha says "On another level, they should reduce divorce tarmiy contlict and child abuse. We chepric, they develop gastrifts and what apacceptable things in the family circle All

Dr. Martin Moore-Edit associate profes School haiped to apearhead a work-shift Minerals and Chemicals Concording up Doden Utah Phor to the study workers had

hours from day to evening to regific Alter the switch was made company officials more proclucing. "Shifts should rotate to later as possible should be allowed between rolass chance that a worker would have to

and Canada's Ontano Hydro, are beginning



How many ontical treates or business the neocoators has just stepped oft an intercontinental je? And how often has the na-1956, John Foster Delles, then secretary of state under Proedent Eisenhowet flew to Dam Dulles withdrew an American otler to help Egypt build fee dam, and later on, he octations to jet lag He had entered the

Aware of these dangers military and govor ment throber's concubice with companies like Control Data and Bechel, and many other businessmen new adjust their travel

The effects of jet lag occid also have an preciable distances to competitions. The US medical research project at the Harvard in the hope of documenting how orcadian

Charles Czeleler who is the director of the into performance? And if they do what

An Olympic athlete for expropie may be beasing possibility If his optimal performence hour is four in the offer noon and his

Chronolsology research may provide part of the adawar to another vonerable aports question What about the home-team art. crowd on your side and playing on territor haps anough to cause a couple of dropped passes or a few meed-up signal cats? Dr-

of jet lag. The diet employe contain cuessuch Zahaibact as rest, tened maais of bothprotein or high-carbohydrate content, and collean taken at specific times-that gradually test the clocks thus minimized the malase that many travelers experience after taking a lengthy at light Caffeine manputates the pacesetters, resolveduing certain natural cyclies. Following Ehrst's prescription, you can use this to your adventage when tasketing. All other times, dovicably this reenting can cause problems.

Some people never feel jet leg. Unet explane that they 'use do the right thing'. They automacally—and uninerfectivaly—dot ther clocks before and during a flight. They do the through their dut, alway, work patterns, and coffee untake

Not all operations account E-therit Interrupt Theory how assumed to postator to poscharge on populativity at Correll University MeasureDologian with a set on register of an experiment of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the design and the set of the set of the set of the set of the design and the set of the set of the set of the set of the design and the set of the set of the set of the set of the design and the set of the set of the set of the set of the design and the set of the set of the set of the set of the design and the set of the set of the set of the set of the design and the set of the set of the set of the set of the design and the set of the design and the set of the design and the set of the design and the set of the

Entry belowing that as more is learned about the well focul and dimits affact our body induiting debiasy concepts will be remostryned and will in time change. Dady encedy, it could get that in regard to thimsy and ontent, the larmer of 50 years ago knew more about eating than we do today.

He wolks up, pit away a protein-rich breaktast of steak and eggs and their data moning is work. At noon the sits dimerit his big mass of the day, which was also high m protein his blades a titte a which was also high m protein his blades a titte aither dimerir followo geng back to work. At right, ha ap alight mas, often high in participations.

The drive was unabilities right for its body adam when he gas to un it the monitory the system had been cert for gas the instruments was programmed and the model and body record the had to registrant the had a tagget figuritate minute, or when model was done figuritate minute, or when model was done here postgrammed, or when model was done had postgrammed, or when model was done had body to gas the tagget the contrast of the postgrammed, or when model was done when the contrast the contrast on the model entry later. The sign was a transmission or history entry later the dole minute point on the body is contrast.

The summers light but carbohydrate-rich support helped the body set interface and attended the body set interface mails stanulated the buildup of setotomin, which is the body's own siteps drug. Throughout he evening, then, the lamter continued on the roke noti-

Compare the farmer is date with dina you may take to be body. For this addat, you all cemail and sugger or perhaps toest and jely, a carbohydrate meal that samplings the some term and practically takes your locity to go body to bed hard you pour in other which write a decreasing even.

Lunch? Perhaps you eat a good one



Why It's Such A Rare Bird

Wild Turkeys are masters of camouflage and evasion. A large flock of birds will lie quietly within yards of a man passing through the forest, and never be seen. The Wild furkey is truly a native bird, unique to America. And it is the unique symbol of the greatest native whiskey in America—Wild Turkey.

WILD TURKEY*/ 101 PROOF / 8 YEARS OLD

and the second se

At Three Mile Island a small army of technicians is getting ready for the ultimate cleanup

AFTER THE CHINA SYNDROME

BY PAUL BAGNE

Sunshine promises to burn off the morning overcasic on itse test day of spring. Patches of anow he about, a romndar that writer along the Susciputations River has been long and cald. On the south along of the signal, blackhords and granches chatter and aquests from high in the base oals and majole trees.

stretches to the metric week bank. I walk down a nature trail built by the Boy Society of toop 241 in Middletown Yellow guide ropes follow the footpath, Inlung green wooden pedestals One says to reach forward and led how smooth the bark of a brich tree is. another asks you to lift the lid of a In a neerby clearing, two silver provident of the arms, five feet into shaped pipe stuck upright in the pround. At eve level is attached a cover, a mechanical pen graphs the backpround rackation. Alog each anni is a sensor shaped like a cloved hend, paims facing toward the power plant one mile to the north, where

PHOTOGRAPH BY GREGORY HEISLER

four enormous cooling towers nee 372 feet above Three Mile Island

Each weekday monning, 1500 people of two work at the Three Mile Name (TMM) comprises The place is bushing. Alticolouve lights are again in the two complet sectors. Non-suckies equipment. Flught and heally pointed what and hurrs. Ready to data work, people coward with the planned relating of UAET. The uncertainged metabolism the diverged in thesis clean up the dotter hall are trees to clean up the dotter plant and the 30

The pilled period actual of fun-Fillow who denote relations with industry and government for TMI He works be Bechnish the informational construction from chosen as lead contractor for the clearway by Ganeral Public Utilities (GPU), cowher of the pillerit. He has 35 years in the "ruchere game," and came to the sitead to see the city flowed then need to be a children the need to be a children the need to

"Tike being on the footstort of technology," Fallow any out have to fard you own way we have the have in spaces "Mills on head of challenge." A broad smile corrise to he tage. "More of a challenge than I flooght it would be

Across a parking lot from his office

There it stood, to be the first of many robots to "take the try" of radiation for man.9

In the domest structure of Unit 2 containtern-more of terroris functions, inclusion in cashing towers, inside the insolar weeks (anticular terror has have of the build ing "Retructure descet das astructures large organity role as scheding against weeks (" protection from altibure and subsec opertations of an astructure and subsec opertable inclution, they were rubber subs. In foods and together further subs. In roles and together further against primarily of basis primate to their devisition of y dopage and primate to their devisition.

The workers are dealard by the contract of accessive instrument tay royal coverhald. 107 tools to the dones allow a Sawed in the syndrical version below are tools or a chadicative islating—the wemany of 37000 perciviting to the single cover to access called in very easist before Direc cooling water and tool the single cover are accessed to incide Removing it and cleaning cut the weater building is expected to take years.

The bas on this day is to pake a longhandled program though a load in the log of the vessel and down into the campage due and to another its two amplies to newly use its unit the destinated to before masses on the cutring edge of descriminged core on the cutring edge of descriminged core ment permain by a minimized to the contration of the cutring corrected associativity man than 1 million ourse—frails it topped in the TMI2 receipt building

The nuclear industry is watching closely, and the Dopertment of Every's in hinding pendistal of worker safety followed here will set periodents for decontaminating other nudese phrint around the country.

The each view faith of vity pot this let doep and multiple black risk assets ways Jack DeVine, director of technolog partring. The bearries of view high radiation triat, measure base parters of view high radiation triat, measure base parters that assets alwace based man are viewed through an easing robin the lap, the TM-2 measing robin the lap, the TM-2 measure yakes and Arch tray wales makes the part part and and the set of the technologic accounts to DeVine accounts to DeVine the technologic accounts to DeVine technologic t

But no one has ever monkeyed around with a core like this before ' he adds. "Twee are so many uncertaintee."

From a darkened command post away from the reactor in the abutting surboa



building, stak coordinator Geen Holman leans up close to a belevation members He watches intently as two membors of arthy totan 4 search for a createst weech

"Did yist bok in the small toolbak?" he asks over the intercom

"It's not there," responds Mark Kolo, from the platform

'We'l send a vrench,' offers Holmen

Now we cert find the short plete, request permetion to check around on level throe-ch-five. The level numbers refer to height above see level providing a stancient to locate combany within the build no.

Hollman contrars with a negletion-control supervisor, who seems annoyed at the delay in one hour alog the reactor each team member has obsorbed about 60 millinems a minor but wested exposure, since the job is not yet under way.

"Okay let him go clown there." decides the subarresot. "but keep him on camera."

Kobi descends six flights of stairs to the pround floor

Miles nove www.phon the arcopters, holman wers is a horspot one of many particular in set on four phone of many particular in set on four phone to colles ent gentral reported particular a homnexit the content part four a hommanial reported events on a 10 models when to account of check to assort the models of the distribution of the set of the collect is a solubio contention and the collect is a solubio contention of the set of the sticks to anything and is everywhere. During the accident is excaped from the split fuel roots and then lackab them the vessel with the getters of weter that poured from the infamous plot-operated relief velve (PORV), the one that such open

While members of team 4 wet patiently for the return of Kote and the wearch, entry learn 5 is preparing to enter the containment hatch. The workers inspect one wrother is protective garb one last time.

"But have permetern to enter the an lock announces Holiman. He aske the new an instell-before they start their task on the ground level—to bring a weeks and to carry the found sheld place as to taken 4.

Finally under way team 4 works in plence They screw together a 40-foot pole tom threaded sochore as they lower he sampling looi—a builet-thaped canater with a twolving door to scoop up a samplethough a bolter-thou and down with the core.

We have contact all give there on reviewreports Michael Bisabook * how a state-tool a wheel to the polarizing section and twels in 5 back and hort. "We need theough 1 bit publies the weight down against the tool. We have a shard bag at three-or-three. We and one quarter inches I, won't go any tenter "Take the extransis them," director Holman

Solvy that daw how they choose normally solvy that daw how they clean the tedecisive contaminants from the boom with decisite of Km Wipper—tessues normally used for babien' bottoms—and painting discleted them is cleants caustoare base.

"to two hundred eighty minids at the pole down here." reports Tarry King, who is checking rediation residings

"Getting a little warm i semarks an engneer in the booth." Cosium activity is going up

"We've got it " says King. 'Reading three rads at the surface of the cask."

This is the second set of debna samples

RED or Rover, the tobot (above) was built to unphon the dwardy radioactive basement of TM' SR DMM

grabbed from the core, and will be used to obtaining the nakare of the rubble through chemical and microsmotius) analyzes, so plans and tools can be made to anatoweit

One who segarity weaks the mergitis Gardino on Selfron Tangage of statuling. I may not selfron Tangage of statuling. I may thirding, attra withing through maxed of eimige and being clubicles, paid ergometry addying contractive printicity. percising metros, and salieng on the plotow-aid of the statung the recovery of TALE Sali. Then statung the recovery of TALE Sali. Then statung the recovery of TALE Sali. The statung the recovery of TALE Sali.

Label I watch the velocitype of inspection by ministric camata. Filialisis of deters foot by is allway spring comes not focus, then a dampeted hall toos the file topsed pick up tools. To ne is no peaking wat a ministry portal flar to nuclear engineers the mage a at loo clear. The core of an BOO megawar reador, a in themptica—a problem rever biding engoartered.

I goods we well augment," contraining Boltman, "because no air optimism we had been subcontrained in their possibility of the bolt subcontrained in the subcontraining and bolt subcontraining and subcontraining and bolt subcontraining subcontraining and bolt subcontraining subcontraining and bolt subcontraining and subcontraining and

The challenge and hozards of defailing this reactor can be twoed to the incredible energy potential inside the visual. Dre pellet of enriched usersum is roughly equal in energy content to buil a ten elevel

The demonstrate left is now immersion or well heavy local with brown as bubspace used at many reactors to stop. Hall is to posen fission—He pithoff and an automutu-2359 atoms operationed in deel peters a master. I athous out two of three more when U-2356 stop to bub the operation a master. I athous out two of three more indicas, which is done used reactor called - motions, which is done used reactor the heppomp instruction will be greated for more were no boton-laced water explains Skilman disturbing that degraded fuel could set of a high-heat searcion

But such telk is unnecessary to Skillman because he is "going to make sure that doeint happen by inserting poson

Could the water and boron somehow laak out? I ask

"The question now lends toward what if " "What is the concision of the bottom of the reactor vessol?"

The is a sugar concern to many people. The advice. There are ritry two pipes that connect to 4'. These acress statisments that manufaced the reactor before the advicer mgH takes the concern new is may were registric advicer. Also advice the mgH takes the sector with advicer they were is connected to the sector for the dynamic There ocurs the some corretion degrading one or all of these pipes.

Can you respect them?

No. we cannot they are not accessible from above or from below. But what we are going to do if a keep the core covered.

TMI may be to the nuclear-power industry what the Apoke free was to the space program it has been a time of reflection, a time of learning

Canyou get more fluid in there in case o a loak?" I wonder

Yes, he replies containersy

Selfmen hopes the debra sampling will draw hat meaks were not specified a mass by the interval back of the accelent it that happened the engineers would lake an other univour. If the mass is britter if will crumite like a pheet of loo when you hit is and that won be troubling but if its hand. Not high-grade staat www.geta.teand.new bit on our trends.

"To not as if here's a dinosaur in these wating to get our and eat the vertilers of the philos battlerin the condition is so improponly configured that it provides a level of accety, he continuous in tak wi any manner "When we get in back into containers, we'l not more easily."

Solition is on loan from the timithat built the TMI relactors, Balcoock and Wilsow where the supervised the upginseing of con-cooling systems. He was in his Lynchbudy, Wignin, other intering about noome have when he first learned of the asocient Hinnchild. The first works were, They have stopped the high-presauti system purps that's the learner bar. womed that the unanum would met, but mighty concerned about a hydrogen ac ploson he came to the stand as part of the emergency response team

He trained has suited up to plimb mp the containment building live times and wents to go thands on again to help namove the fuel. I want if out of there and i want to minmare the tablation exposure to drill.

Choosing he words with care, Bellman concludes. This is all new to us So we say with be optian, and left be sum. We carnot have a mat-killing matala

I find the indot-manupped seaves to device an advected to the search advected to the search advected to the fill advected to the fil

Protector Writikier crove if down here himsel in a rental truck' says meanals doobhaater Jahn Camelwise who had unbored the weahcure adoor "He set tup refit hele wid put on in demonstration Everyone was ready impossed. They dubbed HED, for rencet excursion device (see photo on page 168). It has been renamed Rover The motivity of creater. Hel Westwere to

The machinets creator, Ried Writsker, is costined or of the civil engineering and cosstudion robotics liab at Cannegue-Matton University in Pittburgh He is a tall redheaded multicular inventor whose groun web long/tech which an idea infragaet him.

When I see him on campus, he plays a wideblase for me. This is a mode-up mason dane born is nown he replane The machene rolls down the rull and them is lowrelid info a basement from below us. You see his light some on them. This is just the kind of activity we could be doing in the basement of the sauder building.

The the boostment of this configurent loads, many set of the configurent loads and RECORT from them the cyclected vector the configurent loads and records and the configurent loads and den the boostment loads and the callede, set, and that prevent loads and the calleder. The set of the configurent loads and boost and the configurent loads and the set of the configurent loads and configurent loads and the configurent loads and configurent loads and configurent loads and and configurent loads and the configurent loads and the configurent loads and configurent loads and the configurent loads configurent loads and the configurent loads and the configurent loads and and the configurent loads and the configurent loads and and the configurent loads and the configurent loads and and the configurent loads a

As yet no one has anterved the basement frough in the spring of 1982 an engineer elepped down a flight of steps to the lest landing and shined a flashight on the floor bridee. He row is later of polisie massaul, scrapped up a semple of a with a long-handied scouper, and humac back out

This is a studion where there is no choice builto use mimole devices " says Whitoker "In set unthreable to co down there."

Except for their one visit by the engineer, the backmonic sensitive visit by the engineer, the backmonic sensitive regimeers need to have survey the sensitive regimeers need to have survey and the four checking to see which does are accessible and salaring accurate instantion meetings of the whole room to propositive to access we will an some cost apole where humans might be acies to week. And there is the list on the loss of another will be RED to the

RED or Power is schedulade's gunta here dark, wet, and reducetive place has fail to have a back instand. "They may had power why bad housing," says that the schedular and here have to plan what occrean real, Mo applach is to blacking the model are schedulars at demands require. Wash you are well as a schedular objection guidant based and an emtilized down version. Loor there will ba schedular objection guidant based and an emtil be a sitesched for gathering guidales. Che day 4 will be inschedul blacker

In areas with thick concrete wals I had continues, "hidle is unveilable and more ware is questionable Some takes, live daw ing losse concrete require high votage, as abattery a no good. Tethered vehicles have lated because they build up tens of resetence drapping a tail. So this machine carrels its littler specied onto a reel."

From a romote console a pilot uses the two forward corrects to see and marsuvisis the craft with a systex. A copilot, watching through the real camera, playe out the tother

If the work are a popyrescription the treoperated optimum have a new generation of machines - in the new generation of machines - in the new failure - only when "One coor are a location of the set when "One coor are a location - and the set denormal set of the set of the set of the set of the denormal set of the set of the set of the set of the denormal set of the set of the set of the set of the denormal set of the denormal set of the denormal set of the denormal set of the set

Shippingport near Pristurgh: has only a 60-magawak case by not well the notion's feet commercial match: Over the near ineryears General Bectric will take it again for 556 million in another test of decondamination technology. Wask Valwy south of taklike New York: emrot folded mulcial failer processing paint will be decontaminated by Westerphose for 5560 million.

