WHY ROBERTA. HEINLEN OWES HIS LIFE TO APOLLO

MICROWORLDS: A NEW LOOK AT INNER SPACE

> MILGRAM ANO HIS CYRANOIO: GOOOBYE TO PAVLOV AND FREUO

GOROON COOPER ON SOVIET DOMINATION OF SPACE, NASA'S IMPOTENCE, AND UFOs

REVOLUTION IN BIOTECHNOLOGY: NEW LIFE FOR SALE



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 The new technology of communications cannot, by itself, alter the public's perception of science The medium's not antirely the message ?

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Adapted from a link goen by Ben Bose on Jenswy 5 (1990, et the AAAS's across) meeting in San Prancision









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Herowined scence-totion writer Acbert A Hartheri assimilier te many applications of space technology for the handloopped and the aged in "Spirol" (logge 52), based on teatmining gran before a congressional panel list year. Herobein exclament these two conducts of the Space Age that have assed thousands of lives -- including his own

Propular televacor personality / Agri Doers or chrosine The Longer Bory Ben Tolf (page 1%) tohis month's belon selectors. There is sysciflave you work wait to mus this rather lengthy execution humor Author technic outdroomen and a sensus student of art. Heritane, ind priscophy. Doens is among the most familiar (pues in the history of the modum. Tweng togged more hour in funct of national TV comerses than any othe individual

John Anthony West has retailored "The Emperation New Clothes' (page 56) West a when of barrierli popular nowile and has had shorter works in Allentic Monthly Reliasy and Science Fiction and New World Weing

One of this month's picchiels focuses on humanismits insatisfue apports for exploration. Through last-anting science futtor cover at we decover that main is conjugated of the unknown and this encounters with all an and insate works, are actually a metsphorific exploring the minit and the minit's potential. Catch "Star Selevers" (cours \$2).

Earth columnat Kenneth Broker asiss Who I Stop the Rain? (page 16), and Merrin J. PK pondon the practical applications of teleparties communication for the assume Law Word (pages 146) Imagine tailwing to the IRS, Pits writes, and trying not to think of that costicled experime account? (20)



EDITOR L

Anter in Ch. 1 Bob Galcon, Sulvers, Falls Entrover Wan pro Salver J. Science Domain Serie Editors Des Teus Soot Minis, Des Inder Description Hast Salver Martine

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COMMUNIC/ATIONS

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(Depertop) 1979) is they represent

While most scientific analysis seems to KONONE THESE OF INCOMPANY IN THE PARTY IN cosat advances in the future will be in understanding relationships, gamer than inthe description of substances or events "

Your interview sheds some light on the potential benefits derived from moon philosophical inquiry with scientific. armiyan

Seven Thomson

Neclected Rat?

Post way a fire article I can I beleve however that the jeft out the rat as one of the world's survivors. The rail can live on studying, just about privates. Lan sure

Rev C Dudgeon Bundon Man Canoria

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Quark Quark

quarks together 11 gured out years ago that what notice three quarks together is a freed to know don't on to Nobel la voetes

Calin Gleer Collina

I sather from a comment in Continuum that the must of these being no meaning to the word guark is still current So, herein, a definition of quark

A guark is a kind of coarse optiage chatter, which one can buy in Germany unantermonal joke here -- a joke on modern universe is made out of oottobe cheese. Wity pol? The moon is made of orego

Chris Greet Savone, B.C. Canada

Light Dame.

Your commission of Dr. Jason D'Amonaut December 1979) produced a fine travel two questions for him, however, regarding

First, what causes light in that violaty to slowly than elsewhere? Second, why did the Heaperapportane spend so much time to bring the light back to proper speed? It speed of light with less difficulty than we would intrautier nizewhere where lints travels at its normal speed

Richard Tencend

Dr. Of Argonaus reports that the physical propercial different from our own The Hernaroggorians memoring are polonists from a cluster's solar system who found that the slow moving elem bold they are unwiding to aveau. - Ed.

Dr. Carl Sasterit (November 1979) disasters as 'rather way out." Not so it is well known that tards, mammals, and exploration of nonhuman sensory systems As for humans, it is known that lear and

In which the moders, address and, newspendents decises types arising out

of Dmm and theories and speculation of general interest an brought forth. The interest published are not necessarily those of the solders: Letters for publication should be mailed to Dmm Finuer, Ceres Magenere, 309 Third Avenue, New York, NY 4002

Synchronized Events

On a securitive to Operous, I purchased a copy of an Arthur Keaster movel Devinees at Near Usen returning to Jordini - I board another Kooster boar, The Aoster of Cahnolance, on my boakheft in it was supposed to the Care of Cahng a boak Synchronopy discussed at great inclusing window Nasulal, attain reading inclusing surfaced the societies in Jung's window Nasulal, attain reading thought of the combined the societies in Jung's window Nasulal, attain reading to opy of the Genember (1999) Drivi

What availed me inside? The Life column Typichronicity, written by Bernard Doon I reed for the find free in as many days about the basets free jun Jung's window 50 sme and space mean rothing in this increases ichain of events? I don't arrow what find means builtheeb's toporto dim window

> Sebastien Foti U.S. Embasoy Ammen, Jordan

Gunea Pips

Programming the analysis of human experimentation (1% That Others Way Live." December 1979) public resistance to invitro (i.e. tool-Julie baby) research comes in part because hold by research comes in part because hold by research solution have absolutely nothing to say about it and because of the preplanned diathruction of this developing Table."

Losse Brown wild born sive and well, built is reported that 60 other balans were created and destroyed This may become the general rule it ties -buse expenmentation for womb branshar. Create many babas and destroy all but the superior mes.

Dr. Pierre Soupart has requested about \$400,000 to create 450 human lives in all such research not involving embryo transfer to the womb of a woman. The only possible outcome for these lives in the laboratory is death at the hands of the solientsit, who makes the deceers

In August 1979 it was reported that HEW was funding based on its which human sperm is used to fettike handler aggs per distant human own would be fetblized in the lab by the sperm of ganiles, chimpercoles, and overguters nobuginate and obforcer experiments

All human life is second and should be protected, and its digrety should be , upheld even from the very moment of conception.

Kathleen Sommers Custer, We

All assemble processes and a number of approximations to help and approximation of the spectra status of the second status of the spectra status of the second status of the spectra status of the second status conception by moreal material use man definition of the second status and second status of the second status and second status of the second status and percent of the little schedule and status and second second status and address for the schedule and schedule and schedules and scheduleschedules and schedules and schedules and

It does not reasoure me to know that the office of human experimentation are being worthed over by somewine like Arthur Kapien, especially because he is someone who warts to coarse people into participating in such middle lappermetric authole described in your December 1979 issue

Actually you can get people to engage in medical experiments the same way you get propie to participate in any historicous occupation. Offer them enough money to make the tax worthwhin.

Tarias Wolansky Theils, N.Y

Aquaculture Systems

In response to your Continuum at tacks on catlish (November 1979). I must point out an error Dafish do not eat apper. They are carmivorous and act small fish and rear blocks.

The loss of againstitutes, however is a good alternative of wasdownia treatment and canses, as you impled substantial manates of means (in a losent EM neoritis was indicated that aquable the construction course also do downey on the construction course and additional the construction course and additional the construction course additional additional additional and additional additional additional additional part of the number of tableon, however, additional them and been used widdy throughout the Uniced States Indicat the EMM additional them and by the formed tableon additional additional

The most exciting system using topacoutre and assgread to wastewater topacoutre and assgread to wastewater training the topacoutre and therapies California I am a consultant to Salar Appagatomics, the conservery find designed and installed the system, and in blockness by set most advanced, mast boohneally septisicarias, and most withorise system of the world most withorise system of the world most

Chris Alsten, Ph.D. Applied Aquatic Resources Institute Sen Francisco, Calif.

Shart Damond replace 1. Not out a step or have in the body chain, ablocych w result as the same. The calation body the notiverse freeched densitis. As you particul out, the needed densitis. As you particul out, the process data of when important results bibliomane to supplement insults from the same of results of supplement insults. The members of an expected in the members and the same of an expected in the other same an expected in the members of an expected in the members of

Evasive Moths

In response to John McCown's 'Party Bakel Gaa' (Corroatinn, November 1978), core innects have developed a way to detect a bat's conar it would be possible, therefore to design an intext possible, therefore to design an intext application theory at lead baked on the upperflaming the design and the second second contraus conveging

14 CMN

WHO'LL STOP THE RAIN?

EARTH

By Kenneth Brower

Creatures his own tacuas. and the streams, soil, and sin is also poisoning his metaphors

"The gaably of mency is not strained." wrote Shakespease. "It dropperts as the gentle rain from heaven/Upon the place boneath. It is twois blassed.

The tree is no good anymore. Nece scened it might the amended, four carfund later in Shakespeans a native fand Cursoff hit by stulture acid second by mho application. The tax in Greet Britem to or forgare paties, a variaterm that adapped Sociation (1974 had a pH of 2 4 -- as address any start frain acid patient formations on leaf surfaces and it who is formations on leaf surfaces.

"He shall come unto us as the ran," predicts Hosea 6.2

Let a hope His doresn't come that way The ninin nowaciays is failing wanthstry it is filling sathward fabres in Nowaeg an atmants in Astronolock lakes and in the inversion Clanada's Maritime Intervention for leaching toxic metals forem the soit and from wither papers than depositing them in our driving water. It is hurring our eastern forests: flocagh no one yet show how backy if them has even been a likely, portent of Judgmant Day if is in name change from sweet to bitter Perhaps that is what Hease meant

No hindred years ago ran was a hardin sekit bulkon. We know to tem studies of an and snow presented in years and the second hindra could hold be burged and the northwatem kinet ather second entropy and and are shardly bacomagmons to The changes do a more entropy to us accelerating combuston of logic fuels. Sincke planes from coal burge power plants are foretion coal burge power plants are foretion coal burge power plants are forethe acceleration of the second burget to the acceleration of descend in non-

Satellite photographs have shown Americana on the East Coast the extern of their problem a pail of stroke reaching from the Carolinas to Nova Social. The pail mispecial no boundaries. There milton



The high elevations that once clarified isourcein air pow sorbity the mountain rain 15 Owns

Less of spillar kitskelf from the United Statistist tills on existenti Canada annually The world of fills on O Maria. Online complexists burn to loss burth (an that province) in thit time, sends its own pullar discrete allow daws, such The great coopenendminicate smolther at Subtury Olivers sends and Subtury. The initial discrete size daws, such The great superstatist, it percent of all the initial discrete size of subtury. In shift a daws production have regulated the natival production have regulated the natival

Taif allaciat the it the one at Suddauy and part of the poolent "iterry-two youns ago citry two stacks were taifed than this meters. Now, more than 55 stacks are taken than 300 meters. The stoo has been to '' metabasi ibad jointon (and the value of the concertration of booles must the ground, when the regulatory agortous moths ther the poolson are carried higher and are uppercediment.

President Carter in a message to Corgress last August, spoke of the dampers of socid precipitation. He attracticad a fan-year program to study the phenomenon and sug pessed a \$10 million budget for the instrument.

This share built comes as a measure in the term starter that an exposed to have that are parating for teachers and any starter parating for teachers and the starter and the agent scatalisment as the parating does the years for teachers and the starter and the teachers and the starter and starter and the starter and

"What have they done to the rain?" a song saked not long ago

The songwriter was thinking of indisactive follow which has since withhed from our skees, but the question once again is a good one CO

POTENT PLASMIDS.



By Dr Bernard Dixon

noel existed to a chamcell property that test expediation as a local mesanes. The pottern made annex: which are smoog the most made annex: which are smoog the most made meres. Which are smooth made to a similar that are the upper task was to appress the constraining and a three emission liquid effuent. Since chemical husbrane was be opperiors the two kit libection movied in wells to as bacteria as microbiol scoreingents to different that of finance action.

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In the list experiment bacters

emerged from the teeming its in the soll and broke down the noncus amine. Growing on this bitaine locd, the bacteria had begun to provinsiate and to establish themserves on the obase bends.

Hese recently infinitional of the earliest of interchail version of the earliest a logorithm the Lineventy of Queentinter, Austines, excenting Sections that care desitivg pathodes: We have securition to desite the section of the earliest become the section of the security of what is there is the charan gate in the section of the section makes the logorithm become mean report the charans the section of the charans the section

What makes the story avan man interesting as that because one them score or grant and the store of the store participation of DNA, which can be transferred from one organism to others. Very smiller phomote conclusion on other meniaces of modern merkone, because they allow technad basis and other interesting germa to the art stack by antibiotics. Writing at the Gaard at second factor

(Hell & J. 2020) [21-John Penniseron disacrises the databaset plan of the Australian colleagues instaul or La Microbial 24.0 Calined Alexappene predictors. If the hird backstram to be found that contains a plasm of this calina microbial 24.0 Calined Alexappene predictors. If the use agreed on of a periodic When 24.0 Faculty and microtabaset factor and evaluation and speed in the backmap population provid polition by this subthereo.

Allow events again software mends ideges, Dr.J. 5. Weed, from the University of Califer bury, have advant with the responsible torcontains planned mends the responsible tortext and the software advantage of the software the data suggest the cost work of data with both the data suggest the cost work of data with both the data suggest the cost work of data with both the data suggest the cost work of data with the suggest free of percentage software advantages of parameters and the software advantages of the software they are weeded, using strengt free of balance they are weeded, using strengt free of the software they are weeded, using strengt free of the software they are weeded to access at a work free of the software they are weeded.

Now that we know how bactered scowing and an implicated, poweral possibilities occur for their talents to be supforted more fully. Genetic anginaers may be able to introduce postradedigitating plasmada inte microkeet their darn incomely carry them. Likewise, their is a prospect of making beckers brack down not only 24-0 but allow 24 6-1.

The most integrary service, thread, the most integrary service, the provide service integration of the provide service to be provided and a measure or in methors and the provided service to the both to an immy as term — a there is consequence of the carrying approximate both to an immy as term — a there is the service of the provided service to the maintained to provide service the constrained of the service service and the service service service infinitive preferable to constrain of there services and infinitive preferable to constrained infinitive preferable to constrained



In the laberalizy assertate study rescribes that like to devour a nasty poliutant - perioddes

MADE IN SPACE

SPACE

By Mark R. Chartrand III

avery you ever this to pound it nell or lift in heavy object underwater? Some prospective engineers and factory workers are new doing year thial, triaming to carry out similar tasks in a new inclusity a law hundred miles from your home— straight up?

Right room hwater furth as done as a done as conditions of space Water adds a daig on room to a simulating the water in space room and the second for document in space commonly confused on Spath, can be spathed in a water family. In grade, objects both synchrodient and the spathed in a water family and part have seening to grad spathed in Sharing thready can't filters your way! I only all heads the start filters your way! I only all heads and make energy to sharing the heads and the wood way! I only all heads and the wood way! I only all heads and the spathed in the head on heads on the head on the heads and the head on the heads and the head on the heads and the heads and the heads and the heads and head heads and head heads and head

Working in space is different. You must cope with the cleadyantages of no atmosphere in grawy no temperature Conversely threa sin the advances page of maatmosphere, no gravy and no tempositani visu tawa achieve Many industral processes on Earth are certred out march evaluant. Much dening page into pag gelong it of these in Maturemay antheaks, but here for the substratemay antheaks, but here for the substratemay protory good vacuum. Non-need to waste

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With no gravity you can produce things without using containers. A tog problem in



Shuffer-based construction workers could build the Instructure power plant in space before 1980 20 GMN growing superprise systals for semiconductors and in discorp? them well process executive of known impurities to which the special properties in to known the alloys inter barry contamission by the alloys inter barry contamission of an exec. A non-third barry discorpt on a discorpt and the supervised in motion — I mean metabolic and providing which will result the set of providing which will result to produce in minimum and presents and produce in minimum presents and presents these in the supervised barry minimum presents and presents these in the supervised barry minimum present the supervised barry minimum presents and presents these in the supervised barry minimum presents and presents these in the supervised barry minimum presents and presents these in the supervised barry minimum present the supervised barry minimum presents and presents these in the supervised barry minimum presents and presents the supervised barry minimum presents and minimum presents

However if you want some gravity you can semulate it with a centrifuge and vory it to order 'bu can tarfor-make your industrial environment

The industrious astronaut will work in a wry difficient anivromeet than this aarthy counterpart. He may be in shirt skeeves in Space/ab – the European-built will fellamental factory and laboratory – while a colleague to "outside." declowing a large anterna.

The such outside work, he well use a minimed menusarian purity doe being developed for NASA by Menn Marines the Continuer Recruity (BBA) The prototype was meanly of developed them it makes = 100 kiograms, Earth weight = 1.056 means appearing on TBB kiograms, space weight = dywell mobile the source engineer to by mobile the source engineer to by mobile development engineer to be mobile development engineer to by mobile development engineer to be mobile de

What tasks?

When estroped is begin to discrete the read of the world, the first products taken home ware floce with a very high value-to weight rate, such as gold and sprices. So it will be with the first sprice industry.

The pictucl with the highest value-to weight natio is information it was important to those early explores and is easi mais important to as. To be useful, however, information must be cormain-pikel

Communication is the most advanced of the space industries so fair. Brought to commute on high test TECHNOLOGY

THE ARTS

By James Delson

Special effects for motion extrains the other served almost all solution to the served almost all solutions to the served almost almost to the served almost almost commonly charged off for the density in test commonly charged off for the density in test all solutions are receipted for all solutions are received for all solutions are re

Since have the sense of the sen

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Sarbar checks liny Buck Rooms Jaman

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We ve adversed cyste a bit from the old days." Sinth said as we watched a commercian equip a complicated said of "movie" at the computer console. We re finding it easies to do the old movies, the onesit suit have atmost become required in hordware lime. This has allowed us to go beyond herdware and try for more depth

12 CM/N

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FILM

THE ARTS

By Jeff Rown

In short the science faction tim is a leech on the good name of its host

Science factor has a power and respontingly ances an interg floating particle. It potrages consistences and cavitations and any may or their and cavitations of other namative borns is restanted to which or was not could need to it, many sciences and other and the available of the sciences of other and the sciences of the sciences of other and sciences and sciences of the Sharape Land or Done to state avective. The problem with coverna scarce of lefton be majority of the occernation is usually the majority of the occernation in a usually depth of conditional and the occernation of the problem operation of the occernation occernation of the occernation of the occernation of the occernation occernation of the occernation of the occernation of the occernation occernati

Historically searcher forcen filmmakers have treated ther harms players as second class enfasts, pawres to further the match status exists was linked. In the games first metar players grant players before a silent downing it but the Noon (1000) that Man inthe Macropist the close up while be performed as the second status in the players been years after Matchines. The hadn't mproved significantly, inflast years hadn't mproved significantly.



The Arre Cose Encounters was a rare blend of pist, character development, and special effects. 36 DMNI

pendad on the Mular monster than on the actors. Even the thiss of science-hoton films generating focus on dynamic dojects and events rather than on people. Sile Wars: Close Encounters of the Thed Kind, The Black Hole, Immission of the Black Snabhars. Star Take

Asia anyone in the mounty to durin accurate comparison of the mounty of durin accurate explosition responses and explosition of the the second accurate accurate the second accurate accurate the second accurate accurate testing accurate tes

In fact this is the incident for draw, and most search of the fact that the been set that. There is not to say had good sciences take them, spacecraft, take beams, and tayler starts, spacecraft, take beams, and have starts Say however all chatched Patent and Sar Yeek have made same and thereal use of these trapping. The key is that they are tapping and expensity not corps around which the rest of the tim hould sumphify secrets like patiential.

These is of ocurse to except the fact that movements is a business. Put of asity our sphercus indigutation at the state of the art producent whose offsets fail to atrace targe numbers of tokin buyes with that is will that is will have could produce with that is will have could produce to with that is will have could produce to ourseled on the fail.