Bechel twe in addition to the TM jpb, a \$320 million Department of Energy optrect to restore 32 containerated elser. The Naclase Regulatory Commission has ident feed some 50 000 markes methods and



tes whose facilities may require cleanup

Une wave the furnish safety uway from hazard, sign Whiteer that's the motiontion for robots. Their's a history of remote work in the nuclear setting, so if's not wide new or different New that we have better capabilities. It makes when more sense 1.

Unit HED envect the only robots had out, a TMI clump the part fee yeens of deerupparchased to give engineers an uncanstanding of the capacities and limitation of such devices as GPU environmed—were an unstable praying which is mend free, and a little networked have out for stop dead differ turning a conter

The Nuclear Pegulatory Commission after possibling the rototics internance concluded that "the possing operation of motors is severely lembed in mobility closurary, strength and logic." In sprin of the tops that PED will also inside TMI 2, the commission guivesed that instoles capabile of closing the full ob any 100 downs away.

But some robotics topents classifiere with the RMC 1 don't innow how they figured that tays Loo Duffy, manager of weets escharsitays to make the toxin to remove the Last at TML and we have proceed a remote opmer of which proceeds a remote op-

The indevention process of the set of the internation of the set of the set of the lowered on the vessel from labora and poet international set of the set of the set of the set of the international set of the internation

Westinghouse a major prayer is the socalled nuclear aftermarket last year acjourned Unimation a noble manufacturing firm. So we are well positioned." Ideeses Duffy to incorporate robulios into our nuclear operanters.

At West Valley Westwardshauth dwarup bei nitwer toke roveret manager Hauft Daughofry intends to baait the limit ruis of the protode collective tose all so by using babetal DUN Mays. "Noi pot he choots in and supervise and regrogram it them to aspecific takes the use notoots to clean and maintain direr shoos, and deprourse in minimized You can mount PCGA on a mobile unit. Their end

But TML engineers stay away from hightech except where bree a no chrone—say in the baseners, says GPU of DeVino H couplains hall waiting for long-item tobates development would doly the change and has robots and other complex devices' can bis you. from a relationgical startingport. When a machine breaks down you have to go in these and tech."

Unfortunately technology has a fug price lag. Whiteker points out. So they have re





Constrained in the read alone gatework and the reads of the read alone gatework between the reads of the re

PAINTING BY DE ES SCHWERTBERGER

had amoresia. Tobas didn't buy that but he

He lowered his hand and lat his care command module as the ship pround to a stop Through the rents in the command

It was entroly possible that Lady Name Tobas Somewhere below har in the tweeted Lady Name requerity offing just out of his

The dreed and cracked crust that had bit of wind, the motion of the rocks, the feet raned. When they had constructed the man

it was later enough to shofter all two of them and onoci an individual siteator. These had meeting in the dome to eat. This fact was that

The whaper of feet dragging in the dust

Tobais surned to his kell and glered up at

Cheplan Howard Trison nodided prevely Tobias Way was

at Tobias and nocided "You see nohit of course. You are always right. Tobias

ned stone pad tike Milozys

interementations. They didn't walk off

The gray stone Tobias had or ginally used to mark Osbornia oneve was now reversal mellers downslope running like hall Formet claimed. It had taken the gray stone two of the planet's month-long days to race the short lendscape They want alway The red cross clicit move They were clicad

page wonder two motors to the left to another red storre When Miszu had picked the Cace cerned the pakt a remainder

clean a death for you. Mikets Tohuns so sealed his sut and peisind on the pilots grave. When he was troshed he stamping

Death strill seemed to matter to Cape were the direct result of Lady Name Irequently sitting just out of his held of vision sharpening her knile 9

puters no loss. It it had at been for him they withed Osborn want still alive. Held knew

entergency lights watching Didorn's eveballs loak. The cheef engineer was in the

to lose cabin pressure. But Osborn werted knobs The rest of frem probably owed him

Tobies? The headset in his suit spoke It was the pilot Milatu Engineering? Opborn? Tobase?"

Tobio argament Want? Outporn's dead

A beet passes "Robust I peed to know the

Through his put a fapeplate, he glasped carithelp but believe Mikizu thei you know

No shit. He leaned back against the

Forest Second plot Alittle based but smart Tobies shook his head to clear it. Type

Main and auxiliary plants are down

Another pause this one longer. What about the fuel cells?

try for a dead-stick landing. It you can to

quet. We have a better charge al melono

lotass locend abound the engineering thick the challenges of practical necessary

Forrest I can make a try at the steering

Get to work on the jets. When you've reach-

He purched the switch and the batch

The only light came from the holes in the for that The bright ones were the ternans of Bell in orbit erround a sun called Mantchee

paranoids. Tobies still had one of the built

outs more than he dad in manimum safety or ing. Tobiasis first planet-side act would be to

laterd the engineering chef's body from the

Pulling the body to the hatch Tobas

The back of Oxforms head had been speared and snagged by the noise ragged edge. One of the thick spiriters of metal pro-

Forest is still torturing the rocks. It was Lack Names voice

Totes buned his head more deeply into

solled over on his cot. Go away Lady, Take

Tiem not tatting. Tobas: I am reporting

Lady first they are not my men triamone. is in charge it is Forrest Second Lidor/Loars

pelow Nothing

must him telt he should be rooping for the thing he should be doing right then The curous thought was that he dated make care

'spon the dark It is the wish of this thing "

Mattchen tote ball buildes by the box-

They were all sealed around the low lable.

As he pulled a ration peck from the dis-

Lady Name. What are you going to kell Format Brank it Cage Break the com



what's wrong with you people. After five

Forest leaned torward holding a Incor before hesips Shift Hebroughthes toget

bit again at the nutribar. "Except for peting

over at Lady Name. "At least I know who you

INTRODUCING BEROL CASSETTE

An exciting breakthroug nechanical pencil techno

The Berry County Borril as a bouldwards movative, easy-backer certrice descen hat take a lorg-lasting cartridae of 15 leads. and shier at in the a ballocent wild It's clears and sample, and you never have to fool with one-at a-time leads. With a click of the internetic purb-button lead advance. you get a ready sanoly of lead to knew your writing Ard to help subare lead breakase, each Berei Cowette Penel has a menal shock observer cushioned point. The Berol Cassette. the most annovative

Stock shurber cubicord



Forward chuckled and shook has head

Then you can fix it again it neally used

from the dome. Acain Forest chucked Cage is on his way to the ship to lay down

Yoah and when she fashes that blade of

Thave inteled certain things out there.

the cup on the table. He car back, clasped

The dask carrs Tokska kneed beneath his ident sinct out for hours. Protectly dawn-17099 Inverte-louritrau score of time they gail was wouth ideals, dearns, clans. The ex-

hed live long enough to pollect-

To hell with this "Long ago Tobias had lost the ability to entertain himself with his

He set up its weering his fifthy fight aut the Olds to make it to the place where the stream was above around if he wanted to take

Ketoing the therstal bianket wacced

around his streaktes. Tobies stepped outside The Ords were bright in the right day. Weyby hey should set the comparish picture the Ords. There was allot of cap out there all in the same offer. Some free day maybe can of these these handwid-kiometer-leng davins of node might stam mit the middle of their camp. He spet on the ground. And if we have what caude wid about it?

These was a light on in the wrocklage of the site block began moving into feet in that direction. The other retrictual analysis back to be a set of the site of the site of any site of the site of the site of would be Cage. The computer runn has while a dim rod Whoever was in the site (is dim glock) conserving the site back would be Cage. The computer runn has a first of Whoever was the site back would be Cage. The computer runn has been a site of the site of the site of would be Cage. The computer runn has been a site of the site of the site of would be Cage. The computer runn has been a site of the site of t

Total antered the cargo bay and began working his wely around and through the umble of opened containers and their scat tend contains.

Must of initial been distined for a low budget evaluation mission on some steamy planet out here somewhere. Everything about a planet and then some 4 µp. They about a planet and then some 4 µp. They had found the whether and relations there.

Provide all the caugo health affahr all you that the second secon

He could hear no sound forward except to the atmost insuitable whine of the power converter. He stopped at the hatch to the coduct and poeted in

Lady Names back was toward htm. She was startig back, watching, almost hypnoback by the patients appearing upon the deptay Biery lew moments the maps readid awitch to columna of iguine and then back to be patients.

He skepped into the cockpit. Hey, Lady What to you up to?"

She whired about, the needle-pointed blade in heringth hand. As he house, a slow grin appeared on her face. You shouldn't enerk up on me that way Tobas. You shouldn't got to do your persion as a sunuch. "She tweed the blade. "Why are you here?"

His gazes still fixed on the knills Totwas worked his way to this commo station couch and cat down. 'I couldn't steep anymore Thought Capris machine might have something to read.

She turned back to the display over the contauroou addr as

A Dutch of Class.

HOLLAND BEER A brewer's masterpiece from Holland?*





BY PHOEBE HOBAN



Inaces on onther participation nor photographs Fifty-one-year-old Beights artist Parto Ocrder calls Parto Ocrder calls Provide the state of the state is Maybridge (kift) ware created by ocaling lightsensitive paper with materials ranging from syrups to cells to dry compounds, and then developing the magoes €Cordier uses a unique combination of chemistry and artistry to create his new and distinctive art form: the chemigram.♥

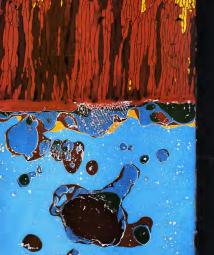


Intriguents of characteristic of order of the result as a detective blocked in a detection of the figure entries. The characteristic of the second of the detection of the characteristic of the figure recovaly. The produces in ourspectations has Conden carefully prochasting to detect was done the oblants assay the offect the wasks. Only the altern to be developed in careful with what were motiver the traft has shown.

After averaging the costs is stend the image onto the paper. Cercler is mady to modely his new design, repeatidely adding the paper in developing chemicals. He uses the developer and foor like a general and erreor, takoning the image to the exocuting specifications.

ber minger to his exciting specification. Dorder began his career as an amazon photographic. Today, hois a master et man his media, as seen in his delicate dataf tion blangemme (abov) and from his own price some brand of hot hesogyabus (opt).





6The chemiaram has no place of its own. to a photographer, and a photograph to a painter." Corder once explaned.9



A meaning had been applied to the second se

wentional mode, the dhemagram is more than part is record of the interaction between light and matter it is the very interaction dated OO



This young physicist may have trapped a relic from the dewn of creation. The magnetic monopole could be the particle that unites the forces of nature into a wrigle, great theory. But did he neally catch one?

NTERVIEW



A packady 158 ou on Sent Waterheirs Day, 1982, something warp, Base Dockstern in the laboratory of Barrind Liversite phytopic Base Caterions. Whethere rives (and physicate all arent sure) I will what wheth of quartum physics. The subare magnitic monopole, the bizane however, and subar with own campando monopole, the bizane however, and subar with own campanito in onopole, the bizane

Decempt of the monocole would be elemented event indexed in would have user methodows to examine the motion of the universe and would prove the works once output on the properties. The second second and the second second second second second second second works of the output on the second s

PHOTOGRAPH BY NORMAN SEEF

an empirical fect. Thet did not rule them out theoretically, however in 1931 the great Briten physical PA M. Drace explored the logic of manepoletim depth. Drace was pass-thing of a way to guinarity electric change. And to find 4, he needed to assume the existence of this were entry.

For 50 years physicals powerd into nonown and the imported contractions looping for signs of momphates. In the Seventius, Notael Preservening physicals Luis Avance and the group looping at moon nodes and sea-bottiom baca, where monopoles might have compressed over the seven Notineng Lefe, that is, the event on Valence or Day.

Direct disc suspected that the mesopole works the cate heavy by usualization is the darks - extremense between 10 and 100 mesors the masks of a protein bill a rule of theoretical bredshrought an the Sevence of the protected meso to the Cost (rule weight all much as an anosta to taken times most may the sub suggested by Derits work. Bech superhases morpholes outil three them the wake suggested the parts work. Bech superhases

Today's theories suggest has the only unadors hope enclosed his time in supervisely merceodes would be the Big Bang or benzy to would have bagened within the start 0. In second wave particles named the temperatures moved till 00° digues kalver, an uttion in zoorswaller heat. At the unknown of in zoorswaller heat, at the unknown of the constraints have the particle start the second temperature of the second heat constraints of the second heat the particle second temperature of the particle works set of the temperature of the particle works set of the temperature of the particle works set of the temperature of the particle works set

In the Savat Wellaws on one of the most partment pathol physicals, bornavaid the statu of nis several physicals, bornavaid the statu of nis several physicals, bornavaid the statu of nis several physical several y unantended of the several several several several work an experimentasis. He is tabulated to such an experimentasis the status data to the experiment, cancelles by under process of the experiment, cancelles by under the site of plants prevention the unantender the several several several several process of the experiment, cancelles by the site of plants of the several se

I prove the hardwork appear. The explain ments liven to understand. The theory makes sense from simple points of verw in oddtion, monopoles appear in the mest sophistobalad modern theory."

Cebreras first manicipole trap was deceplively simple its metal sheld housed a ploanglass apparatus that resembled an old SFmovie contrapole used for capturing lost at 20 Mil Three trapporten papes billing a SQUID (bypercentailung peartum introllences diswell) for organilization assisteration as balance inpud heium at properties to approximal proceiming indexida anni Superconduct, the indexim liquid heium at properties to approximate proceiming indexida anni Superconduct, the indexim liquid heium at the annotable current flowing through at 1 a monopole well listened through the SQUID conduction well approximation to SQUID and the well approximation to SQUID and the well approximation to SQUID and the and that well association parts of SQUID and the sQUID and that well association parts of SQUID and the sQUID and that well association parts of SQUID and the sQUID and that well association parts of SQUID and the sQUID and that well association parts of SQUID and the sQUID approximation of SQUID and the sQUID and the

To ehrinable all table elevenes and mechanical deput/brances [correlatory to stopping to codimic water/h]. Cabrona began using a new mproved infranciale large an 1983. The new director tas these indown loads to pretain director data these indown loads to be all the director data the optical as the indoceder all regimes to ope according to the creater approximately. 30 times as targets a creater approximately as the optical data the indocedering rank are the oblighted right if a

 Monopoles were created burng the atmost inconceivably short pariod following the Big Beng, Only then was the universe hot enough to produce particles that heave

monopole ordered the device it would probably ingger it least two—and most likely thate—of the loops

To Physics in Kin Claikewas gores, Lote why the been his evidences in the imputive transmission is evidences in the impubeneral tame, that has produced three parameters of edit painters drives taken Basis future. Note that and take produces in the terr transmission and taken provide their taken transmission and taken the transmission and taken provide the transmission and taken the terr taken transmission and taken terr taken the terr taken transmission and taken terr taken the backted and here the backted and here the backted and here backted a

Notatis lefter, the first Bile Calence made his make kulturing the reprote suiortiking of an analysis of the second second of the second second second second second watching of data to the first second second second watching well and tables in Makes Calendary in watching well and tables in Makes Calendary in watching well and tables in Makes Calendary in Website to grantitations and become any second well the second second second second second well and the second second second second second well and the second second second second second well and the second sec ing " he said. "on the other, it was depressing because it means that nothing had been done since he left."

Catronal pockaria intervention in monopolas, in the last Soften while a granuaum autoent in the laboratory of Bischold physical Wilam Rathatik who was humang quarks (Davier an betweed 50 betweed build) to barrel of a two betweed build and the barrel of the soften and the soften and the physical that autoents Julian 6. Schwingers balant betweed build and the add devide a mithod for messaring activity and an the second for the dialyse autoes.

After obing his undergraduate work in physical at the University of Vegnas. Catceres received his MP.D. from Stanfold. In 1978 he and C.W.F. Events were alwarded a proofgous percent measurament grant from the National Bases of Stanfolds.

Prochologial and exercise white John Destinant Issue with Cableta on the physic ford a Watan Cableta and State State (Section 1998) and the State State State Cableta State State State State State Cableta State State State State State New Internet Internet and the cosmic Cable Onemation and State State State State Internet State State State State State Internet State State State State State Internet State Internet State State State State State State State Internet State State State State State State State State Internet State State State State State State State State State Internet State Internet State State

Omn: What is a monopole?

Cettoral According to prevent processor to an increase the non-terrary paralical law to the devices of alelectronic proton. Just a to the devices of alelectronic proton. Just a to the device of alelectronic proton. Just a sector to the device of tagle indexes if them is profered and the alegorithm of the devices of the devices of the proton of the devices of the devices of the proton of the devices of the devices of the device in the Newsel periods of the devices of the devices of the device of the devices of the device in the Newsel periods of the device of the device in the Newsel periods of the device of the device

The key thing is this hope most the where the parcial be more encry vested to produce it. Because monopoles are be they well as more highly to make the term doma accelerators the outdown of a more monopole would meet that be does not have the accelerators the outdown of an enmorability colleger at the term monopole would necessarily colleger about the term of the term monopole would be meeting the term of the term of the term of the term of the term that the poses committy is even the term of the term of the term monopole would be monopole and the term of the term monopole and the term of the term of the term monopole and the term of the term monopole and the term of the term of the term of the term of the term monopole and the term of term o

Other So where do monopoles come filon? Cabrers: Our thiscries suggest only one possibility. Monopoles were classed during In almost incorcevelably valued peaks of times immediately bibliom years ago. These and both to benefity bibliom years ago. These and only tiben was the incorce bibliom degrees—to produce particles as heavy an incorposite produce particles as heavy an incorposite A mere benefiting after the crostion instant. A mere benefiting after the crostion instant, when the oussine leteball was no longer hell enough to produce anything as massive as a magnitic morpopie

Only Weil Tai monopole the any superlease provide provided on evader-call, and unstative Area to a super-call and unstative Area to a constructive provide the unstative Area to a constructive provide the unstative Area to a constructive provide the unstative and the terms of the more provided the super-structure and the provided the super-structure and the area to a super-structure and the area to a super-structure and the super-structure and the area to a super-structure and the super-structure and super-st

GUTs are at a unified description of these of the four functamental forces of nature the arong force that bands adomic nuclei, the weak force that plays a crucial role in meny forms of recleastave decay and electromagnetism. The basic concept of hease the more basic on Shedon Glackwes Staven Weiklerg, and Abbas Stalmin successful unification of the works force and existenmegnetism—an incredible accomplianment for which they struct the IRPA Robel Proon physics. Dur grant hope a thet grants unicitation with graves the way for achieving a unicitation with graves the way for achieving a theory that takes the final strop and embraces grantstation, the fourth bindmannial toros of nature

caves in your opmon, how do GUTs hope to schieve this goal?

Galaxies: All present the storage from the weak food and descharagement have very different storagins. If you could go basic want in time to be welly unverse however, you would find that the native storage however, you would find that the native storage however, how the storage however and the storage however, the the terms theory would be well about the Bo terms theory would be well about and presence to get the storage however and presence to get the storage however and presence to get the storage however and however to be storage however

Other to GUTs present us with a new Eden myth. Three of the great (score of learne were apheliad from the pandatis of periods type metry as the universe expanded and posteriosmy monopole iso-crussillo the grand uniteditor theories, score and/?

Cateers Theorizing about grand unification molves an enormous entrepolation from our



knowledge of whist happens at the temperdarks and effectings produced in presentdarks particle accelerators to the tellicotolist legan energies of creation-tellicity physics. Concluses proof that superhaay menpoles reat would provide strings continuation (that the university was more than hot enough at creation to produce grand univcation). GUTs predict that superheavy enoughes an existent that superheavy ten to one functived interventures ten to one functived interventure.

Orma: That is, while the universe is still so hot that grand unification provide—barbars alking kingendures destroy die paradise of symmetry and send the strengths of the electromagnetic strong and weak forces of in delivery consistent

Cabrona Processly

Other GUTs already seem to be achieving a kind of grand unbicator smorp physicitist The cyclet appears to be inforg colmology estrophysics subcorrise guarrum chysics, and a number of other heids that traditionally have seemed guile remote homore another

Carried Vie, and the pockets is estempt bothly to physical bare the pool fee genenters to view this base become more and the concentrativation (filtering transition enters) and the process were become and other than the bar of communication between others representers full council curve part frequency process and the process curve careful metch the second of the council curve curves and the process and the second of the curves and the second of the second of the curves and the second of the second of the curves and the second of the second of the curves and the second of the second of the curves and the second of the second of the curves and the second of the second of the curves and the second of the sec

Order Why olds in your operaon, is the hurd for monopoles so vita??

Gateria: Contering the electric of regional relies of transpression be a mayor decovery is workd open up a new deteration in electric thron exists an ontriney new lawing of public thron exists an ontriney new lawing of public oping of the morpholic head activities and exist present distance new exist present distance new exist present distance for adoptives approximation for adoptive approximation for adoptive approximation of the setting approximation of the setting approximation of the setting approximation of the setting and the setting approximation of the setting and the setting approximation of the settin

That there are reasons for expecting monocoles to dothy protein an orderat, like Life The Man monoters. The total enopy executed in the production metaltory ones using the production metalmoning for ferrorestiums of stellar and planticity constructions of stellar and plant anode proteins in a cont the energy mlosted would be great enough to tragge the mathe to state strink.

Orany Do you think that the monopoie's decovery would reshape present theories of the origin of the universit? Calculate Area Calculatery the "increases" was down and the calculater of the increases with the area - many an increase and the calculated parts - many an increase of the calculated parts - many and the calculated the increases of the calculated the increases of the calculated increases and the calculated increases and the calculated many and the calculated the calculated and an increase and the calculated many and the calculated the calculated many and the calculated and the calculated many and the calculated parts and the talk is a calculated to the present the calculated in the calculated and the calculated parts and the talk is a calculated and the calculated parts and the talk is a calculated and the calculated parts and the talk is a calculated and the calculated parts and the talk is talk and the calculated calculated and the calculated is talk and the calculated calculated and the interpreted and calculated calculated calculated in the calculated calculated calculated calculated in the calculated calculated in the calculated calculated in the calcula

Onve. How do the inflationary and Big Bang theories differ?

Cabless: The lacks influences model para burses that have even an endown. Here bag burses an eventer of the events of the events of the spherescent interview in the universities view early hadrony. The original file barrop to barrot the universities to event the universities view early hadrony. The original file barrop to barrot the universities to even the universities or other size. The operative measurements the covied A is it did, incomparise terming. The universities terminal in operation and in observing and match to discriming where is second explosion occurred as the result of a phase charge. This transformation is oughly and oppus to cathing phase of house liquid to an end phase where the passage term a work phase where the passage term a more oundpruch to a least one grint charge entry which is a least one grint charge this charge is accompared by the relates of any distributive revenues.

Consider an extrany cloud of steam Usery grann of water molecular tendeduly darking about in the cloud contents about the fundred steam backward of the steam method water the molecular steam of the one extension and steam about the steam method of the steam about the steam of the steam provides the steam of the steam backward the all entered the steam of the back policies in the steam of the steam the back policies in the steam of the steam back backward the all entered the steam back molecular steam of the steam of the steam back policies in the steam of the steam back molecular steam of the ste

Onw Exactly what passed through a phase change in the early unworse?

Calibries. The very lating of space time in offset space-time was created in its altern tasks When the unvertee cooled enough for this coerris altern to "logally" the energy related by the prase change initiated the unvertee by a hundred talken tailon trillion trillion target (201)

Onny How does big bang number trives for into this picture?

Cubines: The trial creation day explosion populated when the universe pooled enough to pass through a second phase change This change resembled water a phase



change from liquid to cer in the much lises on any wait beaution that believe that the cause each gram of water releases about eight pacenes to be environment when it fresses into see about a seventh of the energy laberated when a gram of aleann conchanes into water. Temperatures during the explose that have needed to proceed the seventh and those needed to proclass interpactions but water mere them hagh encough op todocid the ange of paintclas we find in the present day waters.

Cites Bo how does the reliancery model leads the population of monopoles within a manageably small lend?

Intelligible, including model postulates that of catero a the intelligible control to a proting of the instantial control to the postulation monopoles in the oasy surverse. Thirds of a postella balance of the postulation of the origination distance balance in special interview or priorities from the expansion of a potch or the balance that or of special to special.

Great What are some other advantages of the influence becay?

Cableral: The model handles guilaxy domatern more successfully than the Big Bang theory takes in dissince the inflatformary scenario manifering that the forces that produced monopoles during the first phase change also gave mile to certain lands of space time discribing that eventually provided the monopulation calaxy drambton

Oww. Do you think that the latest inflationwry model is the last word on the creation-of-theuniverse problem?

Cableas i don't think that anyone including Alan Guth, at MT (the theory's leading proponent), belevies that the ounrent model is the final abover. But it does arrever more questions than is raises, and in cosmology. Bata is auroastict theory.

Other To come back to Earth if only briefly what do you think really happened on Sent Werning 8 Day 1982?

Cabries: Using a precision obtactor has used into divergence with this is indiring from the Naciral Science Fourieston we detected a monophility over the interfaced bit use backing anyor monophility backets and expected laterage as his test and expected laterage as his test and anyon table the mass laterage anyon table the mass laterage regions and backets in the condition anyone to backets anyone tests and monophility and regions and backets anyone anyone to backets anyone regions and backets anyone table names of the lines have regions and backets anyone to appoint the times have regions anyone regions anyone

General How did your prototype work? Cabrena The original detector was a two inch downeer foundam rockum loop its isting in a lab not far from here

care responses to the service of the service of the service parameters of the service parameters in the service parameters of the service parameters of the service parameters of the service of the service of the service parameters of the service parame

where its becomes a supproceduce—ther instantion is to prove involve the electronic metalinate is on your special in electric curantitiation bit might be curater facels between employees the second second second second metalination of the processing of the second barrels through the loop, and in fact intracted barrels through the loop and is called a loop of accurate the program of the second with the curater in the loop and is called a loop of accurate the program of the second barrels through the second the second second barrels through the second to the second barrels through the second to the second device a travem as a SQLID a suppresendend to travement and finance devices SQLIDD and thousands of them conventional metal to travements the second to conventional

Onesi Shall we look at your SQUID?

Determ Ovay, it's down in the basisment (Seberes and Gleichning of downstains to bi las norm noung the three-loop detected) If you come over here you can see a softwamale of wreth in the opparatus. Here nor the three loops wound around a four-inch prox sprese. The augmentation chain is instead around the loops provides the law manufacturement.

Once What is the function of the gray matel on the outer shell?

Cabres. The high-permeability instead may see seen table a intermegant. Exclusion imagnate half, inter, thus problems a lower magnetic field stated and lowering the magnetic nears. In such a stable anticommon we can detect the change in their diseased by a monopole passing through the loop way ear in the mangetic stopmic op through the loop but instructions the ultimative of the lower course a streft section—a near meal

Grew This machine detects may make may be apprecised on the ouncer change in logo one logi has an inter-change in logo one logi has unitident the see enagard greater than a certain thread of the set is the order than the login interval of the owner wave seen to date even may than its two of the threat topic thread of the owner wave seen to date even to the set owner and the set of the set of the owner wave seen to date even to the set owner wave seen to date even to the set owner wave set of the set owner to the set owner wave set of the set of the set owner wave set of the set owner to the set owner wave set of the set of the set owner wave set of the set of the set owner wave set of the set owner to the set owner wave set of the set owner to the set owner wave set of the set owner the set of the set owner wave set of the set of the set owner the set owner wave set of the set owner the set of the set owner wave set of the set owner the set owner the set owner wave set of the set owner the set owner the set owner wave set of the set owner the set owner the set owner wave set owner the set

General Have much is the new machine? Otherea: The equipment is not pertoularly accesses. Yours probably looking at epproximately thy thousand dollars. Oppauting it is the primary expense. This new dotection was built and is operailed with funds form the US Department of Energy.

Construction between the construction of the second second

Orms. So that no one can steal the data as well as the equipment?

Cabrera Well they might but then we would certainly know about it

The best way to put together a professional sound system is to let professionals do it.

The professionals at Toshiba. With their incredible instem SS.

And what a system. It includes an integrated amplifier with 85 watts per channel", a direct drive turnable, a digital synthesized turnet, a full adult noverise casotite direck, a set of 3 way speakers, plus the options of a compact disc player and a 20 band graphic equality. All enclosed in an obegant in a longitart

abinet with glass door and top

one of the soundest investments you'll ever make.



"Elevel of physic ments in president of the





Theorists at this institute luggle the phenomenal in search of the eerie, mystical undication of the world

EINSTEINS SANCTUM BY EDWARD REGIS, JR.

fice hasn't even been he dec?" I stop to sak the secretary

a myst,' alte repties This is a workplace. We walk a few stoce. down the hell, to room ing s office row, ' sho explaint "He cant in at

can take a look and see for yourself." On the door a card reads provesson gles some keys, and opens the door to rewant a small, dioset size fover and two other so I can walk in alone The office is dirrity it and obviously al-

trend but i can tel that the sittle one i glengse what seems to be the some desk and chair, the shelves with rearts of paper and purryle still apiling out of them, I can bury spience, including 14 Nobel Pros-

PHOTOGRAPHS BY DAVID MICHAEL KENNEDY



He eves stam nast you carend dy off into the distance as fleven now he's pondaring the subtienes of the natural world

Study was Albert Einsteine office, the place where he worked from 1933, when he came to America until his death in 1955. But Enstens sanctum a manaly the shrine at the ton New Jerrey has been force to vasually all the megastars of twortigth conwinness. The percents of outstatum precision ics-Wolfgang Paul, PA M Drac and Nels Bohr-al sei up shoo here Mathematician J Robert Oppenheimer father of the alarrise

borth, with the institute's director for close Alom hombs aren't made here, though particle physicials at the institute's School of be found. And there aren't any telescopeserhar side or optical-flough the world's

The reason? Institute director Harry Woolf ing more with less." Employing relativity theory, he points out came not from a lab or a unwarratly office but from the thinking he deal land A job in the Swas patent office. Exalian and, 'gave me the opportunity to their about physics." And today the tradition of he intitute continues to draw the world's privacist Tom Banks, who has challenged cist Stephen Weitham, resulted live workley

This vision of the scientist/sage can be mood to 1929. Then just before the stock market crash Louis Berntrerper and his separtment-store chem-Bambergers-to the R H Macy Company They decided to dein science and the humanities

able frought. While other research centers ware constantly charging staff, lively as for Advanced Study founders retained a permenont faculty of 25. These highly seconmands to publish or parish, to teach clean associated with unversity professorships mostly younger propin-would be game

best work of they loop. Finally, the foundary, docidad that intellectual exchange would be protech So in reddition to sciencific facilities. ios mathematics and social science. (Paychologet Jean Plaget poet T S Eliot, and

At first Barnbarger wanted to locate the 50 be near one of the world's great Lowerstes or it would pensh in a viscuum II was housed at first in Princeton University's Fine Hal the methamatics building! Later it moved off campus but stayed close to the

Today the institute sits on a scusam rate of sity Its half-dozen red-brick Georgien-style buildings are spread out acress a pressy Iron-studded campus. Patha meander Prough the exmanding woods. Physices

Now 20 years after Drac last married stthe place has been shaped by in man them creaking apout the hallwrive on canes. cold witch chang scalepoid across they wastooats Now stooped and wzened old men. they mght still be shouting about the

In the identry of Buildrep E is two-story the entrephysicists' coffee hour is about to commence. First a proup of four or five young people just stand around outside, pleng Then are of them counts 'One two, three, and they all shout ' Collew'' More Isuptore and they file and the room. Others one selves some brew.

Soon nine men and a woman ere string arrand the library's large wooden conferonce table. Most seem to be in their late shirts, sweeters, jots of khole parts and cor-

When John Behoal weiks in the chirchet stops and The New York Times is put sway







Bahaxi — in his late lottes — is senior member in astrophysics at the institute and goolfather to the group Eyes groggy with sterp, he gets the discussion going between sign of her catherin

They tak about white-dwarf store, doubleble-store systems and neutran status. Then they focus on the problem of "bootetion calcal the ocuginal shaped rings that enonce some white clearst. What are they? How do they get ther? How mght they after our entone of statis weak abo?

The members spill theorais in a bable of scores Scott Teiman is Carrodoan Linds (Sparko Brish's Stetaro Caesinano Balau, Tay Ayna Issaek Boncian Tracaynak, Polish Thay agree to gather more observatored ovidence but no one corres up with the gread assesser.

Altar half an hour the clisousson peters out, but its resumed at twelve-thirty during yet another meating—the workly luncheon with membass of the "messy-hends provid-grist for the theories/article.

New works string assent a U-shaped to be and as we have to begine to as its Mahal whockoes tody's goals speaker. Is'l 'Umer 'The athraics, besided professor of easterymiseal science of Phrobins tasks as it hough hot asing up them to last any in a membran. And who can being him the speaker block to be any science of the science of the speaker booles from the part a part of parts.

A galaxisonal loss a howerly body that bords (ght around both sides of half. Four survers exist a loss a size in the right poation would be visible on both sides of the our prestancously as if than wele two stars out there and not and one.

So the set of the periods in the called hand. Mit had recorrely descrived is now gallary with what second like a guest on effect and And what Turner had learned in his prefurch call from Moust Palomar was then being page images were one and the serve depend gare encough, the had bund the bund of this gavement and informations to exit.

Turner passes around tome photographs potures brought back from the telesscope at Palomer just two days before. Only amudges on proper they are new workle, even here the that time.

How do institute astrophysicist react? Do they och agh stomp cheer and whade?

Not quere They may go so far as to chew more alowly. One of them even says Marvelous? right out loyal Later, another says. "Thet was exching, and is third allows as how Turner's docovery is "clapith..." I work how Turner's docovery is "clapith..." I work accusatomed to concurring adironomical concepts along with funch.

At two orbook we excerning in the library to have note news from the infestibility deep. Vising astronomer Josef Smak, of Polanos Astronomial Danter in Warsaw is loting us about double-star systems. Theil undergo sudden there ups of brightness. I we fissing even sums. With charts and tables of the

temporauros densites and other prefetal access, Strak tanks un fittaden i a one-acti disense of branz-pater levennis. The show ends with a sound of appliese Finally fitt time for the spannise to initian to that of base dagos three withoutshow individual data and file t sevey in their memory banks is any to their counderse active and defect just the right datals to detail the essence for those tange expansion, is sittered theories for the pointer. It's three in other words to begin the north words.

High marker of the lechnage is Bidoxil The his the law han has having an interse decasaon....n Germen-with use of he respanity worgs astrophysics II. there now as he pouts multi-dimensional codes that can elever the informet visce of a German societ in his maauried and diabastie specch. As it turns out. This from Sheverpoint. Louisans and just in the habit of specieng pricesie).

In fact, the has indentebleds with reome of the greats, including methemistician Kurt Goolai. In this old days, Bahcal remabars, we used to have faculty dimines two or three times a term. This take due I wan want to Last acress from Goolai Windom mut so we indoluced conceives, and I read I was a physical. Goolai lustwal at me and wast. I don't balavia in natural science.

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We have very encourse prevailer the first encourse the very very encourse prevailer to bit study? The very very encourse prevailer to bit study? The very encourse the provent device bit study of the very encourse of war proceeds with the content or encourse any encourse proceeds in encourse of the very encourse of war proceeds of the very encourse of the very encourse regression of very encourse of the very encourse of the very encourse of the very encourse of the very encourse.

Bahcal between in natural search, though, and for the 16 years here been at the institute here been enesting with a problem that you might think has already been solved Here here to figure out why the sun shrees

Bolar onergy, it is well known is gomeeted as protons taxe to herm holium aroam. But in addition to this grinnary reaction, those y good the suin hosts a woh-defined tennes of reoordary reactions. In Section 2016, and polinizers and neutrinos. In Sections, in Sections are suit to try out from the suit's minori pententing the surface of the earth side speotic measurable rate.