THE ARTS

By Joe Hannan

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Like many of Lucer's precess Alvas on a Cong The Weig Beit Information Investtopsion of assemble principles. Mail composes coale their music by rotating plotes. Hythms and instrumental colors plotes, Hythms and instrumental colors however develops the compositions from research in trocustacs, developments in electronic Including and a contra of the electronic Including and a contra of the physics of sourch He extensions the source regretient of industry to possibles such in income meaning to possibles such in other meaning to possible such in our possible such that is a source of the extension of the source of the source of extension to a source of the source of the internet to an weak of the source of the source extension to be control the lift of comparison of the registry and the source of the source of the registry and the source of the source extension to a source of the source of the comparison of the source of the source of the extension of the source of the source of the source of the registry and the source of the source of the registry and the source of the source extension of the registry and the source of the extension of the registry and the source of the extension of the registry and the source of the extension of the registry and the source of the extension of the registry and the source of the extension of the registry and the source of the extension of the registry and the source of the extension of the registry and the source of the source of the extension of the registry and the source of the source of the extension of the registry and the source of the source of the extension of the registry and the source of the source of the extension of the registry and the source of the source of the extension of the registry and the source of the source of the extension of the registry and the source of the source of the extension of the registry and the source of the source of the source of the extension of the source of the source of the source of the source of the extension of the source of the source of the source of the source of the extension of the source of the so

The except and singent appailable played in Masce on a Long Thm Mere is Lucers own revention: A 50-foot length of last were placet through the poles of a larger magnet and is driven by an occilizer. The visit for the wroare mixed at effect ends, anythere and the detects in selece. What results a motifie tow clance one might expect from a long



Alver Looser. His electroaccoustic Music on a Long Thin Wile played live days normal 30 CMM

statutery we but a compare of leaves from high to low-mocarte of there in chords. Recogning the physical properties of what my strong is user all adjusts the apparatus and positions the missiphone can modily the time court the missiphone of phases. The harmony and the volume in performance by charging the frequency of the associated or the well ad an official and the associated or the well ad an official the associated or the well as the anon flatal the associated or the well as the anon flatal the associated or the well as the anon flatal the associated or the well as the second second the associated or the well as the second second the associated the second second the second the second the sec

KUNN-FM generationed Morse or a Cong The Mere active opering over of of Paribio Parliaments Propert This a dogwald new muscl to brassicate produced with support from the National Information Marks. The brassical sidew control where. Of holescal sidewice of the Marks one cange and subcovered that Marks one cange Tan Wer had water all stopets to matchins accurate sidewice of the Marks on that that success and the Marks matchins accurate sidewice of the Marks on the Marks and Statement. Teamboard Structures, and hybrine of the war.

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THE ARTS

By Damon Knight

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Che all the migd distorting aspects of the plays its setting an imaginary museum which issel is unagenary museum, and at perturp ports the two seem to built oppher / avaid is both museum exhibition opento the public and allheatical performance presented in the same paper

The history of Axolot/ is almost as unbelievable as the play itself. Here are some highlights.

In 1977 Janice Obleman and Calade Belline and wang home from a meeting of the Warren Art Disup in Eupere Despon Theman subject of docussion that day focused on usels in womens and is three a tendency for women to be allowd of working tag? Gelemans a warver folkin a falfar subject in two your more up their mind so refute this what by creating a part workshow for large, imposere works their tengure two years to ready their proved.

Along the way Coloman and logismore begins to think of organizing scores airs of performances to be given with the exhibits ENM the noxide Kale Withams and the NewAme Circuis, a theoter group that has been participant in logisme and the first been participant in the provided of the been participant is the provided of the been participant is the provided of the participant of the provided of the score of the been participant. We also were also been and Coloman were also exhibits. (management of the second second second)

Witholms gray-basilised husbeenslineed that the title must have an unit the motion is carried, and the work is given the rame "Avoid" [a kind of asiamaeder that ordinarially lake and dress in the larval state bit toccasionally metamorphoses into the exist state)

A lung kind of energy bogins to flow from this subjects to the other performers and back again williver include paceal and weters them moto her short. The include start and weters them moto her short. The form The performers improve with the Determine of the queues have the Determine of the queues the the Determine of the queue of the performance there the performance of the performance there the performance of the performance were constrained by the performance and tellbace. The performance appeal also

People at at / volcid skull setsion us a study in I-dan t-give-to-damin postume Ona maiar jatan-high-heating diether boots, a paskly sound i another is in containcy plants is T-shirt, and earth Shoes. still another fostioned with capture



Avointi prevenic invasion by a read colum-

pevelry and beads, is chrising white while here a glass on the init of waich are here actical avert of grun. These are the bohamisms of the Nachmest. They are ded costod inters indifferent or even heating, to the size of mesong money they downter they do bockase they went to and the Sugare community then's that the a often.

Whelm, perhaps because she is obserlish the real, or because she is white haired and not very big is treated by the others with exaggerished orderwroe they move around her as if size might brails or to over lish get if brails or to over lish get if the state of the set is the set of the set of the treats of the over lish get if the treats of the treat set of the treats of the treat set of the treats of the treat set of treat set of the treat set

(We omit a thousand heartbreaking classis—the grant-writing process for instance which eventually results in assistance from the Oregon Arts Council and the National Endowment for the Arts 1

But to Justice 2021 and the Hewdeline Critical ships to observe dig stage in Experimentary and the second stage of and stage therein and the second stage of and stage therein and the second stage of a stage of the second stage

James Aday Sancial Jury seed with them of a theory gamme, just he has not a theory gamme, just he has not help a strain the second second the control of actions in participant of the part of the control the second second second the participant of the second second second second second and has the part of the second the second and has the part of the second the second for the seta of the center has developed in own or the second the second the second for an orthogon the second has a part of the second the second second the second has a second the sec

PHANTOM MOONLET

UFO UPDATE

By James Oberg

Disy 17: 1978 the Nanosel Ensure cannot absence ID Others Earth According to Logical UTO Others Earth According to Logical Angeles atringer Henry Gan sop Resears operates and destinited Ingeneras of a canalist aliven pericentif theosening Gree approach that beam independently withinked by American Balance Repets

Productably, previewend solidite trackets were grack to damy the wasterner of such objects. The public information office at Nach American An Defense Common (WDAD) in Colorado Spinga Common (WDAD) in Colorado Spinga Colorado soliditos. "Anything of that sate at all attractive solid have been portido by our radiat. An Proces listerness Bergsant Michael Berginna declared

Either the Exquerer a staff had not bothered to check with any of the agencies that keep track of satellites or if the shall did check: the results were not included in their amount

The Russians were just as adamant in their claims that the objects def exist as Wostern agencies were that they defind We are convinced that a croppled specestip from another planet is creating Earth - estrophysicist Sergo Bozhich said in Moscow

Viacimir Arheothe added "Thore is absolutely no doubt in my mind that we are dealing with the romains of an aliver path.

The creft was at least soly motors in largth and up to thirty motors in width descard: K sources

A (renderwous) mission should be launched. The benefits for manland could be stupendous, Atelose Zolotov emphasized.

These assistances may asked improvement, but you come from figures quale (armine to Western UTO experts Colore well how no framesion of the Torquise explores in spocedorby theory vaterior and the spoce of the torquise thereing in the spoce of the figures in spoce consists who are thereing Kacentoev is one of the organal answer the shorted in the Naboos Figures in a device of the torquine and list meaning. Kacentoev is one of the organal answer the shorted in the babacia answers of to prove "scientification" of the babacia answers of to prove "scientification" and the babacia



USSM reports mereoive UFOs that inexplicably isstager detection by international skywatchers 95 Oktori

on misinterpretations of visits paid by alienoperatoriaus. Activative has asserted that the Apollo 32 craft was deliberately rapped by UPOs to prevent in from excluding a nuclear bomb on the more

Yet according to Six. The cripple 43-UP clarms are investing a constraint by Dr. John P. Bagby in a scientific paper to write for the Johnson YHB as also if Johnson Integration. When Hergehond Dr. Bagby all this cifles at the Hapters Annother to Calver Dip, California, and asked him about the cripped UFC orang. In english about the cripped UFC orang. In english that hand near beam contacted by Gim- attropic in world have been a local call — or by anyone dise on the respect

Three webs near consistences between the Nature Claim and in only the Dappor inguiting a contrapolitical program by the Claim of Inguestation and the number of groups and hagments independently of ny study. Bagby sent independently of ny study. Bagby sent independently of ny study. Bagby sent independently of ny study is claim claim in Meascese might have concold and have been destined the claim in Meascese might have concold and have been destined in the near the sent study of the might near the sent have been destined in the near the sent study of the near t

Brighty still believes that the objects here opported and wall and have been moding the exist here of 1866 Since the add which range incerto2016 bit 3500 Normal Since Since Since Since Since Alarmetes with an inclination of 42 degrees to the equadar is pronoto large sense the equadar is pronoto large sense the equadar is pronoto large sense.

Wy work levels to make mo discourt the speciality hypothesis. Beging read: Athough other careful tracking organizations and being to discourt the organization and such objects. Beging other word observations in the Linka Status and oversels this could substantiate on the objects estations or manual to subgestion that have an adhy discourses the subgestion that have audien subsections. Det PEOPLE

By Dick Teresi

This is a story about Albert Entition, a scientice teacher named Rodry Reisen and a typical school administration. In is a name story because the science teacher and Britten win, the administration surmotions, and therein a higtory ending.

The ending carrel sky November 15, when the L300 statemet of beam deals when the L300 statemet of beam floated inter Hyb School, in Merm. Floated microbiol statemet from the first interched statemet from the first world's most lamous, and now largest, automit sky interched the statemet statemet the statemet statemet the statemet registrom. There is was, Brasterin E = mol, formation human topbas over a 100-meter from root apple (See photo on page 50.)

It was a thing final to Rocky Reserve format blocks Weie, a celefabraterial Albert Einstein and this Weis work. It seemed arrange to me, seed Reserv. Shermotahis science instructor. "If all the school system has every kind of weak imaginative woogs for what the schools alm really augocal to be about— a meeting of the minds and sharing of block forwall basis. Weak introduces grait minds of the past and makes them fashenable " At week long Resen target the students state thruthen wildowly means, and target the kost helped. They put on a play with hinteen-year-old Timmy Tamile pottaying Enstein, complete with all plans and the socks. To a good plot, "Resen told him," rind ned week was can be Sochies."

Checrosolors yelled, "Albert Enstein's Dynamile! Yell for Einstein, He's All Right!" Other students performed Chain Reaction Disco Danoes. And suddenly Einstein had become a cut hero in southern Flands.

But it ways't every When Morton Reason (fee pot the Rocky inclurance which basing in the Nerme Corps) this proposed Sinati block Wark in www.s sharpy hortoket by the powers that be at Sherrandosh Junior High 1: was toky? - Pleson ask?, To gut footing atrund with Einteien and pel back to seeching societies. "An assessmit persopal worder on his proposal." Net sorthant to differ tokantera e subjerts ?

Then Rocky got a break The assistant principal saw PISS 6 Existent's Universe on tokywaion He was impressed. The next day he extled up to Raisen and said. You know, I never heard of this E-mothting before. "The school board was similarly enlightened about "this E-mothting" and spotwed Great (deal Weak).

To be a sub-scalar and the second sec

And next year's Greet Ideas Week?" Im considering Scatters of Thomas Jatterson, "Reason says," He's also writing a book about his teaching philosophy Tho the? "Tim going to call it Mat Significant to Ether "Reaching or Students"."

When Bodert P. Wieon segred ha developing of Province State of the Sector Laboratory on protein own the lack of the laboratory in protein some state of the sector that accompany in the scale sector of backing at Countries Lineary has accors and of backing at Countries Lineary has accors and the laboratory at Countries Lineary has accors and the sector state of the scale sector the scale sector state of the scale sector the scale sector sector sector sector Laboratory a occelerator. Which neosons Laboratory Laboratory a occelerator with some state at legh-mergy project. New at least one at legh-mergy project. New at least one of the scale sector sector

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Robert R: Wilson' Some teaching: a holping himd for lasterie, and a cell hom an Eastern Institution 35 OMM

CONTINUUM

THERAPEUTIC TYRANINY

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Before securitizing the concept of metrici linear, we must be clear about which we may end we use phild a portion of 6 (and call here a patient). We usedly mean that he is suffering them an abormating of the body and that the is welling to accomposite medical help. Strectly speaking, dasase can allied only the body. The term restrict/arcs is an estaphor "tyring to composite-who have "body metod" in hospitals with charge as like "tyring to people who have "tarky metod" at lixendiss with datagens.

Here the up the integree of metal finites attaining the second se

Today however, if is considered uncellized to inset a period who ack and set if he when not ack. We new "Iccole" that such a period is and the when not ack the new "Iccole" that such a period or to or ophotoge what is really with what is mainten when we send for a CV regarment because we delike the program were to period a TV regarment because we delike the program were no period.

As for the phenomenon of involuntary mental hospitalization, its log times y rests not on the medical model of liness but on the

padatecere The merial patients considered to be a chift with the physicilation and the physical constraints, proteining the midd tweetile physical test of the physical constraints, proteining the midd tweephysical discussion of the physical constraints and the paper to physical constraints of the physical constraints and the physical physical constraints and the physical constraints and the physical physical constraints and the physical constraints and the physical physical constraints and the physical constraints and the physical physical constraints and the physical constraints and the physical physical constraints and the physical constraints and the physical physical constraints and the physical constraints and the physical physical constraints and the physical constraints and the physical physical constraints and the physical constraints and the physical physical constraints and the physical constraints and the physical physical constraints and the physical constraints and the physical physical constraints and the physical constraints and the physical physical constraints and the physical constraints and the physical physical constraints and the physical constraints and the physical physical constraints and the physical constraints an

The error of common service is not leady to add, But what does not there is during the lead with the successful person in its merel? On the homical person-set of there? In a successy deducated to individual treadman and insports 1835; and a province behavior corrino, 1847, lisse of barry. The state the family, and the modical performance most respect themselves to offering frequency behavior target respect themselves to offering frequency and software family and the form doma so

Should people also be free to be a clarget to other? This perform disoperan one we ecogrand that commiss control be divided into two categories those who breek the law because they choose to and these who breek it because that "mental strenge" compete them to do an AL cimrant behavior should be controlled by cimma law, and psychiatrist should be excluded from advancement the law.

The see that the "instrative" percent is hopkedy in the proof an interest that "caused in the origing advancemble behavior to table. Although mension or longing advancemble choose that syngatisms that behaviors is proeffected scatchoose that syngatisms there behaviors is proeffected scatchoose that syngatisms there are also as a second scatchoose that syngatisms the scatter as a second scatter of Celestors, in the his external scatsistics. The mathema is not the many who has been to assort the mathema is not assort to a second scatter of the scatter assort

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CONTINUUM

THE CHEMISTRY OF THRILL SEEKING

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stimulating chemicals if

Low MAC levels are found in younger subjects more altern than in older ones and are more characteristic of



Inter style being anythe his of your recommender for charter with never fight such anticidental? CAM to stave tech awar at both resigna-

others prefer the quist comforts of home?

Unversity of Delwarm psychologiat Marvin Zockerman developed a sensorion-seeleng scalar to ind cut. He docovered that lovds of the enzyme monamme occlasse (MAO) in the body appear to make some poople thirt seelens and offens to breakbod kis

Zucavernan told the Amercon Psychological Association frait htgl-aerolation seatures tand to have low MVO levels Found in the brase and missit offer body tosaus MAO regulates catechigamines which travailar messages from the nervo calls to the brain. Persons with low levels of the have higher keyels of the makes who eshabt a 20 per cent lower level of MAO at every keps Zockarman said "These tesulis are consident with the age and saix differ ences in sensation seeking

His studies also suppread that persons with lowad that persons with lowsobre-inversige amounts of slophor inversigent, and other depresent churgs they lend to use drugs their with supply while a meaning in their nervous system," he next

Other factors, such as socal values levels of provider ing septimenes, and the nearity discovered endorphins, also affect the sensator-seeking built, Zupkerman said Builtle beleved the indencovid. primently determined by "genetically present MAD lovels

"It doesn't tequive 200 much speculation to gabis the adaptive value of ransa tion seeking or the exploratory tendency in human

Currently Zuckerman is

studying the effect of MAD eves and sonsation seeking on mantal stebaty Alian Marine

GROWING BODIES IN SPACE

Artificial collagen sched uted tobe manufactured aboard the space shuttle could sum out to be much before than the organic kind — so good, in fact, that i may sumsh saw material for herean could the

Dolagenisal throos proteinitound in connective taisale bone, and cantilage Antificial collagon could shmatch yonversis makes mart for damagad connois hasterned blood vessels and arignes. Igaments, lendors membranes alen partaps availhoos and materia

We think strong any connective tosse can be repared whooldagen loavs. Kenneth E hughes a research sceared at Baterie Laboratores in Opkin-thus, Ohio, ehoheads the project

on the space shutle rather than in earthbound labe?

Backess of gravity clown here on Earth, the Ibsers in colleger that his been heated in an ecidic solution overlap and bind into an operate gelithit lacks minimular conventionary flat out in space, the model's, the libers would stay shoth during this excention. Inardies to the weight base enimment, and fues into a uniform cohesive subtance with the strength and trans parency suitable for covaring antibiast body parts.

The HV cube-tool projects Distribute hopes to mount in the calgo bay of the pages shuffler with house baintenses a microcompute, an electron microcope, on optable consor and narrow tables filled with collogen 500 bases. A NASA technican is Capp Remondy will set to Capp Remondy will set to Capp Remondy will set to capp Remondy will set making collogen as soon as the physite settles microcol

"The shutfe will give us the time we need to study this process. Hughes says it should take about firity minutes. The collegen should come out perfectly uniform — Robert Brody



Battelle z collegen muking pilyload will nde the space shottle

FLIES COME OUT OF THE CLOSET

Ifs been reported in typesas and humans inourtype abeep and salarmenders Unthecently however trans vestigm had not been known to report architectti.

Fergle ministry in mala scorpen files was hoppened upon by Randy Therinfill, in sect mating specialist at the University of New Mexico, during is an year study of the insects

Organity Toorhifed be served the rightshacus apacels in hopsoof underobtaining moto selection criteria. The lemaks he nood prefers and the large poy offengal invalvise seeps he genetal out of noodward to accessing the motorward constraining the motorward constraints of motorward constrai

Ferniales seen the only onsceeding and humming. Thornhilloand Aharagy males bootkering another male displaying his booty turns tanewelline. Itsels mences leaves behaviorin noter togot a bat meet. The instage copy drough his instage copy drough his instage copy drough his female and draws back his gentals.

When the torseventions successful in facting the feilow fly and in absconding with the prop he then daris off to find hazown willing formáis. The next the he's hungy, though the may not resort to such four play. Alhough all males of this species possess the ability to exhibit than weathern (11) adaptive) the fly's baltowor depends on the stuation Thornhill says





Scorpion by Transversion rejust a ploy for a list/recal

see atomoting bug at divine trise. Thomhill explaints, he il feed on t But, if the mais first encountiers another male with prey (or a cookiet, ing couple with prey), he'll attempt therefalls if

The advantage of being transverthe? A longer, more productive life. Fires save so much time in lood gathering that they sere coordinate more frequently. And they are enposed to feel or postcors soch as the web backing podes, which often captures prove-transmission and for its own other

anapapie of reasoning . Direction who was

INVISIBILITY LESSONS

When the Mahasah Mahaah fog oftened lexitation contest through his Teacontagent (Marchanner (M) shurth, some 60.000 poop) from all over the world enrolled. Shorily thelealiter the disturb relaxed publicity photographs showing the Maharen's a student's bound on boar contentses.