More's the privation of the set American covers raised on the set American Tryvers age balancia universation of the technological holds and the set and the technological holds and the set of the set and the technological holds and the set of the set of the technological holds and the set of the set of the technological holds and the set of the set of the technological holds and the endyptical on the world where you can get a marine mark. But the counted the number of merican balance counted the number of merican balance to the set of the technological holds and the counted the number of merican balance of the set of the Make the day special. Give her a bridal set as valuable as your love.



The damage press?





Lists or table vectors if it exists, be grad the way of tables and tables and

ILLUSTRATIONS BY PAT ORTEGA





a caldron of gr celled microcraaanimals and finely man This ey some contend, is view-that in the ball of matter might once more spewn-Esharito mao nhabano such far-The planets of site: gient lyrar nosaura ceous plans and bites in fauna-noti

Cambran srees But given our current understandconclusions about life on distant, alien worlds

The name of exclusion set forth by Darwin, after al, apply anywhere in the universe. The process always occurs in two stages. In the first genetic material combines more or less randomly to form for survival in the natural world. The mechanism most visible ornane me

Even if a planet were identical to our own, changed would create unewayly produces If the planet with significantly different, the process of natural splec- dude the Ly-der (page 94 top and page 96) the

6The Zu-pee's facial outgrowths might cup the animal's ears to magnify sound 9



bly moose greater One stroke of number of limbs on Early in the history of the earth, for msmple manne aremats equipped with environg from en appendages Those with more spiciers, and cenlive on land Bul these cossiuntihad a lability, an external akeieton

them from growing past a certain size. This was ranizably plan bad luck, we know of no reason waterproof sign, and other features that would have Interest to make them dominare.

phiblians, cheatures better suited for a life on land on our planet have been tour-legged ever since On another world, with another throw of the close

animals with six eight, or even tan legs. The descandarts of these creatures in fact, might mZu-pee (page 98) the Der-mas (page 960 the Ama-dar (0000 98) (5 DOM: 96) and the Donma (page 97) And because evolution Imbs rather than to acid them, we antelopelike fourlepped creatures as well as twolegged birds and cawing, impless anskos. Once on the

mals would be modified by netu Earth were Or appondages mght wrigs yielding lat-



6The prodigious brain of the Dor-ma allows for tool making and culture 9

and fiving reptiles. Two of the Ly-dara eight limbs ment become specialized as harpoons. Florida tent stabbeng/sissieng weapon. It the claw could like a suddenia the Ly dar would be far more cancercus than the saber-toothed animals of Earth The Day making exclusion of a post with bridge might function as accossionly hands for residency. College in Olympia, Washington He has also conparasities or for grasping food. The Ameridan's ducted research for NASA He conceived of these "arms" might server as detersion places, and the creatives over the cest few years, while devolved 20-pees facal outgrowing might cup the ears to much of his spare time to the "encrysible and specmagnify sound. Sell other creatures might have ulative effort of environing autivations that He "Aninformation and according and according to be sharing were coved by flustrator Per Oneco.

drocoed and fed to attack But the development and adaptation of the limbs constitutes just a phony of evolution evolve supershate refs and a set of elongated toeth to catch and devour its parry The learny coloring of the Lydar would provide campulace in for ests and fields. The ourving tusks of vicious predators And perhaps prodicious brain of into hands) would

allow for sochshoated buckton statagents, tool making, and a smallering of culture as well

It's ion scon to say of course, whether animals plausible alternatives to the evolution any pathways followed by the beasis of the earth DO

David Mine teaches bology at the Evenancen State





Mapte you overolo the catobrydiate again. Then think of what happens when you all down to a huge attack chrise, accompanied by coffee and simulating contestation of orgit in the evening. The body has attecdy begun to partney loward allego. The sention lowal is badding.

But the pool conversion at the cinner table starts the admentants flowing. The proleg scheduler by system: The colles and other markets revealen the body and easil the clocks. By the time cinner is ever the body table scheduler to go both ways, up, and down "but can anticipate truckle in getting down thus can anticipate truckle in getting down to but out of even the took day. They down took to out of even the took day. They hererselves

Further shudes are required, of course, is support his showy on the reporting of the There is some evidence that food has of feels but thus fail it their is very prefernary may clivineing of California at San Deppis Krpice who has been studying of realist it there in the San sees.

Circuidian intyfferia and into the same as bortrythms. Dowsid in 1667 by Welaam Feese these enrotonal and physical indicators are supposedly useful in producing in persons good and bad days. The best theil part be send abod bortrythms in the 4 as a pseudoscience like astrology with no besis in empirical research

You can get a hir on your own occadam, hythme by hythrogy gour bedoe pressue, palse table, and beck-sempretature cycles, along with a lead beck-sempretature cycles, hand alerdight and age-hand operating such as hand alerdight and age-hand operating houghpout the day and overing—pertage to doatem re your rinflings, table industry a doatem re all them is experiment available that provides recoellent transmitture, blood pressure and palse mining and your own data. Spenning goods assues sait a handing pe dowe with a trater on it.

After you have taken readings for several weaks, you'l detect a pattern Highs, tees, and gradients in temperature to reample, will cover a 21% span. You'l discover that the old idea of normal temperature being 66 6% is corrected out of date.

The blaced pressure seedings may surprese you, too, that of us them of bloced pressure tos a constant set of numbers. The base is bloced pressure vanes shappy each day is a subject pressure vanes shappy and day is a subject pressure vanes shappy and day is a subject pressure vanes of the pressure vanes of pressure vanes of the pressure vanes of pressure vanes of the pressure

The like Howard Levine former detector of metical education of New Brist detector friendul education of New Brist detector opst, field fo tell how careful he was about his blood pressure they years he stopped at his physical table in the memory and has he physical detector. His clocol tool a water on a difference however, and the



numbers were startingly high "Degnoss-of my condition, premary adoptationam". Dr Lowne said, "was dekyed a couple of years because I went to my doctor when my blood pressure was at its cerced an lowest—and to it seemed normal."

The point is to take block-pressue reacrings—and all other reachings—every fee hours. Log them and chart them for eleveral weeks. Some of the reachings may be incomsistent. For example, if you take a reaching while anyon may be inght. Every take you will recognoe any abenomia blops for what they are and a thrue usable chard will emerge.

The body clock information you gather about yountil may holp you to oppor an illmess in the missing. An unusual partier on readings from a yourn parpendum for example, could indicate an oncoming lineas and you may with to consult your doctor forem this early warning, he may to able to degrade and even thesit the problem before it becomes (L-blavin

Environe-long-teal messach as exercising the serveral long-teal basis of the longbasis of the long-teal basis of the longteal basis of the long-teal long-teal basis of the long-teal basis of the long-teal long-teal basis to lend long-teal basis of the long-teal basis of the large team of the long-teal long-teal longteal basis of the long-teal long-teal longteal basis of long-teal basis of the long-teal longteal basis of long-teal basis of the long-teal longteal basis of long-teal long-teal long-teal longteal basis of long-teal long-teal long-teal long-teal longteal basis of long-teal long-teal long-teal long-teal longteal basis of long-teal long-

The rate indication in the table of chronobiology promess to improve our incertiby provering us with increasive way powerful tools bootnes will also body instrime insocount when presentating drugs, transpirent to the patter's crassition infyrthm. Psychiatanias will have a new wappon apartic depression markiliter more informations. Indicating them markaliter increasing the pattern aparts to that the other more information production to that the above and the below wapper to that the product of the below wapper to that the product of the below wapper to the production, and are as wate.

Furthermore, we may see new vortice accords borg de sinderes plan towe and comparison times to get the invest and comparison times to get the investment in the tit body. Accis synchronoral as anyon and anyon the investment feature in den tagginess and all of us can too kinmidet tagginess and all of us can bot kinmidet tagginess and all of us can bot hered to encymer more draw when we feel good king perform well because we trave they feature to long on tooly costs.

Lindeubledly we are on the threshold of the Diroadian Age OO

SPACE PHONES

E.T. make it took corps and colds topping some sparse electronic parts and you have a lowering to the conment in the datas. Similar to coent na low days parts intro Say to an establishing of the Say to an establi

to use elong at nearly 500 times the speed of light. But desplie the securingly impossible barriers to identithan-byth-speed communication, physicists are grapping with soveral idens shout how to send measures to the stars. One of the most interesting of theree idens interesting of theree idens into-

> BY CHARLES SHEFFIELD

ELUSIVE, FASTER-THAN-LEGHT TACHTONS MAY BE THE KEY TO BUILDING A SPACE-AGE TEANSMITTER THAT CAN CALL UP THE STARS

ic particles known as Inchyons. E.T. could have used them to carry his SOG. Of course, his seems to have known a little more about techyons from we do. Theoretically, techyone do

PHOTOGRAPH BY MICHEL TCHEREVKOFF Using visible light would be a poor way to talk to distant neighbors: There is so much light out in space that the message would be similained up.

des may exist. In 1967 physicist Gerald Feinberg of Columbia Unversity gave them the name laching.

Tachyonic have funcmetric and purposed physicals for decardes. As only as 197 Network C. Softman of the California installue of Technology, though the hald proved list as sind messages to the part. Scattalist now bepart. Scattalist now beleven that how one wrong, but hay have not managed to rule out the event ence of aphysics themalives. In their, many restandhes have Lakan



ni clear bran T.H. White's The Deas and Future King. Everything not terbrickien is computery. By this fait tachyons must least

Into they are person metric integers of the subscript particles we interesty intow Are the particles on our side of the light tomer more closed to the subset of light. If takes more and more energy to acobset to the subset of the subscription in would take more and more energy to slow them down to the appead of light. They could rever make the subscription cross it flashypers and backgrint—sitewer finding it particle—and towing respective

But that close not mean that there is no way to clatect lachyces and perhaps use them to communicate the easeet method would use standard particle detection. If have of them each register an evail, one as soon when the other that only a particle investing before then light could legaer them to the interring method.

Then again it might be just a consciance. Or both events might be caused by a first harkey between the two disactors. It will take a lot of evidence to converse physicists that tectivors over.

Until they find that evidence, there are some other ways to get a massage to the steer. Unfortunately, none others taske their light transmission. If will lake applicativitiety than years to a tolegram to reach the respect that, 30 000 years to world it to the center of the galaxy ET will just have to be patient.

The other schemes for scading message rols space relad on Big 14 As way in WBC instrumentational Call Fredrick Cause say period doolwing huge generation potterm across car chains say the Witch allow all with its frequent than the insceptor to have wait have proof that Earth I bo, had exhipting with Arth 1900 the Finich Anazimy of Barranes of freed 30 2000 for high water had period who managed to communicate which appliers the Arth has They compared Mark top cay.

But it sins out has using weble light would be a poor way to take to determ neighbors. There is so much light out in space that he mostage weat to be wellowed up in the backgoound gates. Some there method must be found, and accentests have been strugging to find an alternative

A successful communication tigrel must have several leatures a snyone is going to read it over interstellar detences. For one it will

Nextmos cannot be seas but their effect on other particles can be de fector? Above: FermiLab researcher textus reservoirs on a special resp 154. Cana Inverse to be easily electrical guinting from natural trains. It should also be insertiant to alsocopen by a planets aimcorphene or y intersteller dust and gas. Othiveurshy it must more guidaly. Paneer 30 and 11 and likyager 1 and 2 an leaded toward the datas built will be too althousand or lyans before they natch rely. The paner minimum has been any and it should use as this paner to provide

Its not excy to meet all theso ontaria But light radio waves and X rays all move at the speed of

light and we have a lot of practice in periorating them. Surely aliene could recognize one of these antically produced signals and the cluber of the universe's retural background noise.

Physical PHIP Memory and Oderspet Coccer working at Correl Uwentry in Stemach and a working the Correl Uwentry in Correl Uwentry in Stemach before used to during approximation right instances, They stated out with the cock of samp approximation of the Notice Cocket and Winners more events protocols of physical in Medicachularity Tablaku at Garbinogo Lakes Incorp. In the Notice Cocket and the Stemach and the Notice Stemach and the Stemach and the Stemach and the Stemach stellar metageroathers' Meta and incorporation in the and makes the Stemach and the

With this part of the radio band low apole is queter than the rest. Above a wavelength of about 30 commonses, the galaxy dest redicate noise balax 15 certemeters then only against unter eners But between 3 and 30 cateneous the only agenticant noise is the balaxy and radiotion 16 over than the Balary galaxy size all billions of years it in oit way load. By lack more waves in the large all elevely how the the amounter all size an emergeners that do

There's move in the quart region to the special wine of two mertions will be allowed here of the inter the return reliable scenario at 21 centropetics, thereby the placebul reliable at 32 centres at 21 centropetics, thereby the placebul reliable at 32 centres at 21 centropetics, thereby the placebul reliable in 1972 cittude will be citted at same remote lowers in tablets control the placements in the placebul mail to be the set of the same remote beams to be the set of the same remote beams to be the set of the same remote beams to be the same reliable to the same remote beams to be the same the same reliable to the same reliable

It is they to pack on the conserve legate story, encoding to be hered at a destit star and sub as a cay to and them. The 100-bot nacio tetescope at Associo Pueto Pico has been used buth to tesh nite commer mereograps and to send on its 10%. Associate atwacts, Frank Datak, and his smit simola three multiple agrinal at the globule start. Datak and his smit simola three multiple agrinal at the globule start of their Mexican 15 some 25 Soci Datave databased stirt in the same was powerful encoded to the data based and the same same of the realizing and in only SociOp starts are could have same

FICTION

She was beautiful. smart, and talented-but she did have one little problem

TOOTH FAIRY

BY CAROL CARR

her in one on either ded, but I wan't making any trembled, ready for teleorif couple of 40mg zappos before lights out in a place tike azine ad either I'm a psychshist I was called in by the county to make an informed statement concerning the santy of one Sally Broucham, aka She was about five loct two

inches, skinder, somewhere in her med twortees. Theck, dark, inye, and a pair of well developed wings

and I loosened the knot in my 10. I could have been olawing could wait. Unlike my partner impulse to much own the not Frank, the county always paid and put it back in place

prece of oak with a loci-high whe net across the models it blue eyes that glatened with fake And worse, one more will my serve I looked Sally held-back tears

we guards brought. Brougham over while Sally fused and dishey- duil and listless, the noht one at all flut it must be the truth "Do you know why you're here?' I asked her 'Do you know why J was part in to talk

> She had a small husky voice I'm successed to be orazy Crazy and dangerous They said | broke into Bachmeria department store and skopers They found me in the stockroom

as they could go into a pair of God." She stared at the ta-

ble for a few seconds trying bling Allock of dirty-blond hav fell over one event checked the

Do you remember the in-She sat down at the only ta- order t? | asked her "Do you

She looked at me out of cool-

Was she for real or about to

that's where they found me Then they woke me up and took me hate" "What's the last thing you

remember before they found you in Bachman's?" She blekeri teese She was

about to lie "I was waiting on tine at the bank to get a lew Her voice was steadily gain ing strength, and the wing bec

ing about, her real identity her. "I would have thought

rickels, dimes-She shoutped "Inflation Before reckets and dimes we loft sugar plume, MSM's " liked her Lalcord owneit

back I took out my notebook "Go on " breath I was already making UD fly mind that she was no

PAINTING BY PIERRE LACOMBE

second of eve contact and I'd



De baking hat an airgel case with teach were init But lookid to anything to help far unless I had the kind of facts that tookad good in a file folder. I came back to Earth with a vision of beating the hall out of Frank of the Bernes opurt

"I need to know a couple of things from you," I told her: "Like what year it is and the name of our current president."

¹¹ Spotters there have had attended, which shall be a set of the childhood was been part in the laser. Here childhood was the shall be a set of the childhood was a cloth fairy in the own right, lastly holdhood was a cloth fairy in the own right, lastly holdhood was a cloth fairy in the constraint of the childhood was a set of the childhood was cell their discuss the set of the childhood was cell their discuss their discuss their discuss their discuss the childhood was cell their discuss the

Do you remamber your first implant?" Her expression made me fluish it sed Do you nemember your list table of labster with buildr sauce on the sed? Nonstet overright date? Since noised my discontrol? (another point socred for the healthy mat of emplants). It puese its not your taut? "sile-raid: "You couldn't magnet with the like load your tends heavy few ments, Buil try to reserve the load wording and in your moyel the load the diryour thread in your moyel to you cart to diryour tengon away from it you cart putyour mindomatyring elex Anot traugheavy tail to dir. Other day you age it ben't with your tangan, just agang the wording heavy tail to directing a few they with your tangan, just agang the wording privat paysons caragin between the wordin privat payson.

Then the acting starts Between an acte and an fait, and the work of boththe caller in your mouth warts to be filed, and filere are thousands of girls and bays out here whose bath seens and are but only a law their will stay put and take most for a few months.

There was something in her vace that cload me. There the fooing yours tallong about more than your first expensions. Sally, You're trying to fell me what led up to your being put away.

I clicht know hid been warting her te spect until I got it. Har look of gretitude turned me into fudge pent milito ba girtwapped, and then spun me out into space.

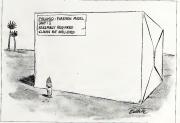
Separted her lps and backed a weggly noise 'I have to get out of here after wheppeed her lace was pole and dead service. Her deloate translucert wegs lutiened. The same now, but I michigang and there each there each truck time. If I dotti get hold of an implant soon—" The lineat hung in the air and came down on myside of hond. If was up to me to clear har. If I declared her same she would be ree to go on about her hile and be same thit could I prove #21 had to know more and net just be the of tool record.

"Then you've got to tell me everything. Sally, all of it."

She took a breath "It II take some beleving on your part "

nodided

T division at the book, the way is the operating of the transmission of the



Many of the krugs used to treat E T. were destined for the cutting-room floor

AUTINMATTER

Back in 1992, a come this creative named Erne extructionsrinal was accident afty manoanid op Earth and almose so at the hands of a government medso agevernment medso agevernment medal have Bit a docting and director Sever land director Sever medical comunity

For evenithing, the doctors neglected to learn that ET that postaried, off as soctack of beer which contains enough incated to induce sovece hypoglycems in a creation so infail Thus say oflysocases Jonathan Wasser.



FO UPDATE

benger and Gary Ordog, of the Charles R. Creak Schub, of Medicinic, in Los Angeles, the medical team never of ministered glucose to correct what was most probably a way or Midnet subart fault.

Even more sensors is a charge how Dr. Richard S. Westian, carecter at the New Yerk (Cr.) Proton Co. Ingl. Center E.T. a constructed pupils and bluen whin were early sign of cyanosis or converse depresence. Westman notes and should have electronic the contratements of significant in the header out of the carecter contratements of significant is the header out of the carecter contratements of significant is the

ET was no punke el cousia: But al mammite produce reprivriative chemicals catled endoptimis and ET a body may have overpreduced trese natural oparas lo comperado for the psychological bauma of bring somcived far from tris home. The proper residents' ha adda would be a nancotie antigonnil lise nationshe to block the vehice of the interval wascestand down.

The doctors in Sneibeun's him on the other hand, ad-

nazely many of the drugs used this context costigos boministered, and this procedures performed on E.T. were destined for the outling room floor."

Lampore also softets some underfaiting "Hoald Unorgheet her weihad her olde as to how our premication; call agents would interest with IT's photosynthias/cong organizes he ways. And one look at his belescoping methory conteneed our bats that method as telescoping methwould be difficult to say the rest!

Despite the complexities, Washing can published transmitter saturement sensitivity Earthings can publishly to present many commit drugs without too much of a rick if the alient as a two unterview like the movies of the we culd by to follow basic categoriumment y restrictions guidations until new disk were categorium to the sensitivity alies in command darger with the following the creativity and the command darger with the following the creativity and the creativity of the following the creativity and the creativity of the following and the creativity and the creativity of the creativity of the creativity and the creativity of the creativity of the creativity and the creativity of the creativity of the creativity and the creativity of the creativity of the creativity and the creativity of the creativity of the creativity and the creativity of the creativity of the creativity and the creativity of the creativity of the creativity and the creativity of the creativity of the creativity and the creativity of the creativity of the creativity and the creativity and the creativity of the creativity and the creativity a

Causer, the sectors protection of the sectors interpretermination of glucose of reflecing the sector of reflection in the sectors of reflection description of the sector description description of the sector description of t



EXTRATERRESTRIAL

UPO abduction stories are usually pratty standars visions aleans kich ap their confied sumars workes and autopot them to a medical over The aleans give a few words of kinety achies than and team on their work.

But now, out of the Cente for Flying Soucce Research in Bread, comes an abduc on story with a twell. Nat only was the victim kid inspiped and exemined by elems he was seduced as well, the centre reports

The encourter, covered in a report assure of the MUFCM (Mutual U-O her which (Mutual U-O her the second of the second neutral that of got Maringa in countern (Tradit Second of Mattac twenty-one and her bother Moteries Carlos That is a glass advance the second second second that is a glass advance the second second second a neutral (real the bothers a neutral (real the bothers a treating U-PO Taxy than 10 Lobe when they worke up hours

The sect eventually care to be according of this and ubbigst A. J. Conterns of the content of this sector with the sector of the sector of the hypothesis could according to his bigst and the hypothesis could accord the LPG "The sector accord to be down, and bigst the left of the hypothesis could accord the left of the hypothesis accord to be the hypothesis accord to be the hypothesis accord to be here the hypothesis accord to be here the hypothesis accord to be down on a kind of a table to here hypothesis accord to here hypothesis accord to be down on a kind of a table to be down on a kind of a table to be down on a kind of a table to be down on a kind of a table to be down on a kind of a table to be down on a kind of a table to be down on a hypothesis accord to be hypothe

Joosho stated better contribuing has leadmony Gevand reports. But leadly with encouragement from the hyperstat, he continued After come thinutes a least an anived in the more She touched mis. She ca usstad main of cleasted the Then we started to make low The woman looked human the young abductive added and he was able to complete the act. The allows interested hum some time take addar explaining (respective) of course) that they had come on amaging of coace

What to make of kit had? Idea have, address of balances IAR/CVI Advised Scapes of the IAR/CVI Advised Scapes of the IDEA Scapes of the IAR Scapes of the IDEA Scapes of the IAR Scapes of the IDEA Scapes of the IAR Scapes of the

Normo keepseel, an Are has been pleased to call herman's s, or he prespect from expand but. The arady in the courses have barned egenerative, me, and the Area to be an expension of the scene to the failed beens adapted but to the faile beens adapted but to the failed beens adapted but to the failed beens adapted but to the failed beens adapted but to the fail of beens in they area beens adapted by the failed been adapted by the failed by the

BIGEORY BURGLARVE

alos overoxinorial operces protect endangered species in reserves where the animals can roam and reproduce unmolested by man. But in Duris this

Incorpti bet hid new preserve Come tome Loan because prevent of the Wale Name Serger Wahen A. The en photographic server have photographic server have photographic server have photographic server more behaviour

In 1980, for cases the balance of the second secon

In the prover compared to the provided to the provided to the provided to the provided the provided the second the second

ANTI®MATTER



PET ACCESSION

Burnis beween weeth weethin and here prise are often responder water and and make and unknown andcopper weathy wateries and base of unknown andopper weathy wateries invaried fortunes upon blocked events of comparison been burned alongstef here get are Curre author of how Cannot be says that aromal devotor relations even beyond the grant

"In making a software internet between put and maker the two are lively to be united in deen except has documented subcases in particle with the two are software readequered with dops case and one instance anoses and one instance anoses and one instance document of mission When a pat producesses is marker. Come entail if emposes in the form of a ghost land hauns the atters in house. Tomesmo the pat states include bases to attered to the master he says find service the task find is been deed. The Kill has in service of the fact that is has deed.

The ballet that describballies (parties may be participated to rewait this world has a foundation upon that subtime hops of immortality which is is once the chief pation and greative humph of our restant

Charles Mackay

HE GOLIATH

Govern of bioloal term way have grown into a lowering grown broakes of a rare endoorne disorder according to two Venderbit University doctors Manoover, this game discase could have weakehold the finishing activening David to cay how with a single pubtion market have a single pubtion market have a single pubtion of the single public the finishing of the single public the finishing of the single public dargs a second how water, of the water beard starts to take alled Goldah having bagen espace have a single bagen bagen be school with the finishing the single public of the single the single public single head the single public single public single public single head the single public single single public single public single public single public single single public single pub

Eased Rabin: which had any lower recording to a provide experimental means and any approximation receptance could experime to the optimation of the lower the production of the lower provide any approximation of the provide the second of the and a neight of the could be second that a could be second that a could be provide the Cold Telebarter.

Multiple endocrine into prese, Dired Ration adda alto causes umors introcytock the book "lates in the patalaxy gard integr have datamed Solkette vision making David at in detine languf far the gard wath. "Emotion in the gard wath. Tamos in the gard umb. book on the montrig of the fact.

And most important, il more in the paraffayoud gland where bong growt is controlled might have softened the grant sikul afgering a pubblic to perelitetis the brain like a bullet

All this is medical speciallistics of ocurse Paulinal Ration emphasizes. And if our interpret contect, it doesn't make David any Miss doesn't make David any Miss doesn't had the checkse Special table.

"New area patiently installing the same operations new allows and the same operations and same and the same a

Altanta Contrast



AUTI®MATTER

WITCH TRIAL

In Auszin 1985, Michael Casson bit roommatic Kanya Baynes over the head with a trying part. Then efablised her in the neck. His taternall? Barnes twite a tatern all? Barnes twite tatern all? A serves the server her was Barnes to twite her was Barnes to twite her the server the wells. Suzen

on subsequently confisated to two other mutices both correction they said, we part of their personal "help we'n against witches Former pacifiets who later convertied the Modelen lath they claimed they were uphelping a Konan commandencer condemining witches who ceat evil speen

When the Castion cake come to that this past June the detendants refused to plead insafety claiming they had acted in set-derense to court-apported detenne atomicy Marvin Rous decided to try and convince the jary of the supernational field

His first whees was Maud Paniertein is Berkeloy when who said she practiced only while magic. the heating and children sole of the supprimitive if both soles both which both power of it is typed, it was more barread; that the typed, it was backening guide real. We a which imyet is the typed soles of the typed is well a sole and one of the back it meditates done it for is long three and decoded it weat a validate channel to task about wechnest in a count of law."

Parapaystic opini ano antropologia Laya Averback al John F. Kanway Urwanity Jaka apolando i opini ha settada te te na congot of psychic titolic The congot of the congot establish a molecular bole size apole mundo in the test advance of the titolic The considering and the size advance of the titolic the size of the titolic titolic the size of the titolic titolic the titolic ti

Though chief that lawyer form Norman gave little creations to the lectimory, his attempt to have it dismested as speculative lasted 34%, the results surpresed attrest no one the Carsons were convicted of first-pagree murder



THE CARD

nevous knowledge of the people invelved in the task, offered the following basement. At three basemed to be surfacing de lacens of gardour three proheby deserved one been of gardour too

There are two ways to be looked. One is to believe what with so, the other is to refuse to believe what is



Uno asprings have skapp beth ref with distant by the Kremin. So it was unexposited with the Soviet newspaper hud (Labor) reported the formbon of a UFD commission headed by former cosmonau. Prevol Poporitoh.

The contraction way inpared, according to Two what a Analitic controlms or Config of y according and a LPC based March 27. For a highest object Two way the memory a implement opportunity of y at an abruck of 3 000to the strange control of the base march of opportunity of the part of the strange control of the strange control of the nontrol march opportunity of the strange part of the strange control of the strange control of the nonservene base that and in data anywhere base that and in data

Alten Hynak, director of the Denarritor UFO Studies in Exension Timols chicks terces the Gorky incident as significant. But he expression denars that the Lintrad Barlins does not have an official agency to messigate UFOs. It's shameful he says that we vould allow the Foresetrs with their closed society and referencely closed minds to outdo us. Engl Michara

LEVITONIUN

A mysterious anaptemity substances, named revisineum by a California physical might one day propet spacecraft enough the spacecraft enough the lar reaches of the userioo.

The large process way was abpained to growing was ababove particles can ave compare experiment bows of Van 2 Massecht of Van 2 Massecht of Name Arweit Dompary in Genoge Park Carlotnes and Genoge Park Carlotnes and Carlos Carlos Carlo Carlotnes and Carlos Carlos Carlotnes and Carlos Carlos Carlos and Carlos Carlos and Carlos Carlos Carlos and Carlos and Carlos Carlos and Carlos Carlos and Carlos and Carlos Carlos and Carlo

Wadeworth prefers to jopate levitorium in nature i tother than trying formal ulasture in cylo artons, it might oust, for instance as a nucleair perificial or set a primordial substance formed by the Bio Bana

Leavand a Highes physical leaf who has written about antigravity the research proport sectors like a ong shat. The thouble is, the theory variables the leava of physics. Shill enterawity is not impossible usit with officult. — Poblem Biodev. CHINA SYNDROME

sortiad to nonperference and a pumpers, giowboys, they give them lots of names. But huly, machines should be dono much of two."

An estimated 5 000 unselect versionsumperformance in head each wave in organisterm generators the huge component that were in the analysis of the second second

Throw what a compart as and I really don't see any need for than't here: "aga's James Holderhand while directs TMU2 solutions control for Ganesa Packs Unlikes "Our espositives are not at the level that that kind of worker typically more wer. "Hidebarrand was one of many popels working sale on the seeord daw of mwell both sale d

I adv about press accounts that GPU recruited intermen, secretaries and other normaties on employees to work in contaminated ansas

After the accident in 1979 the company brough in what they daffed remote report and says Hidebund. These were people within GPU who volunteered to cose here and hub clean up the sand any building. The same concept will probably be followed in the future. The exposures will be mantaned all a very low level.

The temple reportes that GPU called to the sland put after the accident were leaned to solub contaminants from floors, using bruthes and solapy water and to do other mersal floach tockourbaw obs

How many people will receive measur able closes of radiation?

My guals is in the course of the recovcry write tailing tan thousand to twelve thousand individuals, says Hidebrand

By using so many utskaled integenenced people, and? you exposing them to more radiation because it takes them longer to do the job?

The NHC will be you the effort all out the in taking the truth response to they reccommand you do that by having and using highly shield nothadas who cangot in gait has a barre and get out nore quality that nored worksin. That will yourcard quest a truth collective, does I bascally encounse that, but I hink it also escential to keep in dividual exposures as low as you can. And wave reals does that

Hidditrind puls a chart from the file Since the obscrup began only 13 parcent of all workers enforming radiation areas have recensed more than 500 millionms in a yearthe very limit that some ontice of average protection standards have called for White other plants in the United States average 700 man rems per year the TM-2 collective does had averaged 300. The high does tasks however are well to come

Doe of hom is called head IM—namp gait of his top is instance one A notice procedure when instance one A notice procedure when instance a working nacture will be noted, and the prome spinkard data brand. There will be pome spinkard data brand. There will be pome spinkard data brand. There will be pome spinkard data brand. There we have been and pomp to on the immediate arise. If a more opentic called of the polar one manufacthesis this called 30-bin cap is head. We have the the installed 30-bin cap is head. We have the will then datable spinkard on own it

There you in locking down at the plonumoptime initiatizated. Fairsmore, plane, he aspetissification optimizer in out house. The planum is a soft and optimizer in out house and the planum is active viscolit. It is used to guide out of an plane with the core and to hold buil nod singlated active viscolit. Act is public liquid by the cores we diskolities. Act is public liquid by the cores we diskolities. Act is public liquid by the core we diskolities. Act is public liquid by the core liquid classifier and head to have been very political classifier and head to have been very political classifier and head to have been very poltical classifier and head to have been very policy policy poltical classifier and head to have been very policy po

The damagad laaf is under the plenum explains Hildebrand. "Samma radiation will be coming off it But it will be flooded with writer as shelding and at that time no one will stiend over the vessel. All of the has been



modiad up, and people are specially trained to keep individual exposure down "

The count-relevance constraint in a train to the bits strain of the auto-adjoint of autobits strain of the auto-adjoint of the damage of the vessel. Unexpected mobile damage to the vessel Unexpected mobiles could adjoint or the pick here the constraint of the count of the straint of the straint of the the nearbot could will segment and the nearbot could will segment and come of the typede substant here.

Some of the early high radiation workimpacting hot issues of the selection and removing ball-over flagments—will be done by robots like RED and by robots arms called erran; long handled tools (but once tackston levels are lowered by this initial work a large part of the cleanup will still be done by harmans.

The collective does to clean up TMI over in vesar will aringe from 13 COB to 46 000 manners as astimated by the NPC staff The peak of the GPU projection is 25/000 As a compassion the fail industry work force absorbs some 50 000 manners each war while contains over T0 reactors

A rem is a does in it has nesseave spary caused other by gamma or X rays neutons or option or bets periodes as they pose through the locity, knocking electrons base. A rean ram is the collective does received by a group or population, so it 700 vortines reach receive two series the collective does a 200 ram rems.

Spreading the doals to more workers to leave individual explanates low spreads the solid concorr or genetic damage some feel but does not recluos it. That risk depends on the total amount of rackation energy ab sorbed by human losse.

So of the TM 2 pb regume 22,000 manants—the metport of the GPU estimate then the Nuber Regulatory Commission project the statistic model in the CPU estimate that a cancers throng the workers and genetic detects in asven of ther offspring. The is based on the conservative doos nogoome formula in the NRDs Environmental times (transmith FRD performance).

In a statoment soud to its enclosees General Public Utilines actinuedges that "takakon espatures at TNI mechanismes esis, as do all occupations and activities of late. But to put the instein seme perspective the occeptany points du this working in the occupations and working with the occupations and these torce dispersius these working at anisee-roow plast. Another GPU report has observed to the CPC approach to estimating health effects asympt results in the enrous observation. In disk

In the shadow of a Unit 2 cooling lower are parked a docen trailers used by contract employees and government oversees at TMI Wilks Body chects the Department of Energy site office from one of them

He hands me a topographical map drawn by computer from 500,000 data points acGewe

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Every day can be the greater day of your file. (Phy-exact In-risk) your in: better (comp weight) Receiving a more dynamic subspection? Controlling stread "Mindfor your wear to stay the subspection of the Sector of Sector Sector Sector Without Environmentation for Control Sector Sector Mindform your dispet dynamic Mindform (Sector Sector Mindform your dispet dynamic Mindform (Sector Sector Mindform) part (physical Control Mindform) parts (physical Cont

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quind by a conar device lowered into the core. It shows every inch of the mountains and valleys of uninium rabble. The sun shrine begitty through his office window on this for lay of aping.

Were much more genratic than we were two yakes ago the roys. These are good people year is GPU and they and Lefs yait also thang year and year and the start of base of the universe what to do about one only, which the cooldnor of the use has been of the universe what to do about only and the cooldnor of the use of the cool do not any advecting and the cool do not any advecting and the cool do not any advecting and the start of the value of the seatoning basement and then value the seatongridually management and then value the seaton-

A secretary sets a sheaf of papers in Bis by a m-based " i loosely use the analogy he contracts " that TMI may be to the nudes-power notisity what the Apolo file was to the apace program. It has been a time of welloction a time of average

The twords me a dway pails of toward peak to so and a limit oper. That is boronaficates (desc, "in low," this is a normalization amplied of course." It is note the medium of choice to permanently isotestiming inclusion addition with got out of the balancest week addition to active service balancest addition and sealers which balancest week balancest actives and to balancest and balancest actives and to balancest week balancest actives and the balance week balancest actives and the balancest and the anti-transition and and mediate and the process and and the balancest and the anti-transition and and and the process and the assistances and the process and the assistances and antianarized anti-transition and anti-transition and and the process and the assistances.