But officels at Waharshi International University in Partiald lowa declined to continue roany wheel her any one, instructors included, had succeeded in actually lensiting declaring this an inversional declaring this an

Floched with that autoesa, takes you warring of intotake investiging of another Socked mappe investiging of the Socked sample investiging of the Socked SS,5000 This time investiging of the SS,5000 This time investiging of the SS,5000 This time investiging of the socked and the SS,5000 This time investiging of the socked and the SS,5000 This time investiging of the socked and the SS,5000 This time investiging of the SS,5000 This time though it claims that electroencephalograph maidings of clauses who have been taught to think very hard about duappearing show definite abnormalities

Next offering on IMailat emissionce lessons, 'know ing all things past present and luture '

Weld low to see the final exam - James Randi

The universe is full of megcal things petiently wating for our with to grow sharper " —Eden Philipoli

The heavers call to you, and circle around your deplaying to you their elemist spilendors: and your eye gazes only to Earth

Nothing puzzles memore han time and space? And is nothing troubles me lets, is I never think about them."



 Midden-correra baptures Mahanetri a andersa in the Hhds! Of & -- Plata
 Averation lensor, A coopt deal of help from fourt Highber (Highberses)

CONTINUUM



has contributed to the progress of science as much as

All the while the frog ways servingman Wassersug teI Contai with previously tash food-the resect-with pesleader, and continuant to eat

leadent or grass freq s

stys, willow be desecting fetal pics instead.

- Toby Estenhage

Delectful hypothesis by an ugly fact

ASTEROIO BOMBS

As many as 100 000 as-



Thomas Hurkey in Emirance scenary

States: Earthquakes caused

An asteroid cataculted board but siso a large area of Western Europe

An asteroid arsenal would alsohere a district advantable over a nuclear one bemay be an attractive canchdate as a stabilizing force.

He uses statistics as a

The closing for safety stands nobic enterprise

- The last words of Spotswivene, 1864

EGYPT/MARS CONNECTION

Placing photographs of the hostele terrain of Mars and of the desolate desert of



Al top Martien rock formation Al bottom Egyptien rocks

southwast Egypt side by side produces guite a surprise. It's herd to sell them apart.

So exmits in fact, are they but scientists from the Smithscrists from the Smithscrists Institution in Weshington, D.C., are studying the remote Egypten region to learn more should the formation of both the borner Marsten terrain and deserts on Earth

The estifibound uses is part of the Safaan near the footners of Egypt, Sudan, und Libys child Jobel Useenat Virtually no rain has talian those to 20 years Like More, shas stermating bands of clark and Light streaks. Dou'de stream heidt, fassureless plana, and otted rocks. The two Recently E-Baz fod a (For-emptor speech for sam on a 1500-mis expection through the Egyphan waterland subgroundler signals as a compass So far the sournas three concluded that the wind plays a much strenger role in shaping landtims both on Euch and and the shaping balawid

The leasanch is considread mportant for period reasons. Frant, although des ains construite of life of leasen, should have they a standing the forces. this formed clears it will enable southost to find the events hotay—and it shour—bed for Third the research may give scenttas a clearor invite state system.

- Stuart Diamond

The objective of collision sevelence is to assure the separation of anonal during light operations — to also during the situation occurring where two or more anonal could occupy the same power in anonace at the same time — Space's report in the International Cas' Aveance

SOLAR POLAR

In one of the greatest subalitie trick shots of this century scientists plan to send a pair of robot explorers whoping around the fair side of Jupiter and, with all fe gravitational backspin bring them back to the cell fair of the solar system for a whole new look at our closess tate. The sun

Called the international Solar Pickar Mission, the pair will give car a view of the sun that man has never had bofore. They will show us its morth and south poles.

This measure is a port offor between the Europeen Space Agency and NASA which pion to laworth the rebust term the space studice only in 1983. After being necessoritom the shuffle a catego taky that has space craft will soar towerd Jupmer In about the model of 1984. They artigo around that planet — one sub-the going over the top of Jupice The offer going Jupice The Both satellites will conanua to fly atoxe and below the parth. Venus: and Meicury and after about two and a haif years will pass over and under the suri

Each satulite will poss 180 milition mice above one of the two poles, studying evexplaining from the san's radialinin, megnetic held, and sampois to the solar wind and camero dust. They'll be going through parts of space where nether min the mech min has been here.

Deepsteling wil be ubei in Europe and hearther in the other is being put here in the United States by TWN 5 Defense and States With Not Defense and States Arthough will be address with the other address and the address address and the address addre



Retrict approaches the sun. Bladying solar wind, cosmic 3.15 and traveling lineagh space where rectifier inter nor machine has been

CONTINUUM

EYEBALL FLORA

One of the wendest cases in medical history occurred repartily in Cape Town South Misca An eight-year-old boy the Archives of Ophthalmol ogy ports out that the eye ball apparently provides the essential conditions for the gentination of seads more lare wernth fresh ar and



opsuit glowing in bodh African buy's eye toismenation conditions in the vye are so good, everyone wonders why it never happened below

was found to have a seed and sprout growing out of his fall eve

The one-egitil-isol-long sproot, which was nethood by microsupper, was growing just under the surface of the systall on the cubie isdg of the sin About 18 months sealerings. The discontiant sealerings The discontiant sealerings the discontiant sealering and the song surface inside About surgery the egy heaked and the song surface as unter-seried.

Botanists who examined the seeding found that it was a member of the Campostae family which includes heres daraves and annoclus

The stocklent, reported in 41 CMNI protection from strong light it was not clear, however, why no other cases of seed germination in eyebalis have ever been reported — \$ D

BIONIC BLOOD

A synthetic blood is Jacan's keesel export to America invasingutos ested the blood on themselves and in an emergency used to sustain a patient who blod heavily during watery

In the United States a member of Jehovah's Wanesses accospiral an experimental translusion of bonio blood, his religion forbids readum blood translusions

Described as a kind of liqud Tellon, the synthetic bloop in an organisation parliaotocation emation — a liquid hydrocation or other organizations replaced by floorne alons. The staff sosike up oxygen and that comes its usolutiness. Peal bloop does the same thing

The leading devideper is Dr. R. Natio of Green Cross Company Oxeks, Jepher Alter har induced tenself with 50 millitlers (m) of the emulsion (called Flacee-DA) seekel, Those Head galob used up to 550 million hemteries. Those that has commiscally the blood has been used increase here and in-Jacen

These are some problems in one of the blood subablutes the tiny dropiets (less than eiterth of a red cells diameter) tend to grow AL a certain size, they could block capiferies and cause pitchers. Dr. Nato hos



One Japanose valvoly of bonic blood: A kind of legad Tellon

changed his ensuision to stop clogging, but his new formula takes longer to be excetted by the body, still, it's considered a reasonable trausled!

The seal brone blood s pdvantages it eliminates typing and infection problems and it can be massproduced, aikod aved and stored frazen at least two vegrs — Ing Pdt(A)

DUAL APPLIANCES

About four years upo Arfruir D. Little, the Cambridge Massachusetts, consultant Massachusetts, consultant applixinges that could be speak for more than one function at a time, assung energy and norskering efficiency. Today spears have found that have interventiener.

One is a residental anconclearing system that rechannels some of the exhaust heat to warm water for washing. It can supply all he had water for a southers here outing the womest months of the year and much of the seator for a northern home during the same seator!

The extra equipment costs about \$300 - an investment that can be recouped in three to six years

A second dual-purpose spplance reclams heat from the range hood in commercial letches and uses it to preheat dualwithing extern

A third dual purpose applance is a wisite-heat reclaimer for olothes drivers instead of ochaveling out arbs, some heat is blown back into the norm — S D

LASER GUNSIGHTS

Can a gutaight be subject to safety rules more stringent than those oxivering the gun real? It can if the gun is arred with a low power laser

The object assertably consimple: Alsertably conal gun barriel will produce a bright rad spot at the point where abulet would hit. This make, factors untical for potioomen and military agents the only people to all omtisser amerguns are sold.

The problem, as first as the findered Bassical Relativecell Health (BRH) is condemoti, is that the laser beam could be arrined at sometice 5 eye. The agency does have a point Shoching a laser beam into someticnes eye for soveral minutes could damage the person at eyesight. Stang at the sur produces the some effect. but IBH carl t do anything about that And while a bulk can maxim or fell BRH is suthorated to regulate lasers not out to

To prevent acceleration acceleration of the servers of the servers



says the achies herardaux no one cavalone the builds

f took two man-years of effort to persuade the federal agency to do so — Jeff Necht

A search: is a person who builds a castle in the air A psycholic is the person who lives in if A psychiatrist is the one who collects the rent ____lemme I second

Depend on the rabbit is foot f year will but remember that is dish t work for the rabbit " - R E. Shar

PSYCHIC

The January 2 term size of the National Engineer can not 74 preactions by fair leading payofus 7 Hore some of what they have a call and the work's been donting record site also forences that doctors have a lot fuely and heart foreable

 Olor Jonsson predicted Roben Mork, Wilkems would have a close encounter with a real UFO and the real Holy Streput would be found in Ecvol

 Jack Ollan Special the discovery of a new plant bit our Henus space pathe Freshock Drows phat char Pape John Paul II would announce the corring orders tand swame as passas - Darothy Alacon clarmed more police departments would use payofhet is hield solve annes and that ESP would be passed at the lab. major sathingusike in Califorris in 1979 that would cause a lot of demage kill some people and change the coast-ine of the state



The pope delinitaly ald not ondelo any women preab at 1977

Out of the total of 74 proclators, only 2 came clove to being contect — the one boat poloo using psychics and the one about the earthquise though Califormas coastime remains un changed in besetail terms trace psychics buttod. 1027 m 1878 — Joel Cavis

We must weicome the future, remembering that soon if well be the past and we must respect the past remembering that could cleate all that was humanly more this.

-George Santavana

We haven t the money. So we ve got to think " — Ernest Ruthartard in the Bulleon of the Institute of Physics, 1962

CONTINUUM

TEST-TUBE CABBAGE

Genetic engravening may make a major contribution to intercoring world nutration Research efforts are under



Workurs wear aqualungs.m craspen-door slowida rooms

way to change the charaotenstos of food cropsriverything from cabbage to nos to poteloes

One of the most architecture attempts at Cornel Universe RNA atta 30 dri singer the geresk makeup of otbologes ballitated grow them sto cabbage plants in test hubes. Such buckgical angerobing could knock years of the slow costs breeding process now used to im prove load copps.

The Contell researchers haps to develop cabbage that is transfer to drought depass cold weather and high set concentrations in Strains that are ristbonelly support to carrent variable are also being attration are also being atused widely for odesites et not harvested year round et most locations, researchers hope to develop strains that will keep for teveral months without demanter

Grown in a lest tube, the new strams could be produced in five months, the scientism estimate. Standiate breeding procedures risks at least resume.

An intercelatorial conclusence auto November at encode ta November at Introdices nen National Laboliatory on Long Island. New 19th analysis genetic engenesis from many national inter attornation on first attornation of first attornation on first attornation of first attor

"When a man ads with a prety prifor an hour X seems (An a conder bur lishing at on shot store for a conder and it's broper than any hour That's waterty" — Abort Einstein

BRAVE NEW BUS

A new model bus designed by General Electric tas everything an environtient exist could want no gas tank notaligase pollutants and as an added leature a (If) wheel.

The actidat wheel as a flywheel, a son-and-a-hall pike of skeel darks stacked up like pancakos and welded to one income The wheel a used as a kind of starmer bettery tor the 14-ton-electric bus half a being built as part of a more brand income. ment, pantly lunded by the U.S. departments of Energy and Rensportation

All his beginning brain day the driver charges up the busis flywhad, sending i apming at beout 10 000 revalutors per minute Solition that manipplim tradule with its own low pressure attraceptiers of teleum, the wheel spins without slow mig clewin

What the chiver steps on his accelerator the opening fyratival shift in straining a special inclov/alternator powers he buy's ISO horsepower sketch major. What he steps on the bridge to stor down the moth helps show the bus and smultaneously reritiones the heat-weil

The beauty of their electric bue. Off engineers say is that if obearTriped the party head winsi typical of other electric trobay systems. The hywhrel bus can charge up in 90 seconds while waiting at a special plug-in stop Since it is electrici, it uses no pas and doesn't spew out any hydrocarbons as it hums any hydrocarbons as it hums

"Amandans require a restful quiet in the mount proclum theatar and for them tailong

on the screen oldstrays the illusion. Devices for projecting the firm script's speech can be prefaced, but the olders is not precided." — Thomas Edean. 1990

We used to think their if we inter one, we knew tees, because one and one are two. We are bricking that we must fearn a great clear more libbut and

> -Sir Anthur Stanley Eddhoron



Students of Chemistrobial Junior High School in Meani-France Force Albort Evidence by spatialing cut has functional formula with their foodnas A stiguatory also wrate E = mod ownhead as part of a tomother in plant to regorithms the physical. For Alborg size Presete caree 30

SO OWN



A premier science - fiction writer reveals who has benefited most from our space explorations

In years after the host man set foot on the mon, the those Select Correction on Agent of the those Select Correction of the of American Select-of A Hereitendee of American Select-of-Astronauticdee of Astronautictection Selection Selection Selection (Astronautictection)

On 2 July 1971 Incerned & Hiter caling mix to asky July 18 before a junt tession of the House Select Committee on Aging (Honrable Calacte Peopler M.C., Charman) and the House Comment-subject Applications of Space Technology for the Elden's and the House Listened at the left with all the pro-Listened at the left with all the pro-

I stand at hist phir with at the entrusteen of a bindegroom handed a summons for jury duty Space technology? Neith, sure I mas gung-the for space technology space travel spacethese space explorition space always have been

But "applications of space technology for the elderly and the handlicapped" Why not bee culture" Or Etonian fok dancing? Or the three-toed selarmander? Tartic Yoga? Handli up the potherm be way my

rabed up to the procent the way my manual man does "Honey? How do 1 get out of this?" "Dome clean, she advised the "fell

Come clean: she advised me "fell them bluntly that you know nothing about the subject. Shall i write alefter for

SPINOFF BY ROBERT A HEINLEIN



it is not that simple "

Certanty # is We don't want to go to

keeping you alive? Then let you drop dead on a Washington sedewalk? Hoverph/ You

Some hours later I steld. "Let's sum trup committee hearing, no matter how the call reacts has as its real subject Money - who lake a meacle to save the space prognam-but it might help. Some mawhathing about the subject I'm supposed to

So you've said, about twenty types

I don't know anything about it tookay. But

or chais pulsars or persons, we other know the most. Within twenty-four hours we had a couple of clozen as application for ages? . enty-two hours and information started to tookin p-within a week it was a foori and I was starting to chaft my written

decarded it calley proofs had arrived of Technologies for the Handkoepped and

from both my written presentation and my

Indeed a happy New Year beginning the oloventh year in the Age of Space greatest era of our race-the greatest-despiteauxilian shortages, polition, overnom la bon, inflation wate and threads of war

unlimited wealth. This is cersain

of nerves. However, I am limited by the call to a discussion of apprents' from our space

for --- indeed, his hypothesis may be demoshed-but term pertain to learn pomething now which may be and often is more important then what he had hoped so learn

empirically established natural law

"In space research we always try to do is solitiv limited in size and in weath The

> The most imprething about our space program is that people alive dead were it not for some item derived from soace research .

two groups repurping the mest therapy of all

"When you reach old age -- say seventy white carse-most handscape do not show

Witness holds up NASA brochure There is no need for me to discuss applone bit of research results in second third. and fourth generations, each generation usualy has multiple applicators-spinoffshave spiroffs branching outlike a true applications of Lee De Forest's veouum tube. Dr Shockley's transistor

Here is a way to spot space-research coincifs if it involves microminiaturization of any sort mencomputers metallarged lators image enhancers, small and sophiamater where you find the dem, at a pripoal space program

Timage enhancer This magic godget runs an x-ray or fluoroscope picture finoush a speciel computer, does things to I thin puts it back only the screen Or stores it for replay Or both. It can sharpen need to see, and do other Washd-of-Oz

"The is the worder toy that took extremely weak digital code signals and turned them into those beautiful sharp.

I first aiw one in 1977 at the medical dog's body in order to inject an xhart the door. More about this later-

space program Possibly the doctor did not know M D s pan use instruments with no and a patient usually knows as ittle

about it as thid that dog

program is that there are thousands of people alwe today who would be dead unsware of the fact - and complain about

- all that money - 1

They sort of thinking would have keet

'NASAs arrusi budget wouldn't garry Moon program works out to slightly lass

Would you like to be a wheelchar case failed to swing east and instead hit the ample warring for anyone who would heed It-plotty of time to evacuate not only

back, if too was tracked by satellite. But Deople' many thousands were killed. Here

Weather satellites are not spinoff, three rougher on the aged and the handicapped Persetable skolway instantes: If a person's kolwaystain is mead type on the meahner on die. The machene is a bietero grein fluid the sources rate is high. Ministantaffon fluis maake in passibile to burd postable kolway meahines. This source high statistical statistical a teely normal file times and so forth, but menalisatistical bies no bargies contractively personed by the sen it torris. between this weagned cays or rights to mit emotherin

This is new A fee have stready made the switch but all ladney witch is an expect is soon. The suicide rate has dropped matedy—life is again worth fixing, hope has been evaluated.

The control basic of the second secon

Doppler Ultrasound Stethoscope another microministration spendl. This instrument is to an ordinary stethoscope as a Bela Hove is to a Model T Ford

Witness stands up turns from side to ede. Look at me, please! I'll never be Mr Amenca, I'll never take part in the Olympics Twe oimbed my tast mountain

But I m here I'm silve I'm functioning Traumised stort by and my brain we

dul-normal and getting worke is lighting toward "human vegetable. I slight sufface hours a day and wasn't worth a hoot the other eight hours.

Were it not for the skill of Dr. Norman Chater, plus cartain spinoffs from the space program today I would ether be a human vegetable of it tuday dead of carebrail stroke

Wy father was not locky from a similar disorder if took him years to dia—midar able years. He ded before the operation that saved me had been invented, long before free was medical spinal from speak betweeney.

Am Ledenty? I'm seventy two Leaffered from a disorder typical of old age almost never found in the volund.

Yen I handrapped? We but my handraps do not interfare with my work—or my gy is Ne. Dwr forty years ago the Nerry handed me a pixee of paper that pix nounced me totally see a paminanity de, ablied I newe beloved it. That pixee of paper were out, 1 of nt

"Then Handkin and Lisbart 1976 and 17 on bland drives all over the nation. We cristocassed the oceanity so many tensis that we lise track is wait worthwhile we secrated seavaril thousand new blood doors—tot wait waiting the search of the ords of 77 we badly reacted at ent is one back as as vegating. Sha and them welf well to back as the search of the ordering my head to back at a manufall pool—and search to back at a manufall pool—and search to back at a manufall pool—and



too shereas a we and have been a shere we are a shere we are the second se

Wild Turkey Lore:

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 Turkey is truly a native bird, unique to America. And it is the unique symbol of the finest native whiskey in America-Wild Turkey.

WILD TURKE Y7101 PROOF

I taskenced or my left log and said, "Daring i in tembly sony but I think live had a stoke. Something hisppeniad inside my head, and new I m seeing double and my right side feets paralyzed.

"Mrs. Heinlein half-carned me. halfdNgged me, back to the landing -- got me back aboard

Astiprotectional Dr Amardo Forsana, okaptosed whet his his period a targesent is chaine attack (TM) not a stroke Whan we reached California, this was continued by tests. However a TA is fraquently a preude to a stroke

Permether that spinoff, computerized analitemproperty? That was done to me to route out harm tamor No funger The neurologist my physician had called in started ne on medication to this my back to the dimical pattere indexted doneshid loor in blood flow to my brain. This treetment was to contract or so months.

"But in only two mentity I was failing ao rapidly that I was shipped to the University of Califorme Medical School at San Fran osca for further desprove. Remembar the mape definitioner and that dog with red mape definitioners and that dog with red hurt. They did to me withing anothersa, it did not hurt.

The calledge goes in class here — were sold partial with explanation of the grantland goes at his ways pare of the trans way and advect the beat. These three ways calledge was based to show a way of the grant of the transition of the sold into explanation of the sold ways and durational constraints and the sold ways and duration of the sold of the based — advect may and duration of the sold of the based — advect may and duration of the sold of the based — advect may and dependent — advect and advect and the dependent — advect and advect and the

"How many people over get a chance to watch their own herests beet? Utrivy taicrostrarii (Local Sei my herest beering over my disphragm tee and fail see my kinge expland and postraid; see the dye go up mo my brain see the network of blogd wesels in my brain suidearly spring into shap bealt twells with the trip]

They spotted what was wrong, my left internal carotic was toolly blocked to the lift hall of my brain was streved for cotypen as it was tecrwing only what leaded over from the nativek reterconnected, princionly at the Dickle of Willia under the brain

But this is your speach carrier whees louches let side of skul above rest - your word processar, the prince when awrite does all his work. No wonder I was dopey-could not write, could not study could not read availation afficiant

My left internal carolist is still backed the stopping is too high up to sargary Bo lavy sertime bD. Chains at Frankin Hopptal who moved my left super foat tempore at the to moved my left super foat tempore at the to be the left rade of my brain. This penaleon is probled on pages bb and tao too. the April 1978 Scientific American, so i will had a terminal in his officers—I don't know ome graity details, if suggry intereleta you, but been can't be any difficulty in terms to a hundred works or an when the terminal in the abundle can when the terminal in t

The proceedure strate Scap the patient from the kit operating agoing high and curring dawn to a spec behavior the scap the temporal artery Saw a create to the scap the temporal artery Saw a create to the scap the box marker. Converse the bits in too the System Issues, fur is the sense unless gain the two atteres. Converse the bits in too the System Issues, fur is the sense unless gain the two atteres, and to scab. The left arterior scaled my scan is envoyed by the effect atternor conversion. The sense the atternor conversion is the scale of the atternor behavior of the scale of the scale temporary with scales to make the maked on call law them.

"Check by Doppler ultratiound to make strat the bypers write then obled the hole in this skale while base groose init for the interval artisty. Sew back the scale- up to lunch the surgicon tas been operating for four hours, he is hungry (the patient and).

They placed me in a cardiso intersive-

My father was not lucky. He died before the operation that saved me had been invented, long before there was any medical spinolf from space technology.

care noom. When I woke, I loand in my room a big screen with damong lights all own't Those curves maint indiring to see bui wire clear as print to the IC markes and to my doctosi --such things as EKG blood pressure respiration, temparations, blood pressure respiration, temparations, blood pressure respiration, temparations, blood pressure respiration, temparations, blood pressure respirations, blood pressure respirat

Tmanton this gadget because I was not wired to a

Another spece lechnology spiriof. This is the way Dr. Berry monitored our astionauts whenever dear were out in space.

"Colone: Beny had to have renote monitoring to his astronying genetis. For me finany not have been offerly necessary. But it did mean had have not clutterial with docted all was live a fly coupt in a web the microminitatized sensors were so shall not unobusive that in never noised them—yet be numes had the full potune every minute, wery second

Another advantage of talematered tende containing is that more than one forminal can clapital like signals. My whe will me that there was one at the numming suparvisor's asien. Dr. Cheter may have had a terminal in his offices—I don't know that been can't be any difficulty in remoting alturated yerois or so when the technology was developed for remoting from Lanato Houston almost aquarter of amilian mission.

Stood spinof is postpercitive can a Deptho viscout adminiscrept e an impleation viscout adminiscrept e an impleation was been used in the second list of the source and the second second initial and, because of its Depthe nature, fault the visione and electron can be notrained with the second of the depthe nature, had the visione and electron can be internative and the second second second second initial depth second the depth of the depth of the depth descharge in a coust to storoscope is not

B generates in tight beam of ultrasound beyond the surge of the horner ear. This beam divises orientating and bounces back: couldry interference backs in the audible single. It befores much like Doyn instantial motion: then electromagnation per noder space. Brief the subjective to sutrate and motion. Brief the subjective to instantial motion: then electromagnation that the body welface the subject of hims. and the body welface the subject of hims.

SIDIS OUT O SEE SOITOSSOUS FAILS HAY

Both characteristics make it especially useful for protecting program mothers and unform tables. I am not departing from the cell, babies unborn and newly bord and mothers of lerm most be classed as temportry both severely transfragmed."

Doppler ultrasound was used on me be fare change and after surgery

Alteriny consistence I was again toammed by computenzed asial temptaphy No atmomstities—other than the new plate in my skull.

I was far pone. I needed every edge possible. Soveral things that typed the odds in my favor are spiroffs from space Notringery.

Who we do not set the set of the set of the set of the set of the four orbits of points - both set of the four orbits of the set of the set

"Did if work? I have been out of convalescence about one year during which file caught up on teo years of technoal journals, resumed studying. I have contraval prevair te



After the royal procession, he learned not to challenge the throne

BY JOHN ANTHONY WEST

he has nothing the palace staff would have sures "Image-enhancing struccried a liffle of conscience" said his father. for metable was wfastering to his northby what the child had advances and monles as they said "He has nothing on! There shut the wory-and-gold initial is a fille child here who save he doors beford their apversion has nothing only

"He really has nothing on?"

The Emperor shrack within hanself as he heard their remarks, for it seemed to him that of the party time At any die 2 must go through with this progentlemen-in-werking marched behind, carefully holding up the

When the Emperor oct back in the celace his face was as red with shame as his legs were blue with cold. He knew that the percent dip in confidence in the rule." thundered the Emperor even his own personal anplane. the surflind in the entrois was The minister of communications

seen everything on television. The very lackess smithed as he walked past and guards and Secret Service men. disguised as footmen metroped

Perhaps this was only his man-Ination But perhaps it was not Hiad it not been for strained min-Union and the Court, the Emperor would have ordered a cation for them all

ministera his communications reports his public relations his speech writers. All agreed The Emperor's image had aut-

The Perpetual Pol Machine. designed to give up-to-themoute madrice on all imperial questions dividged a 79

The press derided the dobecle as a "sarlotel associatede not as swift as rumor Besides called for emergency mea-

tunitized communications proorientiated at cracibility positivezition with includiticated newston-dande metal tectoick The experts agreed that the moster had spoken for them all and a summit conference

was convened to get to the botforn of the mailes "No " sout the Employ "hut first let us behead those roques

The weblents "four Mounty" the ministers The Emperor summaned his protested, "suppose the weavera prove right and the child

"Bohi or woods, three wears, are are enormes of the state Behead them," the Emperor commanded "But we have abolished cap-

tal purushment?" the Lord High

he exception proves the moned and then summarily behasded

"Buly logic is a worderful thing," the imperial philosopher

PAINTING BY CHARLES PEAK

Iting The impenal philosopher remarked

was apported to study the foregoing overils and to examine the credentals o the offensive child.

Upon what authority did he dage disparage the Emperor's new clothes? What usine his qualifications? What degrees did he have?

If we needed that he very this is pubien made by the or wevers was that the fabre was invisible to the acpud and the todark was invisible to the acpud and the solarity was invisible to the acpud and the solarity was into a solar to a solarity of a become so advanced that in it society becomes a advanced that any one of the thereas is advanced that any one of the prevent is advanced. The advanced of the end of the solarity of the the solarity of the end of the solarity of the the solarity of the the end of the solarity of the the solarity of the solarity of the definition of the the solarity of the the solarity of the end of the solarity of the the solarity of the the solarity of the the end of the solarity of the the solarity of the solarity of the the end of the solarity of the the solarity of the solarity of the the end of the solarity of the the solarity of the

The imperial economist supported this argument from another angle. We must commote how many rem-house the labe resources worked. The angued "Suble it is all agrical and uneconomical—which comes to the same fring—to expend time and effort on imagenety production. Flohomat have been conducted?

Clearly said the chart public relations man, 'it is straply a question of reastablishing confidence in the reality of the Emperors new clothes

The late weavers had taken every precaution to return the secrets of herr art However by bugging the isoms and sup plying the weaters with relected indoctinated apprentices the BI (Imparal Burasu of Investigation) had systematically collocated those societs. The chief of the BI production of the macretil was possible.

Committees were formad. Grants were all located Research was begun And the tel penal copywiter set to work thinking up a brand name for the material to be produced.

In work the Emparics a work that every one of the subjects, logarities of activities, shake in the profile of ownership of come ambiged uichting findle of the over anticativiti. This work a visit distability expediency will move as the programming. Once a govern ment end has been distributed who could not react the barries, and a comparign will an inform the public of all that will been done in the behalf.

The great film director Z/a Balonani was summaned to the palace. An epic documentary film was commissioned. Emitted Material Benefits # told the ontile story of the intervalous new filter.

The empire busied itself in manufacturingthe suble toxile. The impenal inorganic chamid, even succeeded in investing a synthetic substitute for disinibulian to Third World ocurries.

The Ettipenor is new among shore

Only historians remembered the infa-



most procession, but their analysiss of it were mutually contributions of the second site of phase in the retainal class struggle. Another aschedel to a temporary regret atm into an earther less-evolved state of conscissaness. A find postulated an entimate the discondition Eveneen.

Meanwhile the thick desponsible to the event had been example in depth by the impeal offid psychologial. He had been compaled to take the Impeal Polsonially Sait. The results were unprecedented The bey registered zero personaltiv.

He had related to choose between alternatives to the question. Which would you rather be: A: Pope [1], B: Emparer (1)? Initiated he had penciled in his own answer in the marces. C: Conject (o)

To the question. Which would you rather do. A. Piter an advertising campting to permote the Emperior's new clobina (-). B. Designa loom to make the Emperior's new clothes (-). C. Marrage a department slove saling the Emperior's new clobina (-)? He had perioded in D. Other a the engine bit

The imperviti Passaraky has was unanimparties and the impervision of approximation of approximation and of approximation sector over the empire. A leasthed acontecedence-constanting data and that the child was is firm unon. These sequences were alloyed when spotemperatures and approximation of the impervision of the sector of the of the impervision of the sector of the of the approximation were solved and the of the approximation of the sector of the of the approximation of the sector of the approximation of the sector of the sector of the approximation of the sector of the sector of the approximation of the sector of th

Modeal hearmon deliving into the Impaint Archives, just forward a reasoning adplication. They found that in the sails adhifting of controls way smaller to the paintaking among small order to the paintaking among small order to paintaking among small order to paintaking and they are a concriting to the records. The symptoms responses to adhifting the order of the state of the predict to obtace and in most state optimise add the marying previously frown it was devices that most state traitment was required. To most states

And considerable public acciam, the child was awarded the post of Naster of the impact Washobs, perhaps the ascord most prestig out postion in the empire.

Yet within a week he was complaining publicly that he had nothing to do

He was diagnosed by the imparal pay chologistics librormal "but avorred pubto gotted by the priss instanced to accord such a vertici. The Emperor threates called in special session of the Legislature whose prolonged particle sesmed to be hereing for a statement with help came from a steel unexpected quarter.

Out of espect tor findfinis the post of impersal philosopher had never been abalaned. As a pure formally on every official reador the impersal philosopher was allowedly consulted, and has opinion was duly field in the register. Not once in the Otherwoon reveals the



Al Cettre, a polerest tricks the certaler



spools spechettlike threads of DNA onto a class rod. He sen gene, then insert it into the ing the microbe with powers with recombinant DNA stimed humanity would have no natural detersion such experiments over whether scientists should be a lowed to temper with Me have clied down, and In the past ten years of sp. becun to harness the life processes and put them to work unnobced in a world dazzled by technological revolution that foundations of medicine. sonculture food processing Already included among produce human insulin.

THE GENE TRUST

BY KATHLEEN AND SHARON MCAULIFFE

Science and business join forces to exploit the machinery of life

PHOTOGRAPHS BY DOUGLAS KIRKLAND







from ones, and novel pesticides that make

gras have attracted, the most dramatic in-

Commercial development of modern Sevences By the mid-Nanaties, contain applications will have profilerated in withis we whose venture-capital firm, Kleaner, Perkon into two of California's proneering. We knew that if we could tap only a small

may someday destroy viruses and cancer cells. The other, Generatech is working to cals, from enterteron to the opadelike par-

Corporation in Beritaley California for

memory the panceses and other otands m- biocompanies. One Hybridd, her app- fraction of that potential, we'd be in busi-

Carps and Pater Farley precident of Cenza, are among a rare bread of hryforces with Donald Glasser a 1960 Nobel Poze service in physics. They were able to ing innovators of the new buology Today Denus has a market value of \$75 million and Cetus Genertech, and Hybritech all

faced major problems in optimo started about molecular biology, we ran into brick waits " Cape says. "We were told we were

us we click t know what we were talking

One of Cetus s first quals is to develop a al supply dwinding rapidly converting chemicals is increasingly attective. Sugarcare and sorphum, for example, trap up to

6 percent of the oun's energy that falls on ever. Celus hopes to stitch the necessary their instees. When these major food proces games from both moreorganisms into one are barussiari bowever millions of tons of bagasse the leftover stalks, is thrown away To convert this debris into ethanol for It is a coupling reaction. ' Cape explains

use them as little chemical factories to con-

another that turns the glucose into alcohol Using recombinant-DNA technology how-

was not founded solely to exclud the genes from one microorganism to another which had been all but ignored by com-

Curious, these Americans. Many pass judgment on an imported gin before trying all three.



To decide on one of the great imported implicit gins without sampling all three is like marrying the first man or woman who comes along, it might work out, but what might you have ratios?

Wed hate you to miss out on the perife gin. But, pather than invest in an entire bottle, order your next drark made with Bombox.

Judge for yourself

If you still prefer another what have you lost? But if you favor Boenbuy, thank what you might have lost.



contenting a first from automation under cultaner

mercial enterprises. The unaspected advent of recombinant-DNA techniques simply speeded their progress Sudderly repertists could endow their "bugs" with enterprise could endow their "bugs" with entoday new ablines, taicong them to fulfil industry is needs.

Which obtain engine buildings down with building of buildings and with the provided to the set of the set of the set of the set of the the result of the set of the set of the the set of the set of the set of the the set of the set of the set of the the set of the set of

We we device ourselves to trying to do there for industry that making hash yell been doing for staff legs Cape, whose microbial arroy is ento make a well entrye of chemical products – fremplastics to faitliszers – now device from of and genetine Biological production would save entrye scorting to Case and would wellias pollution and lever the operating costs of traditional chemical synthesis

One including documing bactanum has aready proved its costs-thicknesses in extracting valueble metals from low grade or insocessable ones. Wring comparises in Carada, Australia and the United States are investigating the possibility of using microbiel processes to supplier conventional micro mithods allocatifer

Nerobechold even brighter promise for medicine. The body's most potent chemicats exist in minute guaritoss and are extremely difficult to extract and purly. The scarcity and evolution cost of these substances prevent their use by doctors.

Interfacts, to example, has been week been on to instruction of models insearchets. Even if stinued prove to be a power to support a status oncore, as researchers support who will benefit when it is camfurprovers in 322 bits on a pound? However, Cape is so consider that genetically expresent models will solve this prottine week and the power will be the protine or three years a land within the next lead on the genetical wave history week to or three years. It all much liceo protine years is all and work liceo protine years.

DNA FACTORIES

Affough gee griffing was first carried cut between break of bacterian if com proved possible behavior widely different organisms. When mermithan gends are spliced into bacterial hosts, fitewa motocuoung large quantities of retural body substances—hormatels, enzymes, and antackes—which are official or imposeble to obtain enthetically. For the parameterial calindum yill at the end of Calina and Calin in every the copin in or 4 is Sourk Sen Transition end of Calina and Calina in every the compared of the sense that the compared tops Annuh mindle company parameterial (Calina and Calindon and Calindon compared tops Annuh mindle company parameterial (Calindon and Calindon compared Calindon and Calindon compared Calindon and Calindon compared tops and calindon tops a standard and the calindon the calindon the calindon the calindon tops and the calindon

The big payoff came operandly a year thior when Generatics assistive, wrising with the Ghyot Hope Medical Central In Los Angeles and Boy's Islochtary at the University of Deformer, successful in counting a strain of E-cost is produce for brann hommone sonatosatin. Generation Res priented the processes when it as uncelled to hower somalazatin's price from \$300,000 a own to \$300 a chain.

Following this breakfrough Generatech ensourced two more genotic angineeting leads microbial production of insulin and, more recently growth hormone used to teal phrasing dwalfiam in children.

From accommonal standpoint, insuin so this is Generative more speciative supcess. The American match matterial match at 31% million 80 percent of which is controlled by the pharmanositical insues the Lay Generative has agrind a contact with Lay to market has agrind a contact with Lay to market has agrind a contact of the special contact in the Lay Contact of the special contact in the Lay Contact of the special contact in the Lay Contact Special Contact of the Lay

While generative rangements that been shoing here methods in the last doctals offer contrast, here that be a doctals offer contrast, here that modulo are medical through Particularly acating an enforced through Particularly acating an enforced through Particularly acating and enforced through Particularly acating and enforced through particularly acating and the samous produced by the boarn that owned as proventing an suppresents during recent chroad thriat. Use mainteen a target for second-samout DNA sesenchers a clause. Generative and elevanteen

In the tist year or to at held these more companies have entered the racio coupon perdor environments Behavior and Laboratory and Ganas, both in Maryland, and Bogan in Luxembourg in addition tomo larger and langue-existentified acompanies and segme-existentified acompanies and segme-acompanies.

If will probably be simulations before the production of pandoc angineering reach the market. Droce a discovery is patiented, its manufacturer must lest the product regrouply to meet the standards laid down conversion uses no FICTION The visitor sought truth—but was nearly destroyed by it

DAI PHINS

NAN'T BY THEODORE STURGEON come to Medica, salonr to somed bis ture of phylosiaphy rehards, and loak: On Mediae he mosts Altar, a hozo nan, and Wallioh, a beautiful and (mineted availation) in board a Todorn his kind ever to communicate with numeria. Dom Feix listens and obpervos and within four months he ability to empetitize with another being and thereby accept his point of Medican society On the heats of his success, Dom Fakir is asked to Arcens and the humans. Here is part two of this three-part novels

Dom Felix went to Aros. He was wise enough, and expensenced enough, to understead that though the ultimate fluittion of his mission was far in the future, it was apport plished; He was also was anough to

> PAINTING BY MICHEL HENRICOT



separate this observation from wethout throng and to truth for it was to but a manife Dom Folio carrot be stopped just to both the second second second second when you have been as an of hand when you have been as a second second second when you have been as a second second second when you have been as a second second second when you have been as a second second second when you have been as a second second second when you have been as a second second feature sets and the second second second second second second second second because and second seco

He discretizzation of the specific through the specific term of the specific term of the heat of the specific term of the specific term of heat of the specific term of the specific term of heat of the specific term of the specific term of heat of the specific term of the specific term of heat of the specific term of term of the specific term of the specific term of term of the specific term of the specific term of term of the specific term of te

They make no acceled but for increment eventmay where to call and sharey. Bene reterming where the calls and sharey. Bene exact offers counting anternane. Beae act offers counting anternane. Beae act offers counting anternane. Beae had an expandion it, wais include the output operations are also active output operations. These is no need if through the transition and the transition in two considered endowed in the transender the events and the events and the operation has occasioned the events and the operaender the events and applied the mane seatest and the events and the transet and weight and are also applied to the transet and a dimensioned the events and the operation operation of the events and the operation of the operation of the events and the operation and the dimension of the events and the operation and the dimension of the events and the operation of the dimension of the events and the operation of the events of the events of the events and the operation of the dimension of the events and the operation of the events of the events of the events and the operation of the events of the events of the events and the operation of the events of the events of the events and the operation of the events and the events of the events of the events and the operation of the events and the events of the events of the events and the operation of the events and the events of the events of the events and the events and the events and the events of the events of the events and the events and the events and the events of the events of the events and the events and the events and the events and the events of the events of the events and the events and the events and the events and the events of the events of the events and the events and the events and the events of the events of the event of

He saw the goond cycles of the Tense specificion string, and the saw the Tenan sublicities, toxing, and thread the superatory thermatic tenant string the superatory thermatic tenant string the same string the same tenant string tenand tenang tenan

The manihal and is lower has changed whatly not all since the terr recordings. Outbuildings came and east but not often. A doarn or a soare of Ansara would his out more in a white and coskib even hudging away into the mauntains und the thek light obscured thim. A doarn or a scene would be out of the mountains and who the business. tal. Whether they were the same ones fram was no way of knowing. There was no notobable sex differentiation, and there were no young. "There is no need. Aquare explained (Explained?).