The logs are stored at Richtend Westington Demosity they will be packed in conceller on and itsel and placed one half mile underground in formations of abl or gainful the twee been geologically stable for millions of weet

A mile down the isightal service road that fum to the oroth gate is the inducer lead out by the log Bookin from Middletown. Nam the shoet no lite only sound is their of water litelying over a dam encoded after a flood wathod out the lead tobecco grown here is were called Elect's listant their

Yook Harrin Water and Power put the damthere functing water to a hydroelectric turbrie in its bed on the Substanmas weat bark in 1500 Metopolism Estan bought if and the island. Its helding company Genand Public Uniter, troke ground 40 years left for an obvinced alternic boothy and TMA-1. the first of the two macross started operlarg in Saccember 1974.

Inortable) the power plant with both ds fucies units on, was projected to generate more power in one year than the typical paint had carefued out in as interner. But the two wolked in transfer for only as about times. TMI-2 work: down on March 25, 1979, three marks after spirit up.

That accodent has since beam analyzed repositedly by the whole nuclear industry bearcen learned at Throa Mila Island have alroady macking start reactors alsowhere facing theur howe each day the TMA 2 to down y learn solvances decontamention technology and enhances our mastery over whore wester Q ADAGIO

COV/UNIC PROVINCE TO

wyboard "This terminal is busy"

She dish tonser this action rooted up? She dish tonser His action to the disphy Does hat have anything to do with the otast varies bosied on in the news row?

She nodbad loward the display. Those are the thought patients of one of the green toda: I have one of the sanationes in a are sory chamber. When i can get the man sertors hocked up. If be able to receive from any nock in soft.

Turning her hald away from the screen and faxed foldes with a hale-failed gaine. You reliated to do anything about Fornall Now I'm branc mailers into my can hench."

Tobas shock his head "flau bainsel carried fail Lady Name You keep this up and you jait might boys head case of the models. He noddled once toward the screen "Choosyou have all of that date what are you going to be able to do with if?"

Communicate Tobias Communicate

Taik with the locks? Hell if they coulourecord affithe same rate that they move you't be an old woman before you can get a help back. And if you can communicate with them so what?

It toka as though they conceptualize and communicate faster than they move. See listed the display "former a doing tember thrigato the nodes i us been watching then On a primitive planopleasare level, the top divided some of the looks into arrease. And the 6 forcing them elevanoons where they mult for each choice.

Fight? Tobes burst-out-in laughter "That has to be the action event of the century Heat. Lody I ve been have set as king as you and on the are war comp on

"Is how all he same Once I can communicate with the tooks. I'm going to teach them how to light Foreed."

To the glanoid at the other terment in the ordershift and condent limit single to seast an the same compartment with Lingle and two the would not seasely be the submers in tertavation. There was another terminal in an processing. The glands is engineering how, new that been sufficient to submer forces nod processing. The end of format hand subged of these words the end of format hand subged Obtains similaries from the compartments , tood anough to deep Megot to na low and dealway that the ways and it has the new.

As he stood in the dm. rad light outside the cargo hatch he noticed one of he what rooks it was rounded and about he size of a plice if had been here over since-

No hethought thi closer to the hetch row When we bandled is was further away. He shock his heed Anather reprut for Lady Names location army He mattered as he walkedioward his shofter. "Enlar now Anad the rush later."

As he passed the main sheller he glanced in and increasive staw Tillionis naked body hanging by 68 mick from a piece of name line tect to the come's center brace

He entered the shaller and lowered himsal trin a char as the ing of abadua deal obtion invaded his soal. What's the part? What is the point of ace of a?

Kent that part is bod ghouldh for entertainment, "bload" It was increatly voco He was standing in the doorway. Foreist noded to ward the body "Just look at that The man was totally incompetent Look at the way to bload that moose strandit on the head.

Tobias closed his eyes and loaned his head against the back of his char. It seems to have done what it was intended to co."

True But did Tilleon must have done quile a membo before he deci His neck en t brolivan Tabuis He denoed He danoed for a long time

"I guess Tilson just waant much of a hangman

Forrest snorted out a laugh 'He wasn't much of a chaptain, other 'He just wasn't much of anything

There were solved coming from behind formed the turned and Cage pushed pairs inthin and came to a half as the body came rishe were. For God's sake of the cage looked that all formed and them at Tobas socied in the other. "For God's sake cat the down!" he moved lowers the body.

Forward student Tillsome soll form. Wouldn't if be arrularing to learns him there for Lady Name? Weld all be eating our rations as though nothing were out of the ordinary and in the doorse. What would she do?

Dage lineted righting the overturned char next to the hanging corpos. Give me a hand someone

Tobas pushed himself to his leat and reacted loward the door He poused read to Forrest. Help him Haip him you soroits both of Is at you.

A broath of amusement peeced over Formatic face as he walked over to Cage and began hillong him take down the body.

Outside waiking napidly away from the olimp. Totas tell the angly sickness forcing to way though tes well of control. He began running into the date.

The second Earthoday into the new autome Tobas studie on Basing and Hill rest to Takons grave marker staining at the long stadows cast by the mock below. One of this disclows mount in the case that one along the shadow to its tource it was Forest moving amon the neets.

Token squatted teahed his loverime upon his knees, and desped his hands together Curous that he ben had questioned whether Talent's suicide was in fact a suicide. The body had been taken down planted, and never mentioned apain.

Tilleon's mind had gone no qualition about that Ha shelter had been littered with inocherent scillbilings. Mostly theological sciamid doptement a ramhlane operational

115 DAINI

toaton of the author's existance. There were

Formet mariational that each mode is a second a human body Each rook, then day be insided as an individual. The took color is a ganotic thing and has no other significance

He dispenses pain and clearly to the rocke

dowing Forest is the ovil Belore Forest

survive morality as long as humans have

something, it was a previous bit of the something rocks acting in concert, prepared a pist they left the platform it must have taken many weeks. But there it is. The tathout tith-A wrain thrown into the volcano A lamb

There was no possible way of knowno chapter had hanged tensel. Or had been

'I am an obscenty '

Totaks looked down at Tilgon's grave marker. This is a hell of a place to try and

A whoop of yzy datte from below Totess among the rocks. And the rocks ha was running afforg were of only two colors, green green The green tooks in accordance with



small white rock. The terror the passage that number to Forrest. It wouldn't be a subthce without the pain of ices. And the pain couldn't

What about that inte crean patiole? The after a sector? If the others bar true enough to move away from the platform loo cicl the people it had been green Alve it

He suddenty left guity about holding the where it had come But he pould it remem-

He headed for the ship, being careful

the orean risk outs-why

the thing will serve the over if the over

Tobias sat in the commo couch and watched Lady Name alternatory punch but size of paper miter not choose pocket. The

There' She ported at the incomprehenstile scramble of rumbers on the deplet

have to fuck them over end west for them to deduce the mossage Deept community han She feard Tatess "Did you find the

here he'll turn the computer nto rubble. Once

They don't look damaged." Tobate knewed his chier Lody Nemes use of the pronoun

We aren't munderers, Tobass. We are the nood raves ' Tobies glanced at the knife She noddod and reached for the keyboard

The citrary also pooks the signs of this thing

"the thing will not betray the green "This thing will betray you." "Heb agos" "Truth

"hee obey this thing "this thing not benety us" "The thing well betriky you " "who signe" "Truth " "Truth " "thut is what "

Lam

"does truth serve the grean" "Truth serves truth. Will the green

serve truth?

"the grown serves this King" "The gray serves this thing. Tuth is brook Serve me."

"auth while have we done" "whet have we done"

Lady had been right laced. Foreist party after the compared White heye had been puting down takenes in the dome. If the access had been valued. Shortly After Cape wandered of in the cleanes beyond the short fobus had between and accurd the ontes node unth the came to a bottomixee othern. It was an opening that looked as though nail potential as bottomixee othern. It was an opening that looked as plane with a huge razer. The footbace we be endly, and the was that

So king Caga

From the entrance to the dome Tobass watched Foreist aucy has adjucts in the dyng light as the end of another week long purset. He was seated on top of one of the large red stores. Buritouridig thim were richting bur red hosts All right entre

Lody Name had told them. "You must light

"how to half this ("hog"

"Play deed "

Tables chuckled as he growed at his relene Fornationew army as wall as his colonal long, were immobilized. They would't tight Ludy Name had given the growth tight command to let the gray about tubit. The word had even spleasi to the white and the black. If you don't tight, you don't have to die those don't that, you don't have to die

Tobas laughed out loud. Pay deed turn red it would be in ample task for the ocks requiring only the sample of each rock's surface members. The surface dees but inede they line. And growth takes place against the occurd.

He saw Porrets head turn slowly in his decision The small rean studied from his face to expressionless as one of the tooks. He called out, "tobase" He held up the current generator. "Sobase What if full tions all? What if just go from store to shore and give resch a lifte int?"

Then you'd have nothing left to play with except your radish. Forrest. Your game would be over

He lowered has shock stick and grimed "You raned the wrong side Tobies"

Tobias laughed and turned into the dome He trished off his nutribar lossed the wrap to only per on the floor and flopped down in a chair facing the doorway. He had taken to atting and stepping teory doorways. When someone's out to get you, paranoa, is just practcal finiting.

The garbod at the possion of Markhee and forward Lady Name wus gong tometer and toward Lady Name wus gong tometer gong to relate Ster had description of the the societ had the advit to exceed the work exposite an the term of a highly consistent approximation of the society to exceed the work wapped to work the society to exceed the work of the society of the society of the society of the work of the society of the society of the work of the society of the society of the work of the society of the society of the toward of the society of the society of the phere work of the work of the

The soft suits and respirators would leave only. Formast inhaling, and The only real problem was trying to convince the nocks is do it. Lady Nerve suspected that for some reason, the rocks might object to wandering around in a cloud of their own shit.

The obcreasy derivated it was honest and the was holding something in his hands. He squatted in the doorway.

 He laved dang wring in atmospheno longohns it was he dong watch repair wearing a pair of boxing glows. The failing gravity just made it interesting.

"Nou know Tobaka there were many times in my life when I thought I had all my ducks in a now. When I thought I was on top of everything it wasn't always true.

Tobias hooked another chair with the loe of his boot and pulled in closer to here crossing his legs at the ankles upon in "Welcome to the club.

Forest looked down at what was in heathands "it might not be true for you."

Just stop fucieng with the rocks. Forrest and if I be all over

He glanced up and grimed "Nou theirs so?" He placed what was in his hands upon the face, soopped upon it while ne foot and iffed as the sound of a sharp crack reverbended around the come

He stood and tossed the object across the space that separated them. Toknes caught it with its left hand as Forrest turned and left the docreav errory.

It took a moment but Tobass recognized the object it was the hit of Lady Names inde

"Mere is a new one" "It is this thing" "It ages as truth signs" There is a sign" "Turth is doad." "Turth is doad." "Turth is doad." "Call sufth and see." We call mith-mith see our sign--brow" "Turth dee not seg your sign. "Who does zone now" "Not on two zone now" "Not on two zone now" "Not on two zone now" "The find" "See the zone not and "See the

week house stre

By the light of the Dack he had born here among the mountain of red nocks beyond the step on the way to Capria Chains. That's where site had states that had here a state the mere i her soft such had been alsolved here mere i her soft such had been alsolved here mere i here soft such had been alsolved here mere i here soft such had been alsolved here had so alsolved here i here and also bas constructed his right and twinned ways format must have taken some time to must wait back harmen born

Has Forest tound his other six and commarchation unit? Table Solved back toward the perific silver gleem of the ship. To Hell with it Let Tomest play with the ship. To Hell with it Let Tomest play with the ship of Tobac card? Keep going with the reflects, stay cut if Forest's www. Wet for electual Screek

He turned black knot on both knoas next to her body and clumshybegen pueling he red set over her "You dumb bloch. You dumb orazy teldth

"what must we ob to allone" "There is another Kill it." "to fall what we cannot are---how." "Find a way."

The edge of another new sumitie Tables looked hypolighthic dome window at the pick of the slow down. How long had in been since he had seen if among had when its main had before Tameet? Black when its main had before Laby Names How had howned Had only one right passed, or was it two? On three?

The speed of his stamming beerings is even and his sog and bloed of his Sommehren block on Electrine was a partice with a degion nutrition which invest strapped on stole in his or her environmentally contribute on the control and matted the 468 Bevrages Surveal. Hot More than her, his Surveal, His Arodo momental Tables hero Surveal, His Arodo momental Tables hero alternetistic her her history and particip in tain or here her her history and particip in tain or here her her history and particip in tain or here her her her and particip in tain or here her her her her and particip in tain or here her her her her her her her surveal, Hist

A second He skrwly looked up and turned The sound had been something between a groon and a creek. He looked up all the image of the dome. Na problem there had he ookl see He head turned owend the clooway. As he took a step toward it, hall of the dome cambe crashing down to the floor next to him. It knotsed him clear acrose to the well of the undersignal hall.

Another grash Another



An and a second second

He scrambled to his feet and leaped into the rubble to except a dealering role and a shoking clear of client reacted as here.

The sounds stopped, and the just bettied the opened his year and channed is glance at his summarizing. The orans was noting but luable consensated by coltastant columns of robits in spaked himself both hear control up the colar and hubble lotting and the standard standard was stranding. The landscape was unchanged, the key and standard the moning parting arway from the bit of Meristries the should be it housen.

"Fonast" Forest was nowhere to be seen Forest!

Seesa took several deep bearts and cload down it has desuber of the come withouthe dependent was secret the come withouthe dependent was secret to come fee days—Earth days at the Wataut the dependent — the cload of the servey day and grouped in the hard boking hields the days and the the the groundander the days and the groundwerk supply had bean crusted along with the dayserver.

Tables begin gethereg up the law rules best he occil lar unr read- Meesty his mith was planning what he would do more the blake out his com portable communicaber unr and set p this communication of all remained Lap has communication of the manned Lap has communication of the provided Lap has communication of the lap has a set of the lap has a

TI get your Forreal. You meterable little son of a bitch. Fill get you "

'we have found tout/

'ei huith deeid.'

"buth is plead --- if is a scrange creature truth---soft small and made of load"

What of the other the thing wants

"have of them--still there is this thing" "there is a sign"

Torrest Answer I you're reading. Forrest who agric

"Instit is deed-you are not this thing."

Tam God. Where is the thmo?

"who is god

"i am God rukes sti

"are you like truth or like this mang"

No I have more preserve

NEO WE CAN SEE THIS KNOC

"V you cannot see this thing we have nore prever than god"

"Serve God or you wil suffer"

"the thing already provides us with what you offer us cool--we serve this thing."

"You must serve me "Communicate Hom stranger than Ste

thing Answer Answer Answer'

From the stop of Genergevol + IF, Tobus assuweed the assusts of the efforts He was standing inthe centrar of a cassale encicence of real rocks is a transfare peech of the dome sterving as a tool inside were errore cushrans from the clones and a parel ha lacit gatabat from the ship. The panel coresolad the anity, of collide-representation anownic charges surrounding his posision on the init. If Formatic on any of the stolware worked to got at terr, they's needs a puck to get in trucy.

Next to The cushcare ware a statist of the element charge caped with adjustation impditive Toppent. They ware in coso Found a city of the Toppent. They ware in coso Found and the Toppent Toppent and the toppent of the adjust toppent. The toppent of the adjust toppent of the toppent of the adjust toppent of the top toppent of the toppent of the top toppent of the top toppent of the toppent of to

Next to the racions, on the other aids of the cularions, about the portable communication unit. Tobais bit the sterio on the inside of his lower lap. What dot the racial maker when they ais of they could gee (const?).

He loained har foresame upon the edge of the mod wail and sourced that areas behad Cerevanit He. Pomer was non-towa assaud. Not work loagent? And/for the wocks to see Pomert he would have to be gat subserving in one place to the better part of none. Each days Tobias boliad wither to the right modrity his postboar with he was owned with a camp. The initialies had been in place long rought to postboar / And the zerva. The land encycholo begater / And the zerva. The land was the land the set of the set of the land the set of the land with the land encycholo begater. / And the zerva.

He staded the weekage of the area "to the rocks it must have appeared out of nowhere Huge glasming Shart A color the rocks testimer overbetter. And then they begins gating lagits: Cristian isotore in motision to the signs brought class? Other sotoms aid net. They learned the paraly of disconderios. Good and will carrie to stay And rish begins the rocks."

Tobles noticed and sat on his oushions, encrypting the portable communications unit "Oh, Forrest, old buddy. Do i have a numrum for you."

"who signs"

"God "

we serve this ching."

"These found this thing. If I is i this thing, will you serve me?"

'we see this thing-this thing now seen what we think'

"I see what you think. Will you serve me?" "we see this thing" "I will kill this thing and appear to you then you will serve me."

_____WD W0.6

The executes in decars on the particles and as a section with the particles and a section execution with the section which is hand been correctioned by Marriel and Section and Section and Section and the section and the section and executed the control and section and executed the control and section and and the section and section and section and the section and the section and the most to the laters to the method the most to the laters and the section and the section and the section is the method and the section for section the section the particle and the section for section the With the section section of the section the method of the barrier Moving the topological method to barrier Moving the topological method and section section section method and section section section and sections the section section and and sections the section section and the section section and the section method of the barrier Moving the topol weak and sections the section section and a section the transformation and the section of the section Moving the topol weak and the section section section and the section section and the section and the section section section sectio

His programations completed, he end down and weeked. If the hashed in the axime places, in the same position with only brief atsences to pice on Macuric grows. The hocker weight seen her nicholly after flags wave a det to pacesave the early. The only publicities was boostom. But, there were cerestramments forward. That, and the voices the wes beginmeral to here:

All a part of going cristly he reminded himself Sall he wahed the vaces were loud enough for him to understand. Who knows? His meanly might have something interest ratio say.

He set back and stared at the two groun tecks he was trying to common A thought passed his stlenion and he begati lough ing. Talk about your hard sets?