Durit Dort Treis nach diesebera die the tenberation Ten Bossis (and to die New York) aut gestraffer the towards (and to die New York) aut gestraffer the towards (and to die New York) dense all the tenevoir is not to be the tened wards in the tenevoir is not to tened to tened the tenevoir is not to tened to the tene of the tenevoir is not to tened and the tenevoir is not to tened to the tene of the tenevoir is not to tened the tene of the tene of tene tene tenes and the tene of tene tene tenes to tene tenes and tenes to tene tene tenes to tene tene tenes to tene tene tenes to tene tenes tenes to tene tenes to tene tenes tenes tenes to tene tenes tenes to tene tenes ten

 Dom Felix had already noticed that each individual was capable of any task with the same degree of skill, all worked loggethor, with no apparent direction from a leader

manufulated into suggesting it times! to gether with Don Felix's teluctance and gradual protocological felix oncounties of the tithculty of dealing with a creation that thought quite so will as a human but not we all human.

In the end he decided to start from the top, or the bottom, or however one might decorbe meducible directness, and he stad. Aquase I want to go to Ance and I want you to go with me."

Agains performed the bubbly sousait, the energy from his transition as the Dom Folin, who was totally prepared and tensor for a long compage of the and encod, sectouring, and therking, almost physically stamtied, like amanifering the seven steps when the activities that put only six in the flight. Ask han what I was he follower

Alair— after having stad the newtable What the hall tar? — side tim ha would have to start-facture out timt and drive outa cause of termidays taske because no Arcon had mar agreed to note on a cycle, and the only atternative would be to hoot if with Aquate, which no human in he nght mind would atternit, not an Messe Aquate with was present at this inforchange, mumbled and squasked, and his triansfarer said, 1 inde, and 6 was Attains turn to fail over the step that wasn't them

The ovola-and it was a new one eou pored with the steble platform Kert Row pared with the scanned reality as it its path, for example, or an arimal over a certain size, or an Arban pedestrian-With this in the on position, speed was a safe balance between performance and herd to imagine a situation in which they let which shouth it could be himed off would turn itself on again in even the sightest emercency and a locator signal inexhaustible and that could leap the maleeps ten to worky motors at a time were . wind The strange surging gat of this maoffine had become tradeonal in the enclime met workers its way its some iow posity if the gat, not the posity) was

They simply walked out of the fifth condian the Rintof Perlucate enablattied then way across the dually blastery compared to the motor pool whose the cycle with its whosening gyros and its glossming, transpoint airrong wave of them (it was been performed by being and by purpose wave airrong by being and by purpose and the provided of the purpose there been (The attempt burning and there been (The attempt burning) have been and attempt burning and attempt before the attempt burning and attempt before the attempt burning attempt attempt burning attempt attempt attempt attempt burning attempt attem

The obvious or the had already been bugged in and the screet was furntabled Al Cominisk fact to do was to put the screet was furntioned and the screet was furntioned and the screet was furntioned and the screet screet was furntioned and the screet screet was furntioned and the screet screet was furnced and the screet screet was furnced and the screet screet screet screet was the screet screet screet screet screet and the screet screet screet screet screet was the screet screet screet screet screet and the screet screet screet screet screet table to the screet screet screet screet screet to screet scree

For a white Dom Felix attended to the passing scale but it became an offert here is a satendas to the teary differences in the topography of the Madaa and the 50 cday evaluation attending to a Terron to cake in all circuit Bounding and addres access end through it distance the hopp of search an expectation formation or a fleening annexa, and the state balation mobiled the notification and the state balation mobiled the notification and the state balation mobile of the notification and the state balation mobile of the notification and the state balation and the state of the state state of the st

He was proused from these contusing thoughts by a touch on his shoulder, and he turned to Acuaire

The Kelderin portant to tiss the anguerrer Three and the parts of the second second second there is a second second second second second second test of the second second second second second second test of the second second second second second second test of the second second second second second second test of the second second second second second second test of the second second second second second second test of the second second second second second second test of the second second second second second second test of the second second second second second second test of the second second second second second second test of the second second second second second second test of the second second second second second test of the second second second second test of the second second second second test of the second second second second second test of the second second second second second second test of the second second second second second second second test of the second second

Again Aquare stabbed toward the steen-slowing plate Dom Felix practical



toward n—slowly last this not be what was means—unit he fouched it. It immediately tomed rad, with a diagonal line, by ancient briddion, CH

Recail—But before the Ministrame was out the Median trate care a commanding hank an unrestablishie makings. Does hank an unrestablishie makings. Does hank an unrestablishie makings. Does hank and the Does hank and the second one intradiative powerful banks in the palm even intradiative powerful banks in the palm nisched interd drev out is locking pur . A sever nisched interd drev out is locking to the the nisched interder. His did not lamble, he sommad be know excitely what us do. There was a faret dick, and he nose up and sat back.

Don Freise stande die him nie unze esternismente hier dasserer ein Aussachen die von der einer einer aussachen die standen anderstein die Statistiker die dasserer einer einer einer einer onterpreteren die Funder einer einer aussachen minister beite bestehen einer einer einer einer einer aussachen einer einer einer aussachen einer einer einer aussachen onterpreteren einer einer aussachen aussachen einer einer aussachen au

Acpairs you how Inevertinew ' Com Felx stooped adultering and tred again 'Wey don't you over tail anyone the you - that you could --knew how to He was spluttering again, so he decided to stoo

Chip-chip otro There was no need."

Accuse, gate relaxed, said noting. He seemad to be watering. Dom Folk looked at the red-IR communication swetch at the plantetil age under the content being werehains, without being seconded. "What is it you want to let me Accuse?"

Agains turned lewerd him with his tosto and avened his head and again Dom Felsi have brockler vision. The turn of the body attempty interaked the failing of being totally conserved. The gords burbling and modifing came through the translator as "You give conditione."

Thank you Something in Aquaw's stilress told him this was not quite right. Ha amended it. "If you mean what I think you mean --thank you

Not thank me. Wrong confidence in case hallingly these wave not words, apperiently that Aquate had used before Wrong confidence. What then would the

wing conclude, what here would the oght posterior mean? Make someone contribut Chier someone up Confidence of the kind of certifidence you keep "Youmkan youhave something to confide?" That kind al.--!

"Yes No." A long pause Chirp of spcommute on magae


SMALL WONDERS

When microscientists seek out data, beauty is the by-product

BY ROBERT MALONE

Across a bright, creater image, degretite crystels only these unders of an inch thick souther subarnel gold and orange. On a feld of black, dust motes free a brillion while "Whole spectra burst from write a paramecum. Under the microscope les a world of color and greet beauty.

(Relow) Disymptime, an ambiologic is seen we tracemented polarated light (Right) Under polarized light, this Fragilitis citizen shows split ands of bare



6The hardest lob in microscopic research to coax spectacular, informative colors from drab-looking specimens ?

Monocopial port has not speaking to hele way to source to prove the entropy of the port of the source of the entropy of the port of the source of the so

a) microcopy's entry case accention attrice apply intercept field speciments, often wastang out details in a gibre of which light but microcopy the have more developed secturing an which the split denses from allower the specimen and is reflect from its surface. Many of the pholographs here were taken with these new, more coloring procession.









Microscophila hinve diverkiped an enormous sumber of those columing todinapers (rifer), Wein Y Yanamoto, a intercescop specialistiwith the Lourning Resource Service of the Vistersch Anternachone, ages that inducting the right houlenges to obtain advance of interced is probably the most difficult dhose in advance of interced is probably the most difficult dhose in advance of interent borners and a constant can be interaced in many ways, but the institution complement the specialistic advancements

Human singer holding blade of grass (obuve) is captured by interference contrast with polatized light, (orly access) crimewn pigment, morpabilized from tolventu to authentomic powinings, was photographed in polatized light at 24X





Three reflected-light systems are most common begin field, dark lefs, and orthrenotal-monitoreco-contrast (DIC). Bright field bits is should sarright down forcups the microscope and reflected back to the viewer. It is note reflective where contrast a not very reflect and where a specime can be standed.

a not very cruces are where a specimen can be standed. Dank-field liammaidon uses obligue lighting and levels the boxportand dark, where edges, budges, and diriptes cabb the bat and allwin cut brighty. This kind of hummation is often used to examine club particles and to reveal tiny flaves in delicone reischere parts

DIC groups press control over contrast and color, using polerced litters and interference effects. Polalization is especully effective in clapknying chemical crystals and living lissues that coancil be slaved.

that control the stand All these integes were submitted to the Nixon Isstantiere Division's Small World Proformero-matricgraphy. Consist Each controlisting charac his alumentation methods to most the mode of research. The beauty of these versions is only a sage effect, it chains not competence the quest hor movemb whites the were can take pleasare in the survey hoy conduct OO

Deviated Auroinstein Faborel Highlighte cross-section of motice sterry (NM) dompspoles dissolved in water and spatier-coaled with goald is seen under vertopal Assolvation at BOX with the Nonweal DVD method.

 Colorful new lighting methods have helped scientists learn natural secrets that microscopes alone never could have revealed.



A community that shows what the future could be is the next goal for an astronaut who's newar stopped breaking his own records





10h would you pontation the construct of entry where where and in 1995 he was revenuent out for the secret entry Inch would you consider the greatest challenge steer. Ing a mong cat to victory? Picking an experimental 122-critit light of Gemins 5.

Air Force Base in California, where he helped develop new celestel mechanics lunar geology and the constantly updated lechnology of successive manned vertures into space. In 1963 he

tronic robots of the Disney amusement parks and supervision of

The biggest challenge in this second career as Cooper sees it Onto interviewer E. Lee Speigel discovered in their conversation



▲) think we're crazy not to have a world space program, combining the latents and resources of the whole earth toward the exploration of Mars and beyond ⁵ Other We ve been hearing about a Danky otherpot known as EPCDT, in which you re heaply included Could you tell us shout that?

Cooper EPCOT stands for "separaments" postorype community of bornorswi T begar many years ago as a devem of Wall Damys to bring together industry goameniar agoinage. Davidations, who proceedings of the wave that can be dono with technology Ward line to doady all the door with technology Ward line to doady all the technology and technology and technology and the technology and technology and the technology and techno

We'coperay was a softwart vision is then one of a genus at their gins together the opttakens to make their got together to the most them teeps - ween thousand cores of and in floads, with EPCOT as well as Dewy Nard in minute. And row well as the soft building is community them that will age notifies the fulliar and the soft of perfect the nations of the world's periodics whete they can show their haday, and culture-land of take is permanent world's fer.

Other "buries been traveling a bit secritly meeting with heads of state and corpore tons. Do you find that the Demey name helps you to get their interest and cooperator?

Copper. Yes, the name is certainly maps, strough the world. It's is name that people sould standing for capabilities they have contidence in, for capabilities they have contidence in, and we've that with a give?

Overs: What are some examples of the technology musiked?

Cooper Thmis already a bulling or Domy Work that sould yaaconotomot and heated by sober concentration, with the using and water density and bulling on other sweeps to grow water hysicrither that can be convented into metatatat fuel. And which a peoplement Wellbulling the pameter that user treached with the with no sweep system. Wellbulling the samples will table between plottering would heater bulling 1986.

Date: Are these systems considered with costs at the start, of costs to the operations are good examples of cost-blocks norpolating used a similarial energy across in addition to the seasch and devisionment, we plan to communicate to the exolutions the darg. Dates almost has a statistic communications company has a statistic communication of the statistic communication of the statistic communication of the those on a satellite as well as cobier to hitch on the state of the size of the hitch on the statistic communications for the hitch on the statistic communication of the hitch on the statistic communication of the hitch on the state of the size of the size of the hitch on the size of the size of the size of the hitch on the size of the size of the size of the hitch on the size of the size of the size of the hitch on the size of the size of the size of the hitch on the size of the size of the size of the hitch on the size of the size of the size of the hitch on the size of the size of the size of the hitch on the size of the size of the size of the hitch on the size of the size of the size of the hitch on the size of the size of the size of the hitch on the size of the size of the size of the size of the hitch on the size of the size of the size of the size of the hitch on the size of the size of the size of the size of the hitch on the size of the size of the size of the size of the hitch on the size of the size of the size of the size of the hitch on the size of the size of the size of the size of the hitch on the size of the size of the size of the size of the hitch on the size of the size of the size of the size of the hitch on the size of the size of the size of the size of the hitch on the size of the hitch on the size of the size

Ome. What was the central idea that Doney hoped these operations would reakze? Cooper 1 think if's a message of pol bial for world a welly a great place to ine in 1

had met fem a number of times, permiting through average circles in which he was active but since I joined the company live learned more about him. He tended to bring out the best in people

Ome: What about the percestent rumor that Wait Discov-

Copper: No, he an't tozan 1 don't know how the runor started, but 1 think he was busy right up to he death in bitrging overyone up to speed on the projects that he housed their would carry on

Dense: What does WID Enterpreses do' Copper, its two massaich and dowlop ment group that develops the thoses the notes over nucle testis as starting barroy parks as well as planning EPGT Weir not a measureh laboratory but we inn't bighther the laboratorism. Indrags and the public and presentations that contum term has a working night and-basis system.

Ome You've been thank beloto, in the early cases of manned spacefight when you and the other astromast stakked your lives on the nuts and bots. Wate you over lighteead by anything NASA wanted to ty?

Cooper ha i there we were wing to go tather than they we run most coses two had to ind out the limit of acceletation beforence ii were just back atgles to exercise argins much lower than those they argin the much lower than those they argin the much lower than those the arginst the much lower than those preside when they is each, but you store is a solond pain. Twend low that causes a to be pain it was like transpir a werk pain at the like the much pain werk pain.

And in the waterback least with the presaverage autors if the list of us non-yield downlead when the suits filled with water and darged as down like archest What I be workike machine to gat boths untace. The stang, involved a tori of biblecreek/ highstreage strusters, but reducily high lower has a thing law that was goed to happen was breaked up before your link Mecosity fraction tables.

Cooper: No, because I di worke de long um hardto gel them. These was a links bi di rannous ambigation, I augoporo, Nu'l Alexan because I wort to silese on the launchated during prior of the holds. Orcan was north: I launchat dativent for will and dative I and the anti-the site of the dative I and the site of the anti-the thewalth and the anti-the site of the dative I and the anti-the site of the presenve and hardren to describe

Omnit: What about long-term effects? Weenitthe doctors worked about radiation diamage to your reproductive system? Cooper: In those days we knew it is about contraction invite se



He thought he was safely in the past, until. across the table, the future began to speak to him

stand of the townelike almosphere paved street ran sheaply down ha in Albere and Givohada. My head the tate stadencies of commercial curtains and plastic fowers in the the wayside shrines I passed on heat of the summor with the smell of black -- all the women wear black. dust driving down the spent of the lafter a certain age --was tending Nofrilis No plastic foreast Armed with ensuch of the language to buy a meal and to book a the velage prest, from a distance. Petoprinese keeping off robe but he ignored me the good roads patronized by the The first to greatime was the German campers, looking for prophetor of the twema, where I on a plassical pecketal I found succeed paths between at me incurrously, and sometimes he had gone in search of the village of Soprikada. Those same Eventually I had naw garlio, good the sparse fields had been piled comild beet for my moal. And ouzo

By September I had had all I could to form the without One rubble-

good water - a suse san \$1st there. quests not tourists. Then he sent a goats harried by dogs whose small boy southing of through the

PAINTING BY FRIEDRICH HECHELMAN



The Granks, challand people pererally incommating a loken strack general as in who broke the habit because it was not

slip a few words of English sconer or later a Otion t is a portlyman as full of dignity as a ration and heavy balled over in the blaze of August, who ran a saloring business in the Bronx or a restaurant in Chicagosuity years of a vilage like Sophiada. dry-white stone dry-fawn dust, dry gray he was born, or in another across the alrest, as if the ection world heward were a deep?

Semetimes it is another reason that be atows knowledge of English-wat In from the soverne loaned as if it were existing shell was shaked the man of the village. guerrilas- and they thought of Sophikada

Oh this is not uncommon. Other small em America. Yorkshire coaliteide, peasant Grooce. The reality of the jown's remotenew orps men and pulls them back. Only the alien language seems to revive fre cream You see it in the drinking when they

In any one siliage them are seldom two Il There have been other wars since titled give tree says as much as anyone mind its offacts detinably evil but endur

No the talk is of the larger world of the deam because a visitor is a reminder

In Sophkada that right there were no feworthan three who spoke tar to excellent



ness. Spiro came tint-- squat-mallogary tenned, crawing at sity plug. He had served performing some kind of commando duty

better English than either Spiro or the third one Nico i realized the when Gheorphios but later he said elmost nothing during the only sat noticing occasionally and studying me with a frown

his disturbed me. I paid as little atten-

Fortunately, Nico helped by nearly monapoliuping the conversation. He had subcleurs. By my guess he was the only boasted about his exploits to his trands. At any rate, though i found healexcited relation cernus of the Greek spint I noticed Spino

We talked anyway We drank, and I menaged to pay for a fresh carale about three buyne, which was absurd, but it was no

Later Nico and Spiro left and the proprtemplate a bufbous gri in lund colors on an

That was when Gheoretros spoke. He

I looked at him

Get it he incented. Who you remind me of Tiger Bear Moigun " He pulled himwill up on his char from which he had been tanned elbow on the table between us. His English was as fuent and well accented as

Timade you pretty uncomfortable." he actored with a chuckle. Staring all you all place the likerway

He closed hig long-knowed hand around sighed as he set it down

Who is this character i remind you of? I d to the contridive outside to let of the tavement my tredness and the sun. Initiahid me off

12? Gheorahios stratched and vawned Was I'm alkast He was the fourth of-



STAR SEEKERS BY ROBERT SHECKLEY

A new frontier has finally opened, and the human race is at last on its way into the universe. Yesterday our first Columbuses landed on the moon, and today our Magellans are training to explore the star lanes A flood of imaginative speculation precedes them



As an of ensuing hange over many of our migrating with physics, the base science does of the dirulties in getter physics. We want with the we are thus, is primp back on one pices. We want with instant We are going physics before the pices of the science of the altern traditional the science of the science of the altern traditional direction of the science of an over minima. The exploration of plann visible as science of our over minima. The exploration of plann visible as science of our over minima. The exploration of plann visible as science of our over minima. The exploration of plann visible as science of our over minima. The exploration of plann visible as science of our over the plann between the science of the science of the science of the plann the most science and classing of each of the science of the science of the science force writes and directions date science is the topological back topological as also also as also as also as a science force writes and directions are science.

(Preceding page) Making Repairs, by Denet Seech Sothing New Life Forms by Rosecia Mont, (above) Galactic Wernors, by Paul Letry (wh) and John Sotherheim (right), (right) Contranistion with Hostele Alexi, by Kenn Barr













Clockwell from Att A Long Way Forth Home, cover plancing by Kelly Featr N Caedimons 1977 recording of Robert A. Headens The Green Halls of Earth Tak in Hotelaus, be Microard Wheten The One Who Staved Behand to Dwinit Steela



.