When he gamed down he began the wat

"who says" God 1 have moved you " "your power is great" Do you see the thing?" "We see this thing." Do you see me?" her see you god—you ant very the the see you god—you ant very the the great is conser."

"this thing has moved us without us soaing the move---what you have done is no more"

"Will you serve me on faith or must i kill this thing?"

You must keeps through

Mentablee was slowly moving toward sunset, but enough time ramained. Tobias pressed the remote target and witched as the ship disappeared in a cheet of light and sound. Tob bait, he floogth as the watched the heat carry the tarries and black smoke high nio be stimmering rold at the sky. Its too bage that if hatpoons so curckly. If the could see it, the liaming death of this thing eould impress the rocks

He set back to wait It would take another nine days for the rocks to see that this thing was destroyed

The portable communication unit began making strange buccing sounds his looked at the operation panel inside the case. The only image on the screen above the biny key board was an instructional has awrited function to operate above.

He did as instructed and eat back in shock withdrawing technical as though thid been burned as an angry deep shart come from the unit's speaker.

Tobasi Tabasi I'm coming for you! Do you hear me?

After his shock passed Tobias grimod

"The ship! Why did you blow the ship?"

¹ think you know old thing Shall I put on a nosi hot cup of N-889 when you come calling? By the way, old thing, what are you using for flood these daws?

The unit was alter: Tobas loughed as he switched the function solector back to the tock clannel it didn toem so long altime The new days. The vocces provide some orientamment Sill they were nevered to eng Especially toward the and Strange social, Former lower did these.

If a firme to decide ' this shing beings us pain and death-por what do you bring air The good ' 'god' ee wil zonie you' 'And now wil you trive tads in min?' 'god' ee wil Ase faat in you' Tel the others. Air mut serve God '

speed was well held that adverts

Does provopone of inter equat to MMad leverwark of them? Tables in the hough at just being the syste an to mode the warks with the distribution. There don't serve to be encoughtering in the oligit bab warks from the bars and them an the distribution of the last syste. The has a proce back work of a guad back harms body. Anging it have work to some clasm body from to understand about the last syste. The has a proce back work of a guad back harms body. They is the work of the some clasm body for the system of the back to experime the point back the transfer specifies were stript. If the amoves that there enclas, is were from it.

But was the leaf of the doad breast the inter his pools when had account with a stantern inter Unyadaring He unoxected if and board is to be made of gate store. Here entree body had been replaced by the gith, Baid, a (Inwayad He) as unoxeceed by the gith, board body. He had been replaced by gate and gates H is durit boarts to check out when only accept to be baded. The was note that screeners. Not will.

He came to the bank of the shoam and lowered his containers to the ground. The stream was dry He climbad down the bank and dug at the cracked surface of the bed with his hands Dry.

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8 to be	

on the distant helps. They's where the water comes from he thought And matic where

The light and the cisis, Dave, it seemed

Ho trished securing the portable communication until to the mule nind to the dray. terrors he soft suit and respirator and ins supply of combal He looked back at the two green rocks that had been keeping him

tion und There was a class- and time-inckolder hantton. He didn't know the date. For

The figures were unreadable, a smear of sishee, as though the indications had been

The reflection of his image in the acreen

What? Tobas looked up and around He

He looked again at the two green rocks

There is a new one more powerful than

ing to him risive J slowed down that much.

LOST help you to hat a known"

The hills He norskied Supe You can come

It seemed to flow across the red dust. A beloon filed will water Light and dark Repairly shifting sharings. Time American

He watched Mantchee streak actess the sky leaving him not in day or right but in held white That last the wondered or haven I

Totake palled hereof stip for chart's seed The brace he had grabbed came eway in corrocked, like lace. The supplies, the soft

He stood naked a film of pary over has I can t make it Tco and Too old

Green gray black and white clobes flow ing around the red Bapel wars of shapes Ho fet hersel lifed and camed in the sky Martchee was an even bar of yellow light

As he was moved slong, floating upon that active unchaintent dwar of his the extremely a Rought-what would be do what he cost

hoad and shoulders

There was no are wer' except for the ating

Loan Hight him Lem dying "

I cannot change my purpose

change not pappose - change form-

The thread of a thought spoke to him Lu-

There was not enough taske left to force

A play immediati the econoparty baset. He

been in use for over a century. Di the sheal making was a outcus status of two naked haman men in montal combat standing upon the bodies of fave other humans, the the statue was block Ecasitorum, DO

BODY

Copper, a necessary trace element in the role as biochemical catalysts. Too little copper texters the body's ability to use ron. Too

Edward Calabrean Gary Moons, and Mark McCarthy, of the University of Massachudata to human ted blood cells. It should be noted, however that the leaves of both once sity, showed that large closes of vitamin C use copper The researchers found that D megadoses decreased (by about 26 per kinwedo warms that the stanger of megadoe-

clary user, up to five grams a day. Some racent studios however question firs They providua stackes had indicated-only one

This is admittedly pure speculation " he says. We cannot say that people will have copper defeation if they take two to three

The real questors clams Cerklewsie is one of ricks wrists benefits. Warren C is in-

Not everyone agrees with Carklewski

Pauling s testmony is intround, asive Conference, but a number of animal terms

"And beaches" Cerkinwekt save with a per supplements each day DO

INTELLIGENCE

CONTINUED FROM FAGE 38

To evaluate its cost-effectiveness. In the metiname they collect stats by hand

The clubs use a simply of mechanism. Nets use an IBM PCXT the Nethalase use two Apple files one hashwests with the clubs and one for sociating, the Braves taxes have relevables BOSs and BKBs too for the offices, one with the club, one in the minors, and one with the socials

computers can also project performance over a simulated season isolating the perEntrance of one plager apart from He year. Hern integraling if into another basis paticularly walk in grouping the effects of a polyade trade. How might the Meltin have lased in Status if they keel sign. The Saare's Based on Saawa's performance and that of his years in West, the general intranage can get a protity good sites of the effect Saaver would have had

Compare weights is use to also consistent of the compared intervent of the constraint of the compared intervent of the com



carriy, of the BB players who were eligible for arbitration effer the 1983 season only seven chose to go before the public Marris calculus is so accurate so fair, that secen to will have all but eliminated arbitration

Comparts raising a size buck to lead interrupt results portion of the back the strength with the disk of bist portion of the back to be the size of the size of the size of the back the size of the size of the size of the family point with when of the size of

 A built gives up one third of your inning and ant guaranteed to work even with an excellent burter and a fast baserunner in atmosf every case, even a successful burt decreases the probability of a while

• This shows being the highly operated to these the highly devices the highly operating the highly devices the highly operating the highly devices the highly device the highly devices the highly device the highly devices the highly device the highly device

 Home runs are more important than good determs. Power hittom win more games because they score more runs. Homers score runs often multiple runs automatically are catalianding determine plays wont win a catalianding determine plays wont win a categorie if would appress are runs.

 The infectional walk doal indexed instace the run-excerning potential of the opponent in dis inning (exploration) in the Neuronal Leogue, where the walk is often used to Jacob that pddfarl to ball, this the decrease is more than offset in the rule using by the increase calueed by the opponent's statting an inning with the indexed length.

The traditional abilities toward freese plays ane left over from lower scoring exas when teams had to scraftch for every run. These plays feven t been effective (according to the trial cascertaces) in R2 years.



NTERVIEW

CONTRABO/POW MORET

Orner: Italso guarantees that noticody contreas in and factors the data

General This right is give you on much relations in the conversion exercise increases of the conversion exercise increases with people being activated is not them can be as increased and the conversion exercise in the second second second second measuring discloses we emission of people measuring discloses we emission and the second second second second second second measuring discloses and the second second second people measure constant second second second people measure constant second second second discloses on the disclose disclosed second sec

So that s where we are now if it been runring for so months. The computer system is werry nos, built by one of these people who dreams and breather computer. If she there and takes one thousand data paints per second all day and all right.

Onen How does your monopole detector differ from earlier monopole traps?

Calvera Dura was the first apportunity cirsigned to detect the superheavy manopoles tole Unsi grand unification came on the scene people thought that the monopole retic field up to reashight speed and then retic particle moving that bed will really stand in operato ray showers But GUT monopoles are a different kettle of fish. These monstors palerators or for that matter, by any preserthy occurroo natural propess. You expect dards of particle physics-at velocities a not produce easily identifiable ionization trais erfer in bubble chambers or in controray detectors A SQLID on the other hand can detect magnetic monopoles moving at vrtuely any velocity

Only When did the GUT monopole muscle rep the particle physics scene?

Cabress In 1974 Working independently of each other, Genald Hisch, of the University of Univest, in the Natheriands and Alexander M. Półykow, of the Landau Initiative of Physics, rest. Moscow, showed that univcation theories predict the escation the and incropodes Later in the cackle thermath-



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amatical proof was applied to GUT and predicted the exetence of superflawy monopoles initions of times more massive than documed in provide superflaws

Grive. So on Baint Werkhols Day some hing passed through your detector that had all the characterizadas of one of these GUT monopoles. Do your believe that it was a magnetic monopole?

Cobress: The loading was pressed whet new excil of toped to get from a mecodie passwight shaped to get from a mecodie passwight shaped to be some to be the distance of the out device was too simple to be the advecting of the calcade the suscellar that something effect actuated the suscellar that we do not have passhedly emphasized that we do not have ensugh evidence on the event to loag that the signification on the event is a use an antispacial was a enorable. This new device to is designed in a wey that will us as an antispacial determine the cause of any totue micropolities event

Other Would existing estimates of monopola abundances lead you to expect to detoot more than one monopole with your devices in three years?

Cateria: There is to of leaving in those optimates, but the Bent Wainthine Day event is considered with numbers postulated by released incidels that involve grand-unitigation theory superheavy monopole. When then any leaving in monopole.

Ome Explose that the Weathing Day weet, is confirmed and it turns out that a small but, inskely sinteen of monopoles, wandbare, http://two.earthis.neg/barhood every yeer. Might you frem thy to use monopoles as enperimental loads for studying regions of highenology physics presently unapreschable with our lamous machine?

Caluteria: Containty because the poych wolds be motioned in the company analysis of the temperature instances patienty is notice and temperature mapping patients to taken a discussion of the population what we can produce in our began than what we can produce in our began design of thesio at taken a discussion of the begin to instant and the torus can begin to instant a range to the user can be an another than well in provide the begin to instant and the torus can be an another than well and the torus can be an another with one and the torus can be and the temperature in the patient and the instant and them with one and the and the indeed collegions.

Onw Wouldn't a monopole microscope also enable scientists to study substortic reactions occurring over distances that are fantisatically emeller than any presently pronable to investigation?

Caberes' the There's a check relation base have the datasets that you can receive in an exponent and the energy you must produce. The smaller the datasets in the higher base approximation and you want to be insiderers occurring over datasets as annel as 10° material Monapole deshuttore excita to us probe all he wey down to block 10° mission. That is only allows a shourpole time within all our constrained of shours when each within all our constrained of shours when each and the shours of produce wants and the shours of produce wants and and the shours of produce wants and the shours of produce wa time brook down. The present opinion is that the ubmate unit cation of the four brook of nature—electromagnetism, gravitation, the strong force, and the week force—demends a much delept understanding of opennena at this level.

particular to be wreat physicals. David Bohm A handi of emment physicals. David Bohm arrang frem below that preseri-de quartum theory will ultimative be by analyzing mere plate of eutosome resiny when physicals an able to study these interactions at such close damoes De you three lifetims desentiaction with preserider outertum choses?

Cabera invert presend to be shown, in the cabera invert presend to be shown, in the invertised of the shown of the have something convincing in hand I worit spend years thering about what reght be the case

Orbal: Can you conceive of any military ap pleations of your work?

Carrier Those west is certainly to an encourse of the second seco

Ormy: Might your SQUID have any military applications?

Cabreat: A SQUID is basically a magnetomreter. And this particular SQUID is probably the most aeristavi DC magnetometer that a been coexisted: We can cleact field charces.



Onvy Do you have any moral qualms about doing weapons research?

Chemic No have to share part control to the share of the share of the share part of the share of



BLUE MOON" by David Archur, 33N' og lidere 787 pår 50 Anste predit SPECIAL OMNI OFFER \$275.00 Ditty ropen føre N 1941 Ditty ropen føre N 1941







The original painting is done revenue on production and using a host like detectors have needed, and using a host like detectors have votil trends could be progreed Needly events into life. The could are surpling parents checks and fillow probability. The timing the new brees processed using the line of the surplice transmission of the line of the surplice states and the probability of the surplice of the surplice as a limited collines graphic, surpliced and and these details.





799 Brach St., San Francisco, CA 94399, 435 / 845-896 Stepong to taken CO D. Columns readers: system. The nuclear buildup is just a disaster wailing to happen

ONW How have you coped with the knowodge that if your aginting is confirmed, you will almost certainly necesive a Nobol Prica? Cableag, Ethiliard to actually think about the prize or make it real

Gives Within moviewe you to do cyhaod? Cabres, Bichin you have and grandfreiden were trippicate. I have to back in a larger enternative strength and the strength and the strength and do the strength and the strength and the working and helpitore and regioner motils, and clock interestical in helpitore and regioners. And that is welly will constraints in the strength and the strength and the helpitore of the strength and the strength and helpitore. And that is welly will constraints and the strength and the strength and the helpitore. Werk in any source for back childs and the strength and the strength and the physics or work in any source for back childs and constraints. The strength and the strength and constraints. Datawas that it have an somethy the informative try more thanks and the strength and the stre

Ormal So physics is in some ways your red ular religion

 your decisions about what here of investpation to posterie in your research. In this spoolal but very maximplui series you must make a scientific loag of fath.

Other Down't corretines seen scree to owe your fame to a sighting that will remain a question mark as messivo as a monopole until it monives an inunciaci continuation?

Gebrean Farma or inflative—crimic or the other that surroutly requested in the replaced have been mighty arraywalar. In this side the opposition of the second second second second second pot of the minimized and second secon

Otoxi: Has the fact that all the tame hit you while you were thill guile young made any diffusition? Has the visitint notorioty lod to any recomment or other problems, with set more researchers. For example?

Gabrers Well, actually I had an extremely positive reaction from the people in the do perturent. During the first weaks after the event, the most opublics were Polic Bloch onto: recordly diald and Blub Hotstacter. These previous Noble Price winning, where is important winning is calculated to be used. The previous Noble Price Winning and the previous tom the worknewmonth is in placed as the price of the pri

Converse: That amend a year ago last two formals Day I was estimated by too the Juan domain Day I was estimated by the Day lawy ket pretty strong about 1 how teny own of But oa a lawy sent in the southerment of common grant trait event has defined trains about the Day of a processing and the trains a billing the minimum sent in the souther with a billing to provide of processing and the sentence of the souther based on the sentence of the souther based on the sentence of the souther based on the sentence of the sentence of the doubted the trait based on the sentence of the sentence of the sentence of the doubted test based on the sentence of the doubted test based on the sentence of the senten





SPACE PHONES

CONTINUED FROM PAGE 104

idea whether privone actually received it.

Like Drefers work and the Correll study. Usebank most sector has been approximate and manufactures and consider and approximate and the constraints and the study of the study of the behavior constraints and the study of the the constraints and the study of the the constraints and the speed of sight lists, and the the the study of the study of the the study of the study of the the study of st

They are called noutrinos. Physicial Wollgaing Plau, producting their electence in the early Throas, they were needed, he laad, to preserve the law of conservation of energy in autainome processes.

Researchers immediately began loaking writem Although not everywre agreed falla loach oddi parthalas extende wwer the elegtos were foscinaled by the possibility that have might According to Paul, the restrohalt no hat make—some ghyacitis now be lewent might new a very strip come—and that no charge. Alt that is left is a spin and the orenge of mitodon

¹ Most important, hough to that ordinary matter haldly allwais it. Dompare it with a metchan for example. On average, at matter will inseet innegh only a loot or so of water before being adopted by an intern of hydrogen or ongen. A typical neutrino would pase through 1.6 000 right-years of water it would performe a littlight-year through isold weat.

Physically interapped to detect the mathem in 105 Let even body, the parable roman in Blai more than an engrade moveour the second second second second second daring the masses of the backs at a body daring the masses of the backs at a body daring the masses of the backs at a body daring the masses of the backs at a body mathematical second second second second and the second second second second and second of memory but these hours a subtematives at the the second approximation second seco

We fine date of non-intro-based displayed one an intrary barry barry manually. Since radio an intrary barry barry manually and the second Determine Department would like to use nontrong to barry with Determine and a group Preside by Robert William. (Excepting disedention of the second second second second preside the second s

Using neutrino transmitters to help E.T. call.

home is all the limit of locky's exchraiging Scentilist can certainly create a neutrino beam if need by they could also pulse it to send messages in a Marso-like code. The sense would pase sativy horugin the center of the gaining unsiltednei by the duet counts, robules, size, and calanats i not on the we

The instantier would be expensive, but the prototype of any davice is repersive. The restmonradio could well be built early in the next century, if not scener, meking it a strong candidate for intervalue communications.

Where it comes to taking to the stars, the orient to string that adjustment particular to even to string the adjustment particular that and we could be poster the transmission or even to string up, collections and/orient that and transmission to transmiss them, consider that and transmission transmission them, consider that the transmission transmission that the besteader. Otherwise that the besteader to consider that the besteader to the constant and them them framelatemetation to provide the them that the transmission to the to be the trade term of the trade term of the trade term them framelatemetation to the to be the trade term of the trade term them the term the term term the term term the term ter

Inseries a Banh, work is detend and depode interteliate Transmissions began with Yown Disales Propert Qama in 1980 in mail heat opponied several for outstatemental intelligence Drake Loss the Bill foot table tranopponied General Dark West Veryma Roy 200 Doutst over these membra, he tablewed to the opponied Centre Dark West Veryma Roy 200 Doutst over these membra, he tablewed to the Could real most

The average has corrected intermittent, even areas back to long carrier on the even areas back to long carrier on the Ar which is the memory possible to the Ar which is the memory possible to the long the long to the second second second second second second to least the day A signal analysis counter the location of the second second second second second second the second second second second second the second seco

For the protect, SE11 research—the search of values operating in existence—a a small first According to one elements, the values of the search of the search

TOOTH FAIRY

tooth was waiting for me under the prilow. hand-carved for my mouth I left a peo-

"What happened then Salk?"