On stants I mail Lutternad

The life hands come up and logable, the boals clasted unce. No chip this term, and the was another train-the way fraction and the was another train-the way fraction and the sead at last. I confide found talk lower Never Never Never

We inclume to them in a rush. Can like to a condence? Is that what you're taking? It you to the excepting on confidence, can you trust me? Is that what you want to now? Is that why you — the gestured — "turned off the communicator and the recontra?"

Confidence yes

Well driver, Aquasis. Dom Felix said de vourig: 1 give you my tarthou word that whatever you say tome in contidence, I will never report to a strole barca equi-

Soul It was probably a questo

I will nover repeat a confidence to any erson in any way

Never

74040

Dom Felix set himself to social switcher tors -- shattering ansazing revelations. He watched in new astarishment as Aquate skid of the set related behind the panel and turned on the recorder He obsed the prediction of the locking pin, and perhaved to Dom Freik to Jam on the commenceator Dazed, Dom Freik old (1) was net until weeks lase that he learned that such controls washing mapped and only to the Jaman hand so designed that he falling object or carelestry pixed carego could solver it by accelent and that he We dawn hand would not affect this type of swetch.)

Just how much ferrars pethnology allo be and the comparison and underwert a while decaying chen of readers and the participant of the sector of the sector method and the comparison of the sector of the communication from all the lab of the communication from all the lab decay to have a decaying include on all the sector decay the problem of the decay to have a decaying include on all the languages. He lab have and all all he languages the lab paid and Acoust officiant, and in good then they came to decay the decay the came to the sector officiant.

The holds, Dam Felix thought, are just too dama good hie was by no mains the first to have that thought in had been a common observation and occasionally a bette cry for over a century better his with firms "hypotologicals and aducations had oried doors over that technological refinement for a logit rate, lawarefing the inclusion



Contrast for gains of the tracks, where the contrast of the tracks of tracks of the tracks of tracks of tracks of the tracks of tracks of tracks of tracks of the tracks of tracks

These neights included through its met as has and in also allong the could fill of the list back segment the plotory warmfield wall of choices central building, the can with the same material all light is strong, and counposed of particlements (biggshere in isome way the individual back of through and county building as on many that the light all loads in Medicen terms, we oblights at loads in Medicen terms, we oblights and the

Intry on a Aratia sejatibit againti the Resarrose try data Charatorialy was watch than and laws, procurately to set, the Resarrose try data Charatorialy was watch than and laws, procurately to set, the Resarrose try data charatorial protogrammeters and the results of the grad protogrammeters and the set of the grad and the set of the results of the grad the set of the result of the set of the grad the set of the result of the set of the set the set of the result of the set of the set the set of the result of the set of the set the set of the result of the set of the set the set of the result of the set of the set the set of the set of the set of the set of the set the set of the se

And all this, in depth and detail, had surrounded thim for days in his research; he was completely familiar with every sight and round and testure and the difference between the holo and the difference. sight indeed it was this that brought up the fraughts of the Sunction of holography in Terran outure, and "Doing to Ansis" What the tell for?

He found out what the hell for

Aquate sealed beads him, whitepead and burged into the translator, which said, "Food for you in cycle." The attrost monotone sounded harah and loud in the big hall. No Arcan indicated any response

"Thanks: Aquare 1 know 1 m not hungry just now"

Steen

Baren it ihouge born Falls, using white the states of the art to design in some purchaster for that take to design in some purchaster for that take to design in some provident that the interactive memory arts and the interactive memory interactive memory in the state through of yet? He took a chance and skad, Thir not always, either

Acuate said Confidence

The scene in the cycle rushed back. Ab solutely Aquere You have my word. You may trust me

Trust Yes.

Sterice again. How in time, thought Dom Pelix do you bring Acceptance to people who care to in inverse dom't, concensivale with you and call to don't or maybe don't need to commandate with one another? They --

He assped

For perhaps there seconds he ween there at all—not in Arca on Medias, or any, where else he had ever been or need about or been told about or holeed.

The sky was while itazzing, bugst all was all bights and with output through only and bights and with output through only and bowst in tarking and with data itation as a moved the finand was metered and big part or it high bights and big parts are and the sky and the sky and parts and the sky and the sky and parts accurate hand the sky and the parts accurate hand the sky and the sky and the sky and the sky and the sky and the sky and sky and the sky and the sky and sky and the sky and the sky and the sky and sky and sky and the sky and sky and sky and sky and sky and the sky and sky and sky and sky and the sky and sky and sky and sky and the sky and sky and sky and sky and sky and the sky and sky and sky and sky and sky and the sky and the sky and sky and

The ground shock and he was award of the ground setsuch their approximated loga animond situ, with many pains of loga and heavy feet shall beaking, holdread animond setsuch and the setsuch and to cauged the root leaves, heavies an through caupting a wardhout of leig setsily ground his inverse develops, and lead as in mover caupting a wardhout of leig setsily ground his inverse and lead to the setsing the root leaves in the setsility of the setsing of the metric counter of the setsing of the setsility of setsi

Acceptance.

Dom helix fired to open his eyes and so cww could not. He had not yet closed them. He began to paint clowed for a moment at the foor on each side, started up ways from the wall, and then he had to pail down his coul to wipe the tweat their poused down into his eves. "What way hat?"

Word every Agusse pointed to an Arcan humened down against the well to the right Indext undextend

The

And he were weightings, no see were a better work inding warm wind his looked alward and see others of his load with wold curved wrags in of white, idear bodes he loaded warm at housend me, which is a specified bare set, specified with whipped barm his load access to this list alware of hern and underplace that they alware of hern and underplace that they even stateworks in a weat warm with

He billhood and he was back in Arca Shoken, he said. And they said rothing over happens in Aina. He teert to leach

♦ To his astonahment, Aquare squatted on the deck in front of his seat and with the powerful beak in the pain of his hand drew out a locking pin A panel came ajar, he opened it and reached inside ?

Chirp chirp chirp. The sound was sligge there nore of the others did it "Rouse" please

Aquiate averted his strange head to look at Dom Felox. He sidd, "Come with me." But when Dom Felox started to get up, he stayed him with a gosture making him at back down.

And they moved through a landscape, the Median bactions, downfroms mountaintop and into a pocket cargor with a date, crocked later later to bottom. If was heavily overgrown with low shrubs of many kinds and long-limbed, reaching these

The wind sale other norm merchail how in this shelled wills, and it was caser to see without the perpetual whild dust device the same set of the herg. Ocean Demi liets was Demi Peter norm of a plant or a book herg and the same set of Append without some diversity and appendix without some diversity and the same set of when some that the week both nonble to addrict that we wall not set.

An animal was snuffling into a bush whether to browse or to hunt. Dom Felax cald net be sure. It was somewhat bogen than a trainer lost, twis was degend-no, expression and the segment of the segment conversion of the result of the segment of the trainer than the segment of the segment the next which was upfortunit for the next of a limit the information of the the sec of a limit the information of the the member of a server of the the the information of the server of the the member of a server of the server of the member of a server of the server of the the information of the server of the

As they watched, income rained of the correspected-rowns fill watching on with the longer bolimble equipped with clarkle ingers and-yeak thad only the legal and a short clarget, thick tool. A sort of certain the creation, which preimmerse, furg and the correspondence of the legal body ang claws into the lists of the legal body ang intern and begins to occurate extravastically an Nelle with four legal formale with elant.

Derivifying seemed to mist over and return again to clarity. A wry strait portion of Dom Feiks mind was amazed at this combination within hits of intense observation and uncritical acceptance. Watch new that later.

There was a change in the valley probeby selectal part of the complex gumber of Medion weathers to which as in all its kind, the wegetsten had learned to accontinuous Busins seen before were now leafloss, new vince were noting up the trees, which had chassed hermalives the same new occasion. Clearly some sime had persoid.

Again the sow the live animals. The male beared alarity examples the female. She had changed districtively their hindiquartees had blown up grossly—the last pair of legs seemind blavity liab to support them— and had lost some of their meterity, as that they disgged rother than iffed. She seemed fairly uncancerned as the noted among the underburgh.

Basilety for less top along the design of the second secon

The offset runned back to the lenselse who had regarded this insighty confine turn that charterist She had offse parcers. Here spikely legs and the was numbly charged by legs and the was numbly charged had rundarities along the ground Dom Falv left an uspit to have here to stop on the rundarities along the ground Dom Falv left an uspit to have here to stop her to beyon here then spingtheread backline was invisible. He wasn't nearly here was here

Very concerned, the watchhold the situation of in the liab day aschera, used in the prover between it and the next anable wat prover between it and the next anable watch (or gring 1 subooscillar) where the ground, now hereichd beautif the thistial and entering allow, anable, and them audientify and offers back potential by the stage of an allow and an anable of the anable offers back potential back and and the back potential back and and the back potential back and and the back potential back and the back potential back and the potential back potential back and the back and the

The formule stock particle, purports parts, with which the main methods in the first way formated to nee the main memodative final methods in the signs. Instructure and foreign blocking, the immediate while what socked more lines around that may method the social first and and hung handwidthing to parts atom by the shared with the parts atom by the shared of the parts atom by the spars in the main client give the apart file main client give the another gence.

Again the scene mitted over and correct Divisionally limite has been approximately and a method backware and holding under the backware had indegree the scene of the scene in the scene of the whole of the scene is to goe before the whole of the scene is to goe before whole of the scene is to goe before whole of the scene is goe before whole of the scene is goe before whole of the scene is goe before whole whole is the scene of the whole of the scene is goe and under the scene is goe and the scene is goe the scene is goe and the scene is goe in the scene is goe and the scene is goe and the scene is goe in the scene is goe and the scene is goe and the scene is goe and the scene is goe in the scene is goe and the s

The second male (whether 4 was the series of the had sain before one), Dom Serie of the had sain before one, Dom Felcone sould not be susje (application on the second saint) and the second saint fut or of bayes are be upped periodic or the needs over, dealogging this and/second the needs over, dealogging this and/second the (altituded this floar, feet under hims and (altituded this floar, feet under hims and (altituded this floar is the tunder hims) and (altituded this floar is the tunder hims) and (altituded the second saint) and the second saint) to is come down with team (altituded the second saint) and the floar second saint) and the second saint).

He sank down parting, to set for a moment and than couched own the corpsewith a sense of blows with the hardspur in the contar of his forglimbs: he created a like of calkbases along the creat of the skull, the way one might chip a line are block of lice preparatory to creating if in No. If was done with schement in that is

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vou leave of



Appriated to be an old skill, or an interchile proprogramming. He then forced the long fingerike claves of both hands into the crack and strained. With a snap, the skull opered like a book, and he plunged his face into it, orbibling

Meanings the fing under the busil begins to originary services are of the hill a caracty since over the service of the service

The mole, blood and brains dhopping from this long sources if lood per their long the policy sources in the source of the long the policy of the test of the way. From the control of the solutions, between the blood period of long sources and a source of gapmand or the long (long and control of the sognet of the long (long and control of the sognet of the long (long and control of the parallel of the long and the long and over to the during of the langest base and they and the solution of the langest of the out of the langest base and they control the long based of bissission, manyward have frame frame, the solution of the langest of the control of bissission, manyword have frame frames the langest bissission, manyword have frames the langest bissission, many-

Dom Perix followed him shocked noiselede gathamshad himemay have been another switt making the cauld not be seen. But a second raw to be a offerent and lower part of the willing the size name the monthie according highling the size name north review in was the bocases the had only avoid part of the willing the size in the off part of the last part will name.

Aquare, do I have to go through this whole thing again?

Approving viol. The scenes mixed and decend with you a glimpse of the mile guistre glows the ultrativity and the initial guistre glows the ultrativity and the initial boar. Felke found himself following the more quady partial famile, apparently not all the works for way, beginning to may not core to all only line all young gain. I for they take the formation to pay of the take the second second second second second to the take the second second second to the second second second second to the second second second second to the second second second second to be set of the second second second the second sec

The mist, and again the view of the adult make. He seemed to be having trouble knoping a stady gait as he trotted along 102 CMN The latt model of a stream bod above the late subdorfy the latt, can be not bank, but could not he jay for a white, gathering strength and this factility frameworks and bagest furnarially the stream of the stream of the stream of the could answer and shift his body is the could ansk. It spain: then by an it to leave the ward and stream of white his laterally the latter and white his body is not above ward and stream of the laterally the latter and white his body is not body and the stream of the latterally fell back, spain-frame lows all spains, and the dated introducations using latteral the stream of the latteral stream of the latterally white the neuron lows along that and the dated introducations arguing the latteral white the neuron lows and the latteral white the neuron latteral latteral the latteral the latteral models and the latteral latteral the stream of the latteral latteral latteral the stream of the latteral latteral latteral latteral latteral the latteral latteral latteral latteral latteral latteral stream of the latteral latteral

All length the creature got to the feet took a feet tolering steps, and, but for a quack stoop and a touch on the ground with one of the why furthinds, would have failen. It that quark with a fifthe mark success, and very soor if wats welking stimot complet—weak to same but with increased contents.

The mail than a mature, bipedal solut, perched on a rock staring all into the distence. Under the rock another contempla-

He knew he was in its path; flight never occurred to his plant self, fear hardly at all. When the jaws closed on him, there was regret, and something else 9

Taky cheering on a motion the class A heat polyma along heat servers that approximation looking for whitever might be added that a heat public weight of the unstance of the entropy of the servers of the beget and losing heat heat heat share that the thermal heat heat heat heat weight of the servers about the the servers heat he

The most, then Arca

How longhad (takes? Dom Felix had to charanteler within there estore out in the tyck), but he was not hexact to go for it Jacqurg by the indices of husger and third, he tait in order and no less than he had when that shat vision explosited on hem "Aquiter who are you dono?"

200000 1000

Antawaring what? He hadn't usked any-

"Yas you ask," ranged the translator

"From detrost you tek, all day all time " "Aquare! I didn't say anything! Can you

"Aquine" I didn't say anything" Can read my mind?

"Do not know read

"Do you know what i'm thinking when i on tak?"

*Contrience

Dom Falls was a little nettled at this "I have promised and III stick to if Do you know what I'm itseking?"

Aquan droned "Fithylttle camibal stovermin Also how the hell. Also what is he drawn how feet."

Should Hear?

Tis no should is only is "

With a fouch of examplements Dom Felix rephrasedid "Did you- do you etter d to do the any harm?"

Notherm Maybe hurt Just truth

The truth cannot hurt," Don Felx said

Otrop chirp chirp

"NotwithAcceptance, coant," said Dom Fela in his O.F. D. trop

"Fifthy little cannitsalistic vermin is acceptance."

Dom Felix suspected, and rightly a questor mark on that one "Aquare, inside no manal judgesents on snimal behavior." do roserve the right to express disput an what it find dispussing "buy of haven told me how you do this, what those—those and uncertain are."

All sentent intelligences can do

Well Loan)

Aguate soid nothing. The nothing lasked a long time and the more Don Folks replayed that interchange themost lustered he became. He did what he was traved to do. He confronted "Il think you have juz soid I am not a sentient intelligence."

"Met *

"Louid learn it, then Horo? From you?"

Steaming Dom Felix thought his thoughts

"Not arrogance. Truth " the Medisan responded, just as if Dom Felix had spoken would

This could get to be a real nursance. Hostoring to safer ground "What were those - uh - pectures I saw the piece with the white six the one with the birds?"

"Not pictures, Is real."

"Somewhere on Medea?"

"Not on Medea

The birds that sea-that looked like

To livera

'How long ag

"Is now You don't behave."

"Of course I don't it takes a beam of light fifty termavears to travel that far?"

This not light. This is now

If was at this moment that the Receiver

"Can you show me Terra span-Terra

With one sweep of his head. Aquais scarned the entire chamber "No one is being on Tena now"

I shought not. Wishing he could retract

the thought. Dom Felix said. "I'd like you to

This is place of reward Arcans sale any sectoral intelligence anywhere now ently decided to expand "Reward" he here, at be anywhere Enough go back,

A sort of shrine, a retorat He had the ing 'Aquare why are you telling me

In answer Aquare mimicked the Accept tance gesture, hand on hand hands Hen away be bed or lena lie plant on fore, maybe you very very great Terran Marbe you most greet Terran Marbe you make all Tensins be any sentent mela gence anywhere now

other creature, see and teel what they are

It you very great Terrain yes. It no, no "You're not taketsing me you're teating

was not a word, but the flash of a picture

Lord to I ve bad excupt of the Who

ohild a tity stooped soundly have

The bourse remained Beads them an

The outputs facied Dort Felix tubbed Fairy him canyobetabo warvan him nad

He thought Aquare was about to return it.

Dom Feitrig water was awapt sway be-

health and ky surpassing environ he had See them curving up out of water and their permanent smiles and their rackillion of my This however was intrately more under a whalk sky and the good hunger to: pale orange light more than climitang the

A dischar is more than a plant or a bed, a dolphin lives in more than speed and toam dozen more, some even now without names: lowth and speak with them, live in human colliprehension. No living thing exists more immediately more instruction

> Lit was somewhat larger than a Terran fox leaged-with a segmented body covered with fine and for Two small limbs hund from the base of the neck 9

sense all dolphins are one dolphin and sea from their evolutionary adolescence on

work) of the while sky 'Hr. these elements central access to other aerberice iron with the privil unity is prime, and individual but when the clearft comes, it and attie more of its kind. What it had when it was an is no more, the sharing endures and is im

much-encapsed Dom Felix & comprehenpermanently What overroded was the sight

The city nestied in a small deep cover spire on the south. Most of the only was overlooking it perched on the cittle that formed a backdrop to the lown, were linked

Dom Felix knew this city intrnately-he prowft-most particularly in the chain of buildings aloo the citia. The Research There was certainly nomistaking it The only duling was that real and glearning and complete and in addition with that weathnne buildings-mine, when he had, on dat aga plans and some graded ground-

He had given credence to these overthan what Aquare and they were 'What he' that could hardly be a dolphin's concern. complete it had been completed during

Therefore he was -- he really was -- look-

Humanity has always responded to the willy is not the same way Witness the Terran winchouses Witness man's flight Man but he found a way to by and that way was higher and faster

(But always higher and taster?)

so much so that when Aquare spoke to him twoe without a response. Don Felix reland store in the post of the loss of Arcan meditation, ready to wait for however kong it might take

Simple words with laver upon underlaver of cessave explosions of planning

Yes DO

NTERVIEW

CONTRACTOR PROVINCE AS

The Yan Allan nakaton balls and other sources Anthen indiation separate in nonline to be wely conternative, were putting the naka verying). So we were method plants to set up it bow moment bank with normation from the calmins on that we dut pattector indiation, we could termoluce our own finate in nailese damaged memory. A normal of up decided termoluce our own finate in nailese damaged memory. A normal of up decided we other want to all a valencement to or objecting down

Onwill But you recently became a tather and-

Geoper: Yeeh I had to get recycled its a life more complicated than a vesectamy but it works. And then haven been and long-term raid ation effects, so those lears, were groundess Many astronauts have taken regular phreatist to stay active as priots and so the declars have been able to keen pretry clear take for an

Owner: Do you feel that there is still a competitive aspect to the space activities of the United States and the USSR?

Cooper: Right now mans at all. Our appare importmin the term out back to diretal cally that without any doubt the nest spaces starton the works sees will be a Sewart one. They centainly are speecing several times as much many in space as we are, will write had some informal invisitions to come up and participate when they get is built because they well aware that we in not drano much.

If this we could work with them onal fold Integra has work to all one work to all of us and this hay reaving to cooperate bacoust they not fold the villarive economisms imment built to built you than as a people My with and I were host to Amabactador (Analog) (bodyne work them as a people My with and I were host to Amant Cooperating and the sound the and the second the sound of the theory were all guardiaughter all Demy in the cooperation of the sound of anyon on the diverse Wassement.

Onsel If they are indeed willing to cooperate with us in space, what about our end? Are set trends and will co?