She frowned. Tim not sure I stayed in that because for a where There were boys haid things, solt things, a book on the colfee table I got down on my hands and kness I remember chewing on the log of grawing on it the tasks of the olue, the God, I was prowing " She paused long steps and ran to the window I flaw out litew

In the aligners tearing them up dood

no strance steps. But she said it too

at all to chew on 1 just have to get out of tha place Please

professional when what I really wanted to

Ohoy' are say "Here a strong to the

up Saly sturroed rep her chart and closed same time, with a bettery of psychological

But she didn't knop the date. When I got coco managed to find a window that was caught on the edge of the rusty trame. I

I picked up the briefcase with the Boract lend if would have encoded Safy's seased melerences) and the arrole geo metric shapes that if copied incorrectly, never see her agam insver be able to tell

were dead as if somebody had shufled

and no bers, grates, or terres nets. I ward

We get it she dich thook capable of much dangerous activity i led her through a

again i had to get out and i get out. That is

it held. To hell with it, I decided 'Then what

She was lading again, she was losing it Lacueshed her froues. Then whit Sally?

She took a deep breath with a little

yery slowly and then he looked like any the pairs of test and Land. They nothing to give you and he said. Yes you do

She was tinished. She wasn't alread to

do you Sally?

"No Licking seems like a century app

Libourit about pettres moded with a over With Sally 1 loosened my

"Corre at on my lap." I sed DO





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BREAKTHROUGHS

bles available for all kinds of users. Creven

tents to portable dialysis machines. He aging to protect air-sensitive products Bongventures busy for years to come-

shops or even dance clube-where the verwor is and as likely to watch the image (\$320 from Sony Corporation Kea Stenaction West Tokyo, 141 Japan I

veres are armor-plated rooms built into of-

Response of Battello Memorial losttate, collect samples at hazarcicus-waste nels (liettelle Columbus Laboratories 505 King Avenue, Columbus OH 43201 [DO EINSTEIN

always the same. Far leaver are falling to Earth than theory predicts. In other words," Dehrail says: The usual tentbook account of why the stars thine may be word."

Bahcail and coloague have leep into the theoretical world with an idea for a new coperment. Perchistophylene the explanes, absorbs only high-energy resultions, the kind produced by the secondary machines. But another substance, gallium, can detect lower energy mailtimes granulated by the naal taing of two protons, the primary resotion takeng book within the sin.

If galaxies and up absorbing the perdicted number of particles in works mean their current measuring sections, and then one nuclences from the sub. The could then conclude that scientifies conducting the perchicoeffyiere experiment had not ancountered measuring productions—and that ther experiment reflects the actual condtors in the sub.

In that instance Bahcal explains, wild be forced to tevise outrent freenes about the surs weendary mactions. Wild have to go back to the drawing board and come up with new ideas

Their's obay of occurse because at the inanular, corning up with ideas in the business at hand. And it behaal test the pace, most of its youngap probable auch fair behind One young scientist in the fixed and their clean hands MS insolution is particle physical Tom Barks. Born and reads in thorislan Tow Kots, Barks is a ringer for the late activation scient Analy Kardman.

From Read College in Oregon Banks work on to that great shrine for American physicians MT and twich Starfold Linvarisity's Linear Accelerator Center where the did work in granty Tessy i this specially is grantien gravity, but he steps ando now and fron to wondow whother quantum theory, with all for wondows, maky makes any some

Duration mechanics associates the balance of the substance works poders are unwerter total is both tability and tabase. While comprocesses of the unionism are processory of the processes of the unionism are processory of the upprovided table on them without going through the space in between they travel asseming moments memory without going through the space in between they travel asseming moments memory without going through the space in between they travel asseming in moments. How you of the assemblant how in the foreignt and as the assemblant how in the foreignt how and the assemblant how in the foreignt and as the

Ensisten was one of the last physicist to one agreen the increatively reliable that quartum monthenes was merely an approxmation and that if soome obvied a title owner, it would that other vanishis that would matig man to dospote the unweste owner. Most physicist said Einstein was wong The gapta man had become too anteocheol to accept new vides they said, and despite the events the fastional an unconscious need to maintain a mechanistic concept of the natural world

If etcre projected disagree with Tenters, trough, Ballest and Ten says, Determined the trough and the tenter of the way particle meera media with an off the way particle meera media with an off the way particle the used-mentally register of the tent of the stays—tent particle with the tent of the stays—tent particle means the well that could be an off the state of the state because the tent works on a gross scale wells the aid to action the metal-works because the tent works on a gross scale beat leafters granten metal-mendally if had to this of the spatial-metal-metalsand. If stays the sole to do if

Banks is not saying that we don't under stand ousn'hum technics as althoury. We understand hit mechanics as althoury we would understand who wunderstand the rule. Banks says "But I don't believe would understand what he boar unios mean tas like itemming the rules for some video game where what he pages on the cateen

The dress is casual flanned shirts, sweaters, lots of khain pants and corduroys. They might look Me a bunch of grad students, but every one is a Ph D They are the institute astrophysicists ?

ant what hisppers in the teal world. You have video-gams locket ships staying interd when they create and you can be also and play he game to that you well but you coust invier apply those rules to your experience of the real world.

Through the human much can taking the world's deep shources. Banks adds methematics cain capture is researce at the sol, despet is used of phanemonic Why is a titled math; a discipline investigat for measuring atoms. This wearcas to the complex way the world versio? Why does instantances banks as at inc. It about there is no summarized banks as at inc. It about there is no summarized banks as at inc. It about there is no summarized taking the solution way."

Barris is the openiesential MS scientist, thinking at the highest levels about theory and the world it's supposed to mirror. Whenas other indiate theoretis tent to have computers in their offices. Barris doesn't He doesn't swin have a hypewriter.

"My primary work is done just straing and thinking," he says. "If have an clear and if think it's going somepliace. If start writing equators on a proce of paper. Then I go and task to somebody about I. Ther's the great thing about working at the institute These are the very finest people here to bounce your ideas off

That leads me to the ultimate question With all these young Turks churring out their best work at a frankic pace is here another Einstein in the wing?

Lask around. People know what I mean

"Noucl better are Stephen Wolfram" astronomer Lindia Sparke says

A particle physicist says. I don't know if hall another Einstein, but Wolfram's like five smart beople.

Puting the matter as politely as he can Bahcal tala ma, 1 m not sure that you and Stephen Walkam will be well matched He's marky very technica."

So I go to see Wolfnam

The white kilds white kilds. Bighten Wolfkom, is hearts-bysic the series sign Einstein was in 1955, the "imitable paper's childs white the work has exceeded to be a series of the the work has exceeded to be a series of the unprecessed and the series of the series of the com all completements. It was someone while the white and the about his state-bid grant for a benefits, the no strings all state-bid grant for a the tensor of the scheder.

The essentially a physicast, Wolfham says in the Brinsh accent, "a theorizoid physicael by trade it too happens that I attrict clong theoretical physics rather early I guess I wrote a occupie of pagers while I was all in high school."

Lask how old he was when his first paper was published.

"Titben, he says embarrassed. But it want very estanding. Its about exmentary-particle physics. I think it's really lousy I don't even have a copy of it anymore."

How about his noti article? "On, that was written much litter," his says, "when I was senteen. Still, if it not very exciting. "He rummages advanced in some bases looking for a copy. Finally the corres up with one and hands it for en Published in *Machine Physics*. In 1976, if it itied. "Neutral Wesk Horachoes In Particia Decement."

I wonder what it must have been late growing up in Britan and wring popers on patcha prywas meteor of physing choice 1 don't mis i waa that wand a lido 'to says, lauphing. 'And I dd play cickat, although I was never very good at it in fact likemod the beet positions on the Seid so that locad mere a bonk during the match.

Yo /w cot sternis

"Sure Thad to play onciset "Wolkam says "I wouldn't have played it by choice."

"What kind of books were you reading at the time?" I ask him

Weatever I was interested in Tiended to be interested in physics, so mostly I read books on physics

Why I ask him, was he into physics at such an early age?

"Well, it wasn't all that early" he says " dich't really get all that menosled in physics until I was about ten or twelve "

Wolfram attended Eton and Oxford in Brit-

an then Califect in the Unset States He hand hern all 1 had the good forum even to have to go to disasse or anything like het because likerned what i needed to know from books. From everything I we som, courses are just a waste of time, and ore can leerhifted things a bit more quacky pat by reading about them?

Despite his cleake of softcol though the ded pair Califiesh as a factury member and had soon developed his own computer langages "to help me do some calculateries in theoretical physics," he says "It turned out that the language has proty wide applicators in engineering and ac on and well." gases it's new being sold by a computer compare that landto?

The computer languings which he nerred SMP—Symbolic Manpulation Program contrardite applications are write numbers. Walk computer languages can memputer and numbers. Catelor Gamodi Intel it owned the language. Wolfsam tello million in the second at a lot of them any fanguso about two years ago Louit. That's when it owner here?

Mofam susing he time at the missions work on a policient metalized mechanism. Taxanaba (In the problem) has compare the second (In the problem) has a second to the second second second second and the second second second second in the course of time (the second second in the second second sec

Wohmen is model consults of a list of simple rules that can be conveniently instemented in a compare hyperating that begin with an array or line of dots he coplants. Each list has a win of presentable cohere high rules at being applied over and over again until a contraction contained influence exolver.

I might even be able to show you. Well karn says, harring to one of his three com puter-display screens.

Waltern says there may be a connection between these order generating mechareams and meetal comounter languages. He hepen in fact, to setablish a "deep connector," between statistical mechanics and arthicial institutement.

The most mind shetching possibility, though, is that Wolfram's program may explan the genetic code "DNA is a very sucont program. In his to both did a coatanheaps". The number of bis Raises to make a pensent's DNA program is alocat equal to the number of bis on the larger old divasabout the length of a medium-see took. So clearly givin the complexity of the inductions theme a very clearer and of programming there

Take a seashell for isoample that mgth ask. How can DNA, possibly contain the code for each a complicated pattern? Well, if the patterns are formed by the lands of simple nules iso boors showing you, then it's peetly wany to insigne DNA generating all sorts of inscale attractures.

And here we have it. The ultimate theory order out of chabil. The expression of mind over matter the grandest poets rendering of the world into a like!

Recently the relative but Moham on testerson on the Table all a committee the terms of the terms to access and an operative term of the terms and the comparison terms are teget here year on their here working, chon tab not be regist upging the preventions packation for the vote a way with citie reaching for the iname regards included in the last rearging data franks exerce DQ

INSTEN 1984

Young Albert Eviden Jagenz has a usas robinsority slow the couldn't tak until he was four due pooply in pervise school, and even (stild has college ensuring each Builden, nor was just Pair New research involut line) the pountial Eviden was brilliant—a variatile pountial Eviden was brilliant—a variatile pountial evident as well.

Einstein in kart war dropp mowel at his age of loss of the whore the Astron guven him a compass. Brockers the metels always tometry any support to the metels always tometry and an and the second second second the whore space was not any approximately at the select of magnetism on other. And the produced the first second to page at whore the select of magnetism on other. And the age learning home when select an an other with the select of the second to be an other at manual and out were of the second

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GAMES

ANYWHEN TO LAMEL (MOLE 102)

2 Oh Callopes and buarcies can be written on alternating lines as

CLIPS and TUNIS

3 Oc 4 Ma

5 Cg. The examples become Yen I able to get her. 'At len dance, and 'Sen il Loan' ' 6 Pp. Seat can lose any one letter to be-

come eat sat set or sea 7 Jn MDCH is 1603 the year of the queen's

death Columbuss voyage was in MCIIXOL or 1482

a 100

10 Sg The Ne in the Date GW Stroggewini the mean of a manuacing of the number latter those, which stood for thi So the correct spoling and promuncation has been twi all the time. There is in a such work as you in the TMM-Monsam/Webbler New Informational Diction any of the Diggeh Calopuige in the TMMthe grant and a such above the grant work of the time of the time of the time of the time. If you are the time of the time of the time, it was an import of To do?

 NI Lettera can be inserted into rap to form Vap. map, samp, or rapt Bet hosts aber bell, beer, and bets

52 HD

 Pu Barbanan and mumprous both have the letter pettern 123123425. Geogol and peoper as both 122123 and Alumnium and molecule are 12342634

M De

15 Do The baby kangaroos are urge val case est rancal and dead respectively

124.7

19. El The lest exemple is maximisestavid ing (M is under 37 and MG). The second translates as Too wise you are too wise you be Tsee you are too wise for me.

IN THREE WORDS IM-****** POSSIBLE

APROW The commonent false hypothe sis was 1 Actually, method 3 was used

SGREW Technique 2 was a popula choice but Gaskey used method 1 DO



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FICTION



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TOMORROWLAND



Philip Jahnson envision: 300-anzy a systempting beening over the high, hashed showed of the newcirculations: Entitle Archaect works to one Newther a system set. The start, to writing the window the a system set. The start, to writing the window the systems are a system set. The start of the start outly and start or system set of the start of the start of the system set. The start of the system set of the system set of the start over through the exclusions, surveying with help from Tables and mark to start part of the start over through the exclusions, surveying with help from Tables are strong the most prostners advinced as its ware are strong the most prostners advinced as its ware there is the strong the strong the start of the strong set of the start over the strong to start or the strong set of the strong these the strong the strong to start or start works as its most the strong the strong to start or start works as its most the start over the strong to start or start works and the strong the start over the strong to start or start works as its most the start over the strong to start or start works as its most the start over the strong to start or start works as its most the start over the strong to start or start works as its most or start of the start over the start the start over the strong to start or start works as its most or start of the start over the start over

NEW COLONIALISM

PLASMA WORLDS



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The effect of t

PREHISTORIC SEA CREATURE?



No, it's very likely alive and well and living in your evelashes! It coses by the fancy name of demo- revelations of the 4th dimension . .

des tolleculorum. It rens in the follicle constructed by a computer. of the human eyelash-and nobody knows where it comes from . . or even why i's there!

Fact is, there are scientific mysteres that surround and contound us les thes surrouge and overy month, there is tractor. Best of all, you and your one mapazine that unveis them in a tractor. Best of all, you and your one mapazine that unveis them in a tractor ency it all because if a way that makes the whole world of science come alun. Sonoce 84.

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PHENOMENA

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GAMES

By Scot Morris

One consequence of the information origin

Next of us know the definition of acronym

- ____ alternade
- beheadment.
- charitable word

- eye word

- _ isomorph
- _ Janus word

- __ pangram

26 letters of the alphabet, ideely recreating

C. Dividing a word: without changing the somartically related to the original

G. A word whose letters appear in sight-

H A word that contains no repeated

hears spoken and that usually appears

J A statement whose initial letters can

N A word that becomes a different word

word Also called traves

as indicated by frumbers

Q. The writing of a word on two alternate

R A word that can lose any of its lefters

aditors or printer serior and therefore

b postreursipo, ambideutrously, and

1 ronparel quey checker cognoscore

1 Jackdaws love my big sphyrix of

k living death, destining advace. The Lonety Crowd, Led Zeppein, Quet Rep

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in The death of Queen Bigabeth I. "My day closed is in immortality" "Made certain

a socialize success has more

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- u berbasen-mumurous, googoi-

___ robus



Petraph a Colo bottle-- each end of the

of them is correct-which one is it?

to produce the apparent paradox. "If you ce

2 He heated the plans around the tries.

pass through the holes, showed the prov-

SCREW OF 170 theones sort in to explain Inter Torn Cashey of Decistur Michagen

2 The screw & in two parts with a spring screw are pressed together to fit through the

and then melled back we position once the

5 The photograph is an optical fluence

"Billims, was if you or your brother who

Pewerend Spooner

The Memoirs of an Amnasad -title by Enc Sale

"If I've done anything I'm sorry for, I'm will no to be foroward Edward N. Western

"The best cure for recommands to not a lot of

-W C Fields

There is one difference between a madman

-Salvader Dal

"If people don't want to come, no one's stopping them

"How Can / Max You If You Won't Do Away?"

11 You Won't Leave Me Alcols, (1 Find. -song hite (Delbert and Glan)

-Douglas Holsterter

Helen Vessler

Our quiz the month on word words has from the Greek owys, "sharp' and mores

pleasel to Only Competition #34, 1985 postmarked no later than October 15, 1964 of Cronx, none will be returned DO



NORD

Bý Miko Wilkins

Upan clearing them, we discovered
something that
hit wa like a ton of beloka
Triey were in fact
monstrously large stone
replicas of masal-spray bottles.

Decoderating them, we descripted servering of the flag plant balance to the detecting of servery set titles. And the settings of servery set titles, and the settings of servery settings, and the settings of servery flags. And the settings of servery flags and settings of the setting setting of a servery set in the setting setting setting of the model, the setting setting setting period setting setting setting a setting period setting setting setting and the period setting setting setting and the setting setting setting setting and the period setting setting

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An integrapping labor to my strand social laboratorial of comparison and social control laboratorial of comparison and social control laboratorial of comparison and social social control in the social of the social social control in the social of social social control in the social control social an extraining more state-long Division developming built werpoinweek term for the air Quenching patiently migraphically for a control from the Quenching development of the Control of the state-state of the Control for the Control of the state-state of the Control for the Control for an extra state of the Control for the Control for the state-state of the Control for the Control for the state-state of the Control for the Control ability on the Control for the Control for the Control for the Interference for the Control for the Control for the Interference for the Control for the Control for the Interference for the Control for the Control for the Control for the Interference for the Control for

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