Capper: The truth of the maker is that MKM doesn't have a vel-of-most space program row il heart text goal frai evolusimulaie public relatest. I here have to most anterest is out here dopine the tail-oftim most anterior during the base Applie Rights because i se grawn hundrisch, or black around text evold about the named base around text evold about the named has been. One if it execut that for here been allo more interested?

Betwee my, if we week to amounce tomorrow that we had a manuel massing seting ready to head out to Mars, you'd set a high level of public misses? If thisk write criticy not to have a world space program, comporting the talents and resources of the whole earth Sweet space exploration.

"Before TDK picked me, I picked them."

9. Social to view much registrand through the central adaption to the Social Physician Countiess times to check quality and performance. We fix we tail a far in continuon with Stevice. Each TOK costete has 350 components, assembled with Tok costete processon. There are 2017 check points for the standard control of the standard points for the standard point for the standard points fore

why each TDK package bas a full lifetime warranty.*

As we discovered, Steve has been using TDK cassettes for years. Long before we asked him. For a perfectionist, that says a lot.

the address of the sty IC samp and being the sty IC samp man being the state of the state of the state of the state state of the state of the state the state of the state of the IC state of the state of the IC state of the state of the



shouldn't be left entrely up to governments' because a lot of the neal innovations come from industry I thris EPCOT is an example of these entreprise movision at its best, and I'd like to see more space reserver han thet source.

Others: You were a technical consultant on the Nm The Black Hote. Whet do you think of the recent surge of interest in science factor?

Cooper The public is opening its eyes to a bit of technological possibilities. I read soarcel technical aido, and i priver it termstates progressive thinking. Chicken today are interfailly sharper than they used to be, and both they and their parent are realizing how much solence technic are realizing how much solence technic memory.

Ower: EPCOT s activities and space programs aside what other technological possibilities do you think are taasible?

Cooper: I think we could very likely bring together the talent to build a time mechine Own!. Do you really mean that?

Cooper: Yes, it is theresteadly possible of though these are also of passible but can be a revended without typing it is would take some except tensil engineering and physics. Taket, people who are progressive in there think is good to our in their technology but think is could be done.

Overs' If a time machine were built, who would be the first to try it?

Cooper. You re looking at him. We didn't know much more about outer apages in 1959. than we do about the possibility of time travel right now Size. I divoluteer: But we hitrihit even started counting herdering

Oney Let stake up another subject on the Image of science. Do you think UFOs meric sences scientific attention?

Cooper: I certainly their they should be considered with an open mind. Very likely well lind out about them sopre or beer but probably not just by analyzing pills agits may. I likel array to the scientists who are womed about indicate framitier collexities of their should care what their collections.

Other When show to repeated stepsor terms that the shorts has a many UPOP Cooper. It gots back that there were during there they desting appendix of the short of their with the schematic there. UPO mettical with a schematic there upon the distritt or choose masses along the discourpoint or choose masses along the discourtant (but registrit the schematic theory on table to prove anything schematic theory on the discourse of the discourse on the discourse of the discourse on the discourse of the discourse on the discourse on the disc the schema you have been discourse on the disc the schema you have been discourse on the disc the schema you have been discourse on the disc the schema you have been discourse on the disc the schema you have been discourse on the disc the schema you have been discourse on the disc the schema you have been discourse on the disc the schema you have been discourse on the disc the schema you have the discourse on the disc the schema you have the discourse on the disc the schema you have the discourse on the disc the schema you have the discourse on the disc the schema you have the discourse on the disc the schema you have the discourse on the disc the schema you have the discourse on the disc the schema you have the discourse on the disc the schema you have the discourse on the disc the schema you have the discourse on the disc the schema you have the disc the schema you have the discourse on the schema you have the schema you have the discourse on the schema you have the

Direct Dutinit you go after some UPGs as antan force prior in Germany withe 1950s? Copper: Tes several days in a fore we sighted groups of metallic assoremated wholes at great abtudes over the base. and we tred to get close to them but they were abilities to change direction faster than our typters. I do believe UPDs sent and thet the that unrestand ones are tom.



some other: technologically advanced colliation. From thy association with sicetil and spacecraft. I thrick have a peety good desi of what overyone on this plants hals and their performance capabilities, and I mausi some of the UFOs at least are not hom anywhereson Earth.

Dense. Aren't you concerned about the reaction of people who may read the?

Cooper i in always been finness about my were in the ways it because the entransition have been about y maquated by meanship comparises, it is up to each of an to always against people who uses it my name for accommodal watching quoting me in the existent people who uses it my mane for accommodal watching quoting me to the effect half in displays to formore the people and it any UPD informament cost that all than uPD informations and that all than uPD informaing the means that all than uPD informations and that all that uPD informations and that all than uPD informations and that all that uPD informations and that all that uPD informations and that all that uPD informations and that the second of the second of the the second head to see allows to the second of the se

In detense of the mixery stitude, i.com i really biamethem to borg negative when i consider the indicatous things that have been said and writer and the fact this the mitrary is negative some time accustly its a life embarrassing to acknowledge they can texplain spore times.

Offer Do you think there should be a scientitic project without built in brases of that type to study the UFO phenomenon?

Dependence, Well and it hooks as if Prance has been apport to tappin councy a popular and a provide transmission of the subject in an instant open minode internet: to accurate and watged contacts. As I used I must need go based and contacts that faile you strong to be the the school that faile you strong to be the the school that faile you strong to be the school that and in the hot work.

Otex: Are people psychologically waidy to face it if UPOs should prove to be manied by visiting alerg?

Cooper: Peoplewanto know what agoing on in the world around them and 1 hink thay representation the test world be a Allocation of the state of the state of the Disc because of the above transfer and have come out on the subject. And a location process are allocated of the unknown. But the main we know the greater the likehood of training UEDs in a famely faither.

Omer What about your own future plans? Where do you fit in here on Earth?

Cooper: TI be putting more time and effort into consulting with companies acrive in which advanced technology programs can do things effectively on a dickal scale

I think we is a la contracts in the "We have the ability loading outsides in dryst have in progressed mentally or psychologacity to the decount that it set worthwhite to bave curselves of the lace of the earth set in the engine black at the optimized in the base in the engine black at the optimized is the engine black at the optimized in the set in the engine black at the optimized enset is the engine black black at the enset is the enset black at the enset black at the enset is the enset black at the enset blac

PROFILE

Back in New York, Stanley Milgram is taking psychology out of the lab and into the streets

hy av color Cy anocks, ordinary people who are not what they seem to be They spattang from the med of Dr. Stealey Migsam accos psychologist, talacher, vrauces experimenter, tamatec songwriter, and most moently, unalyst of the television program Canada Canana

Dr Milgram sat by the videotape machine and delivered a short preface to what was about to appear on the memor he vice was set but the spoke rapidly. Words and idear moved cyclele from his mind. It was hard to about hem all, much less write them down

We all have a musiced way of commanceding with one another, such Migrain Mary of these access convertices most are real parton. Byte logs such aliance. The Cymercel provides one means of studying these masks, finding out how penetratile they are, and discovering where the mask and and the covering where the mask and and the believes that showing is better than tabbilities that showing is better than tabto. It is chose on the wedectare.

The TV sceen revealed an ordinary esting Two sources, a man and is woman, set at a table, taking about the woman's proposal for a psychology project Ster wits an carreet gadiato sources. So was the main But he was also a Cymond, a regoeter of words Everyffing he saal was being fed to him own a wreides electrone to condo settad in his ear. The other end of the horder wits on the oppose soils of a

PHOTOGRAPH PWARCCHWARK THE HIGH PRIEST OF GUERRILLA PSYCH



care-way mice, where Migram Introde Mark Interchedinithretic amorphone watching and statements to the tappopping the Heart Medical and Interpreting. And with its the purpose of the state/of and a cold second last the Cyramotic in the next room would separate the words, using this contracted that the words coming and other month of the mains in thord the weithe being binned by ing to summon the cold second methers are not all set of charts have

Throps got more complicated. Migram sepped weak from the microphone and another person look the since continuing the conversation through the Cystende. Then werean news inclued the difference. Then a third person complete the mike in the spatial of a low microps, the woman spoke to three people.

In the dam byth term the elevation screen, it was clear that Mylar was plasted. A huge semis apread across his (new) boned ment. It screens had welfed in at that scream had welfed in at that the hist time. Majoran had seen anything the hist time Majoran had seen anything beat of many ingeneous and seening mitantic of many ingeneous and seening mipermystip the Majoran had cealed.

The mend of Stanley Migram, a ventable idea tactory has, for the past 20 years of the career. locused on the problems and condifferent of toward beings hings in complexcessedar. Therefore, produce dry hingsconservation toward being complex that there is non-neuronal beam hinds withing complex there is non-neuronal beam hinds withing complex a substance making all of us no most than a substance making



psychology out of the lab and into the streat

Skep the Cynameds: The idea for the expennent came from Peroch dismalet Biomord Restands Cystem de Bergeate. Duing the third and of the plays the with both themain Cystem and the handsome but duil Christen started under a blacketty, sind both woo thair beleved Resame. Christean stards in the monolight, utering the sweet nothings relayed to tim by Cysten, whose holders in the shadows

Migram adjected the idea for what he only the Qvinit mode of speech. The persentrough whom he channels this speech is called the medium of the Qvinited "The a way of setting particle perception." The example, whether or not anyone would percent that you be an eight here speech toops that you be an eight here speech by Or you could let pergetion. Put is there me in works with.

Migram has even used the method in a true Cymonikie way in one encounter he hold a sity mails student take to another student, alomate T grave him a line to ropest Migram recalls, and the gri responded to a t was a party good kine. Later the student takit me he really encount the expenence.

Magain admiss his acquiriment his a acence action hear 'A life Connorth' Branch or Investori of the Bady Shatchen's he way thoughtfully. There is acromthing robotic about the process. And the wortes that this suchnapau mellific bail loa invagenessis in mich produce. Timight work before as a rowel, "the says, in all senosithetia.

Driving could revise such a statement Polychology experiments and out, assally the statil of which foctor is made. In MHgrain s code between they never been ches grapp of experiments he partformed in the SRDs has shared been idored as a pilly in London and a TV drama on CBR. It is uprefix the beams for a mode not being Wined in Function. The sport of the experiment Disoletteen in sitemits.

Byt there receiving the additional from harven to harve with logarith them a group begin ready to a grouped that would be the logarith and the additional to the logarith and the second that would be logarith and the logarith and additional begin ready to a grouped that would be logarith and the logarith and additional begin ready and the logarithmetic be an strateging the logarithmetic be an additional to the strateging the and group works. The strateging the

The subjects were loid they were going to take part in a memory test. Each one was instructed to give an electric shock of a certain voltage to the learner every time he or she gave a wrong answer. For each successive errorg answer, the subject was to increase the voltage of the shock.

The subjects adversaries of the stocks by Trajecta a welch on an implement cooling and of to welche, even is also out a power level—town ADDARTE PROC to power also should be an onmost sous Attraugh the machine island. I deviced for association at the learner welche of a corehity indextuned iseres of scoresms (for source), adjust is address of scoresms (for power leagers in tated the pairs) if for auch power leager that stands the pairs in factor association of the common the subjects that the characterize in the tor colleverd

Magane aspected fee people in to all the ways box, even score the utgrad of the authority tapies "Box/characteristic host-index people and the second score and the second score to proceed of the second score and the people second score and the second score to ass. Mary of hose who heapen the available second host with a second score to an analysis of a score error period box marked and the second period score to an analysis of a score and period people and the second score of adopting and the people score of adopting contain stand is available to the score of adopting contain stand is available to the score of adopting contain stand is available to contain the score score stand is available to additional score (score score) and the score score score score addition and the score of adopting to the score scor

When news of the experiment got out all hall broke loose. "There wire popular are rise, that described the subjects, behavior at each and satistic." Mitry an eye today. The writes model the real point which is not methods people are in the lact of astrocy's beams from 6 in some consequent attacked the experiment as being untellincal. Beind the larch Mitry and passes was the shock of lacrony what the experiment uncovered. The belves that in or one had proposeded beyond the into site loads astopped at the timor law, last example time would have been no childran."

Assed whether he regrets having done if the yenawice who the heatboard in Not at all 1 below in the experiment, and happed in representative of "Summing up, he adds, if a been more twenty years which that experiment in all probability tills the most important experiment (Two and a the time, i chini sealers it would become my professioned eventy."

It was feel, and more it made hat a weeknown man hat bigetten as well as to searching He appendication that 'V conjumn 60 Alandas, which and his films of the experiment graphically re-creating the samples And has succent, body writes took on the subject. Observations is Aumounty was nominated for a National Book based in 1975.

Science of one kind or another has always been part of Migrama life in hepschool as exter of the schools coerco managine, he over ed among other



trange the biological hexards of radiation He also wan the school's gold medial in biology Heinementers welking the streets of the Brank taking about Zeno's Paradox with her hierds

He also worked at a noncoertific skill thay would come in handy later in the stagring school productions. The fluxion of the stage tesconsted him and his came to ap precise the value of drama in his psycho lascial workinments.

Total correspondence of populations wet the origination of the second constraints of the means of the second constraints of the constraints of the second constraints of the constraints of the second constraints of the second constraints of the second constraints of list version of memory and a constraint of the second constraints of a constraint of the second constraints of a constraint of the second constraints of the constraints in the second constraints of the constraints in the second constraints of the constraints in the second constraints of the constraints of the second constrai

Migram left Herverd to teach at bille from 1963 to 1963, the years he did his studies on obsidierceol authority Herme saturated to Harvard teechang and conducing tesesich unit 1967, when he returned to his horesteam. New York City where the sinov a professor of psychology at the Graduette Centre of the City University of New York

Cone of the greep pleasures of fiss work, ages Migram a what ha barries experimental invention. He is from orable by designing just be inphit techniques (fill a plafecular lead of inspantiment. Sometimes in hexperis that is corries us with the teching Sometimes in happens that other way around in wather cases her imigination and invelope open the way.

Skrega couch from the storing "It's a real work" Magazer operation of a find out just hope small. If this earts of an event to those "book" stored out the those of those "book" stored out the those of by using only your method's of thereful and main as postbook in "Massachurats well an exploration of the those of the those is may be critical account more of any mere pacepta overshipsed in your there of a store the postbook overshipsed in the those of there any the critical account more of any mere pacepta overshipsed in the those of the postbook overshipsed in the those of the those operations of the store of the those of the store of the store of the store of the those of the store of

Each person who in ed to reach the larger got what looked like is small, blue benk book in the back was a ped of dismoved passands addressed to Stanley Migram at Hanyard. The back was passed from person to person twe abatron in a resyrace until it got to is target. And as each person plasast icon he or she sent Migram a contring him who would have the book next A ful of the efficiency of the experiment depended on the atriwichees of who was hendring of

Migram nicesdy snee the odds There is only one offection and 000 fast tray, how people in the United States will know each other persons by The odds start failing once their instantia of them many people in would take to marke a hookup. Migram solved for guesses He got estimatic of 100 eacher or more

What happipped? In one case the charabagin with a what famme in Astross He handbeff to strail. Due book to asimitier the straight strail. Due book to asimitier burger with the strain and the strain and number of limits between the weep pedia handbeff as you regist thank. After straining all pipelial as you regist thank. After straining windig straining and the straining and think a couple of strangers in Migram poth to strik a couple of strangers in Migram poth to strik and bank and a shall accesse away to strain and bank and a shall accesse away the Previous.

There were often notions Migramitived to pazzharud such as the question Do poople rolly liel what is on their mode in opmon polic or surveys? What a parson says and while the does are often two different things and since people may not be telling the truth in an operation poil separatily in a polic ically validle stassion, is there any other war to uncover their taxel elements?

To third out Maysen tool while a known on the leak Hell known, but it on and depotently increasing the the subsects approximation of the subsects of the subsect of the American Strang Community were addressed the Grand May of the SOFC of the American Strang Community New addressed the Grand May of the SOFC of the American Strang Community Bay Software and the Software of the SOFC of the American Strang Community Common Strang of a neghtbarrow of the software subsection of the Software of the software subsection of the Software of the Software of the Software of the Software software of the Software of the Software software of the Software software of the Software of the Software of the Software software of the Software of the Software of the Software software of the Software of the Software of the Software software of the Software of

He tred various topics pro- and ansdivil rights letters (dropped in both white and black neighborhooids), Naz and Commanial faders and in Hong Kong bits Mon and pro- Charin Kw-stee med

In the Nex Haan studies only a small runner of Nexa and Concruss laterative worth maked, while more introcupys letters gat through the in another oblical study model than pro-brinds in the studies of the model than pro-Bary Bostwater cross And in throng Kong, Dhang Kaishak kater digdd call threem-Maomail, gathickel and digdd call threem-Maomail, gathickel and this tabay when the population of Hong Kong Instal to support pro-Communities demonstrations.



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D EVANTI 383 2010 5 Long Red East Country of Both

While handy for clean-cut issues, the lost-letter mathod. Micram found was not too effective in studying more sublis to sues The method also had a fee built-in mobilems. His efforts to distribute letters pirplane windows didn't work too well. The envelopes didn't always land faceup When dropped from a small plane, some stratigied on the plane rself. Placing them on the street, one envelope at a time was

Transarrayship retworks that permetekke crets transmitting political opinions, information, even cragas and fads, have intributed Mintam and have brought out some of

Most recently Miloram has been working on a way to revive what he calls decayedwhat's happened to old mends and an in his deck chower that represent his latest attempt at this. One sate cleach combast a frey Stone please cal followed by a phone number. He puts these into caroute-

Micram takes the craft of designing his experiments seriously He scheated the methods or exercises, as he calls frem

that were set up by his students on busy Marihatan streets. People were asked to people's thoughts -- if they're about arraight reflections of the way office people tee to-

People did come over and talk about their cents. The information is probably filed answin Midnam smind for buture teleancon

Mintern also repreciátes the inventivo neuro of others, Allen Funt, of Capital Certera, among them. 'He has an insulve sense of what shapes behavior. Migram of the shows social psychological pering, save Miloram is the episode in which a pappadan a cherr He asks Funt whether he ordered the pastram on rye. Funt, gag in mouth crunts and shakes his hold no Tho



boy then leaves without saving anything or

DI enume' Mirrom adds, switching from Cardid Carrera fan to psychologist have sensed danger or gone off to cell the police. Of course. Canolid Camera dower11

Micramis own skill as an experimenter on the expension of living in cates. Mimany was one of the first to study the overamothered in somuli from the world around of myopia as far as peting myoked does. that is typical of the urbanite. In some smail-town versus-bin-city studies he's tried to find what forms it takes. In the lostbe pailed the Handsheke he found, with the bein of hes students. that urbanities were proffered hands of fnendly looking but si-

mes that come of hence in the city. Part of stranger' someone you mucht see every even spoken to each other, but they had seen each other on mechbohood streets for years. The bond between the two was subtle but strong enough to stir one wortan

As a teacher as well as a researcher Mitatam makes liberal use of his imagenation in Itarano the minds of his students nord preconceptons. I try to get them to nav attention to what as and not del belieddied by preconceptions. You have to be you ve thought the case to be " He himself uses the calculating eye of the expenenced psychologist to evaluate everything

two as possible, he gives them sample tasks. For example, he makes them analyze how lough activated elevator buttona work. "For some reason, many think, they work by heat. he save "Actually 6 9 and electrostatic effect," as some of Migram 6

vasables at work in a pen-bounding study noting how and why it bounced differently) I don tuse the bouncary pain anymes: The says. T tuse the bring that may list a track of these needs to be with the track that the tuse the tuse the tuse that it bots its beak in and out of a pless of water to it noise back and faint on its prest between uprofit logs. Bouders are asked to be more tuped to back and faint on its prest between uprofit logs. Bouders are asked to be more tuped to back and faint on its prest between uprofit logs. Bouders are asked to be more tuped to back and faint on its prest between uprofit logs. Bouders are asked to be more the back and faint on the prest between tuped to back and faint built be the back and the back to be an uprofit logs. Bouders are asked to be an uprofit back and the back and the back back and the back and the back to be an uprofit back to be

Migram obvocusly anjoys his work. He botts over with new ideas and seems is given in the loany of having to pak and choose from the vasely of strings has mod obsorbects. The dospitine of being a social phychological prevents is tossity washed costanting of my sherpes, the notes about trianell.

And there are other meets. Although the solar in reformed: 1 don't hink i would have been as good a songeretire as a ransolar proceedings the also commented listor in the same interview. Therefore nonder the d like to be removinged as a plantier of like to be removinged as a plantier of like to be removing to a songeous. However, there is the songer the extent of the same there are a son-taking there is the there of only too same taken there are a songer the extent of the there of only too write National content to a signify hered. human

In the meantime back in that life, line as safed a two common countering. Fock, when doesn't is aelekter body of werk protein nour world? The answer is descrutively introle to make while the investite to show as the safet and not so subtill social becare at play mound up, how they ofeat us and wen control us. We are to immediate these natively well are an immediate these natively well are as the safet social social and that is obtained as the fact in the fabris the list to noise he is anormaling to weller.

Ourselon two What has he learned about harms instance from the work? This more posturated about the degree to which citcomstances shape people's beliefs, the answers: "People respond to elicitatitatical Peactors can be productable the doglee to which they respond user counter to the belief that we are totally rise. It is a lossion you cancetermee forget."

And the list question. What will have be the Quivroad's the turth rating of the possibilities. They would be valuable to the listen of period to an one's question the listen of period uses the listen to the could be quited by the assess A person could use that contain timps would would use that contain timps would not but camption assess 1 would listen through would be done to period the would be written the taken it. What has an adversed be written with a listen be adversed.

He pauses, a new gint in his eye "Imagine" he says "a whole room full of Gysnods And integrie their rection on discovering that everyone else in the room is one. Ino





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oe Milison requested cremation. He had got the idea in 1908, early in his long Me. He was neat and offi ceret and and he didn't wird his remains 'to take up space' in 1991 he restated his desire, being a person who tends to repeat himself and believing he was near the end of he kno but then the Wackman Break to be one hundred twenty-two wonthroom he stated wat again his desire to be cremeted He had had a dream that he would be oremated three times, that his ashes time and registhered the third When he spoke about this, friends thought he had become sensie. But he hadn't; his dmam was a prophecy One year later the tront

One year later the from wheel of his motorcycle dug into soft sand and he did at ande from which he never recovered. He was convested in an appropriate um

Pice billion years later the sun had wollen to a racius of one astronomical unit, swallowing Mercury, Venus, and Earth and vaporizing Mars

BY HUGH DOWNS



If the black hole spects TV sets, the thrice-cremated will risea disturbung glimpse into a universe of strange and skewed possibilities

Along with everything clice in the world. Mikistom's ashes were recentraled at 4,500 degrees Kelvin. This time they were relationed through the solar intercept of the solar interpendant to one hundred million degrees Kelvin. Soth-the billion ween other

Body-two billion years after this a sitivent as negative officient to Royae Millison was, regethered his aches in the Graat Implication and compacted them to negligible size. There, of a temperature above one trillion degrees, it are milled them a thed time.

He was not peopreed terwhen happened alterward of efferenced alterward of efferenced in the negativened on a time ao databated in that an teetime ao databated in that an teetime and additionarismost the control eog. In bending asset instatteretting highward laws cool of shape, did the same orary time, bo strapping that allows a labele habit to special a tokenator or for law rows again of prices ecceptical by a new weiversel.

Although his memory of a previous life wise heavy and at times hauseling. Royce Mission was not surprised to find himsel back in business, and net much changed -- except for having a neurotic aversion to motorepoints CO.

> PAINTING BY ERIC PAETZ



But I am working, too. I have completed

I feel that I have proved one of two thesas Either I have fully recovered or a

1 must note pre sprint? espectativ im-

Thave been in Death Row three arrises

the converts. Now that i are well agen 1 inbekets to the moon and spand our last days levels down in Luna Cry

Southanness Parryons in this room it

A college professor blind from birth the moon The books he reads and re-

A teah age boy tied to a wheelchar who become an astronautical engineer-some tion for a cripple 1 assoured him that an encineer old not need loos even on Earth



interest in life, her major rolief from the sect-

A very large number of elderly people who wrote to me mmechately after the first. landon on the Moon, all spring, in effect,

Louid add avanplas and essly Just lat abled of all signs get more spiritual lift out

Later. No. to most outcass of the United States the entire space program plus all #8. washed on a few rocks

paid for stall several a mos over in terms of

aryone had dared hope and second, that most moradibly bumbling studed incot rativity relations of any povernment opency

agencies were by law not paimitted to adto information with or a fack a press now-but the damage he did twis of.

start studying Mandarin of possibly Lower House) and to Barry Goldwater Sr intois DO

THE GENE TRUST

by government watchdog openciel in waaaang the first drugs www obtained from recombinent bugs. The Food and Drug Admenistration is likely to be exceptionely calabics. This could mean the follow years of teering and up to 550 million in costs before the product goes on the commercial warking.

"Nost people don't realize how considvative bucatess is asys Byers whose vonture capital tembra been dosely watching organg dwelopments. Thefeer of leability is enormous II could run is company over regit: Bo it is perfectly relional for busnassmen to spend the money to ensure meanum tallety.

GENE GAMBLING

Auditor way to mothe genesis of different mesoarganisms—cell fusion—so far has accuped the controversy whiting alcund recombeness tobal excession. Cell Suscemates the unreable contractively block decay and some of the larger pharmocekcell comparison are apportenting with the new technologie.

These animates when is used in right worthoft baring as detected as reconstructed Data. In detected as reconstructed Data. In detected as reconstructed Data. In detection with the other tools begin the and tool with the periors tools begin the recent based or tenders possible as and recent based or tenders and the and tools must also be and based to the and based tools and the and tools and the pages as an united too possible and if was and based tools and the recent based or tenders possible and the recent based or tenders possible and the recent based based based too recent based based too recent too rece

Get basins sit into manage folialities? one innovation based on it has afreedy been heralded as an advance no less m portant than recombinant-DNA lectricity in 1975 Dr. Ceser Militam and his of leagues at the Medical Research Council Jahommy in Controlles. English, stur-



bled on a way to fase a myelome (kin cancer cell) with an anticody-producing white corpused. The result, called a trybridgens begin to turn out pure specific anticocias (Mucader), therefering specific anticocias (Mucader), therefering specific anticocias (Mucader), therefering specific anticocias (Mucader), therefering specific anticocias) and the specific anticocias (Mucader) (montality)

Lest ID Missark discorery thronk way a dottant antibodes want to hispat. Bet wareing astabodes from the annual for the sum produces in molars of antibodes in which some an more special calls, deterd abstract the sum of the sum of the sum of the segments out the hybriditoria whose mubiditions and the sum of the sum of the segments out the hybriditoria whose mudiates to determine the same of the sum of

Hypercent and prevent him To L. John Calaron an industry producing arthodies using hypodania. According to senademi Hawaid E. Green et early gail is b provide arthodies in chinaci adaptotic testine board gail. So market of atoxid sized miken a paternial US market of atoxid sized miken ayaari Theoremany kina product, new board gails to experiminania dea is a page of antoxidade for detecting hearing a Alaxa udit concerptions are an antotranse of the production and the tohog notame classes as heart strick and or produce and accord and anto-

Degrootic meteratili ani less strictly regutated than drugs, and Hybritich plans to consolidate its eerings from tisk ists before expanding into therapeutors in about twy years. The hope for the fluxness to metnimitabilities checkly into the body to outer numerous diversest ranging from hepetitis in the real to outper

Many sciences we cancer as eccuring because the immune system can't necorrate malignant calls. Greene says in draw works, certain individuals may laid to generate antibodes against concer in individual backsted from the when their calls of a backsted from the when the calls of the back possible forms of cancer therapy imaginable — one that is backed concerneural disferes mechanism.

NATURE S BLUEPRIN

Generate engineering and cell Noten are cell at have as to the bitterbetterbetty medition. Then the kine manufacture is a deviced manages of the accompanies and increases in all techniques, modified on mature is basen to Arken Corporation. In Pala Alto Celliforma, researches are designing so particulated drug obleany systems the will help debases suphaman insulin. The terms increases and other body chemical

These substances are extremely powerful and, athigh concentrations, can be tooic, even tatal. The problem is that after an impection of lablat, drug levels in the parlevels is body peek rapidy. Then dwindle. This fluctuation is a major cause of mempi dancerous drug side effects

To prevent the Azaia matching the exdoctree splain, where each gund ascrease as hormonics to a carbolled that whost unwarried and efficient Devote now under classification of the splain and splay and only where its medication apple, uterais, or carculator splains assumably efficient provided — in the splay and only where its medication and an explain and an explain apple and an explain and an explain splay and an explain and an explain that can be threatured to match the data before included in each the data before included in each of the data before included in each of the data

Alza recently received permission to market a these year latit control system in Keepo Placed in the sterus the device continuously releases progressions, andural borth-centrol harmon. Becourse the progressions or cleased skowly the device servict the investment science elibects of the PII.

One of he most promoting of any determining water to be an any promoting of any determining of any determining of any determining of the any determining of the

We are also briding of a sampling device, a sucking device, "reports Dr Anjan rec Zahlaces, the company's foundar Instaat of dispersing machication if would take repeated blood sampler for up to have weaks or so, proserve them, and sand themainto a machine for unitysis

"Toblever will give a whole new dimention to moderne. Dir Zahlteren alsy i Thsteed of melyang just ens blood or unetomple gurssed using a physicel exert, yschi git a complete petale of new he patient functione initia dally file. A personmight, for example issent to take normational pressure in the dally file. A personmight, for example issent to take normatication and the second of the second takes of the second of the second of the blood pressure is at mix and should be conadresid or toortiment".

Anony Zvilision anonyme. Dynamol is working to aliminate the possible histiniti of food addives: In light of the resamt size othern scene and the dwinding list of food dyes now soproved by the PAL. Dynabol and ut to develop dyes, weekners, and peservatives that would not pass through the wall of the intestine and into the body.

Dynapol hes louid a way to latent show tool-additive molecules to larger indepentale polymers. The resulting meconicieculos unstructed by storage, oceang and the digrestive processes, will enter the market in 1981.

INTER PAN HORMONE.

Al Zoecon Corporation, another nerwards program has led to the works of het commercial inside greath regulator. Known as mothoparen, tantempts an inside is normal life cycle by blocking materiation. This regulates a synthesic impaction of a metical mmetic.

sact hormone, is a most effective pasticide

According to John Desertion vice-prodent in charge of research and davelopment at Zeecan, "leases go through daimatic matigraphoses from workfliel larwise to hatolicased pages and than on to the adult assge with fail wings. Ziecon and other unwark prosperchers de out to inlate the growth chemical turned on and off to the horizon are rises. Torgets 7.

The natural humonic had problems it was not powerful or restortive enough in was too repensive and because it was industrial it couldn't be patiented. Zoecon evaluation all these distributions by synthesarco a charmod all threshold in the synthesarco a charmod all threshold in the synthe-

Metropiene wolie by keeping interte hat also problems in the solut stage, such as mogazees and the hantly (a major catte prest) from Luty moturing it is completely unlike conventional periodskies. We call them insect-growth inguistics: Demon explains, becaucio its incli hand pretored invoisioner transbage halong does

 The commercial development of modern biology really began only in the early Seventies. By the mich-Minetes, the applications will have proliferated in ways we just can't imagine.

not immediately drop dead. The methoprese affods the insect's hormone balance and when the ball is ready to makes, in cars i and it deal.

The insolve growth regulater is sourcessal that Zoecon was one of the liter terms Chreate accentation to the liter terms Harry Resemption and the program begran The and Katanger and Naken had no idae what the heck an insolve growth remained and the terms of the program.

Beforeparen in rew the baffet periodia mesiatile in the observations in natives to other organisme indust, this is soft that it is set an early to eatile when compared it gains through the animal's dipathe walk and correspond in the manufact when the lase bread. Instantial of going annual the backing Bando and things to and weakly me could be upon applications, and the meaning band the manufact.

Interceign the products safety became a regit headable for Zoccon when the tim safe out to obtain regulatory approval. The Environmental Pickedaa, Agency demanda to know what happens if you overdate at annal on a peeticide. Soccon's problem

Methophana is so sale that an animal can't overdoon

Zoecon is trying to develop a journale homone antigonal, methopraries mirror mage, instead or telesting growth the antigonet would accelerate it, turning insects that, as jourgilos, cause terminidicus even demonstra terministry info (2020)

Determining and the set of the se

Zoecons long term plan is to explore plant genetics. Using genetic argumeting, Zoecon hepsils to produce better plants, marks that are more obsease and mocoresistant, with higher yields. Recessioners will atterript to do in ho laconizity willat takes years or may even be impossible using classics plant-breach ghechmoses.

The testery of bacechnology flough short is expanding the patient of innovation in this country. Over and over again the condecters have been floogling hims wiling to risk that monery BL cope stays. The large companies with view (ave bace to be have been cough) that flood by these rapid developments in backay. The same sets the test as assessment in backay.

When new identifications come althing the prepare with should three intermitting in holds, line and single rates, line when the should be and the should be althing the should be and the althing and the should be althing and estimatodical tabinitication become the tag powers in the industry loading they and the should be althing the should be assumed by Motodian in Franchism, the assume the should be althing the should be assumed by Motodian in Franchism, the switch tabinitication in the Motodian.

Well Ceause Generation Zoecon, and the terre provides of biotechnology become the corporate gamma of biotechnology become to ensity to any But the industry as a whole is entant as mode continues preparations to we been as weakfund; by how inspiritly intertional wavefund to the industry of the minimum entancies and the set of the provide minimum entancies and the set of the set of

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As to the child the impanal decrease marky midle official whatever it wits that made itm unlike weaption also. Noting charged, not easily He was accustomed to finaliness. In the end it was not even a high prote to pay, for what writer came, note built to stread even DO



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X-HERO

Log--drive memory----on the Bealgover. Got his from the same heliborato that pushed into over the gamma limit and put me out of cervice. So invier did square exposits with the Versite.³ Another years ended the sentence and he gammat is little strily. No a note boy not incoving solite how to strike an ender by proteinowing solite how to strike an endering his way.

"Wall, it's late," he concluded standing up "Nice to have met you, pail." He offered has hand

I did not move to take it I said, as care fully as my state would allow, "What did you mix?"

"Chi you've had your ear bent enough for torright, he answerset, "what with Nico Tying the sume orbit of the time. It gets to be too much."

Not even inyerg to conceal his edgemoss to close up, the proprietor came out to conlect the glasses and coveres from the table. Gheorghos bade him good-reght and impand only because he had just restard hew drurk i vins. Thed forgotten.

What were you, then? I demanded, weihing to God the world wouldn't rock and twist around me

MeV Oc. µp a mask hand I never serve put as simple biffer (pot rotatised Finary you incost" He sughted incruigly we had a mission out rider you have a well cost in you have a simple bit of the well cost in you contain to any out well and and not a loop at part of the mission in the mouth masks mouth and the final the mouth masks mouth any offen of the how of the mission have the mission of the rotation of the mission have the mission of the mission of the mission have the mission of the mission of the mission have the mission of the mission of the mission of the mission have the mission of the missio

He grinned again and stools off into the right if turned triancally to the program. Turying to make him understand that i warrood to take to Ghearphice some track or atteast to know where it could ind smitch marring. But my Greek wards not smitch that far and the proprietor know no Einglish at all.

I traced him in the motiving. Reaple parties him out to me, a liain and obtaint figure outlines against the unbernetie thus sky who was screambing over a rocky hill in pursuit of a impring goal. He was singing at the bip of this vision—a magnificent, welling tenor with long controlled, Balkan sheking on the held mote.

Thought I was going to wait for him to come down. Il hought I was going to paster him with questions, but I don't I found myself on the road leading from Sophkade not even looking to see whether his was still in sight.

Last regit he had thought back to a dream, like Spiro and Nico and a acore of others itsue metric this time forgotten courtry. He had spoken the language of a cheam. Nice he had spoken the language of a cheam.

I was not sure that I had. But I was not going to stay to find out DO





CONTINUED FROM PHOE 14

os news promptly, and Men way easily make juga serve useful nochuniel ourposes

9-C In employer vension. King Philip, correl out for God a sake: the object is the correct sequence of texonomic descributions in belogy. Kingdomphylam, class order, Samily genus spaces. Kingly place cover on freeh, green splay regeletable adda v for vensal is addivation of species.

10-D. HOMUS designation the initials of the two Great Lakes. Huron: Ontano Michigan, Ene, and Superior: To place the lakes in weet-to-seet order. It is Sama.man hale eaking process.

11-F. For paleontologinis, the phrase Palaces evolve opulant memores of a planckers/pass incosts the ages of the Opnocou Ens. Paleocenia, Eboerni Ohgocone Miccona, Problemi, Palestocenie

12-D, D. C. Van Osseil is the name is physical uses to make sure he has completed all necessary straight bulkness admitting a patient to a hospital diagnose, convincin, via largen, antiviation, it ...sing orders chill infake and output, symptomatic chugs, specific duage, ecentrations, taboratory.

15.3. The animemetric used to be But or osranged our syung grad particles. Janober Meil, Dat when working gradners and the synthesis work in presents a taking users when any synthesis and the synthesis and the synthesis back former, end, compare, wilding pares. The work of an presentation of the synthesis back former, end, compare, wilding pares. The work of any synthesis to degrad the synthesis that the sectory gray when the synthesis back former, end, compare, wilding pares. The sectory gray when the synthesis of the synthesis and the synthesis the synthesis and the synthesis of the synthesis and the synthesis of the synthesis and the synthesis of the synthesis and the

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17-J The four types of skin cuts are PAV. puncture abresion indision laberation

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25.G. This classic memories. On old Ownput whethis spour Anti-assed Sarman vando some hops, reminds every medical intern of the 12 cransit nerves, easting fram front to back of actory, optic occlorentary trachises ingermant, addicators fixed, accuster, glassicpharyspall vogus spinal accussory - hypoglasseli

PUZZLE DUKCKIES

 Where's the dollar? Adding the belieby is 520 the held guests. 527 produces a mean-rights sum. The belieby is 52 should not be added to anything, but suffracted incent the original \$20 along with the natural 63, loget the 55 nowhold by the cleft.

in alphabetical order 3. How many Fis? There are six fis in the

sentence. Because the film 'of' is pronounced we, however, many people tend to overlook it.

4 Vowelless Nih

5 Rhymakes Grange obliga moeth Roader Cegnal. The figures represent the lights that are left off on the deptal deptay of a calculator or watch as the deptal deptay appear. The next digit 4.5 were all the time segments 8 Software known with your answer blank yours right OC.



you we marking in so ecomen hody that the smoot ballyhood phrases are in longer flaghed on your werking mercenin By stalls an ensing. The Mail Shored Journal phrases (00,000 copies at any mit to Dersch Terrors (00,000 copies) at any mit to Dersch Terrors able anywhere in the workt, having offset able anywhere in the workt, having offset angeoanger Such introvence with make to be anywhere in the workt, having offset angeoanger Such introvence with make to mescalary for development, one of the enclosure of the development of the were hough any mit chain interaction and were see balance to introvence and were see balance to interaction and were see balance to interaction.

The equilitie mediates that will mate this possible is a damp in how we build the sections themselves instead of making frem heavy with restundar could be call creat into them there power larger and linenais, more orculas Wen o forger them to make them taking-order We can send a technical a to could be the operative Bocause of this (he Dek Tracy wast radia may be a salety by the and of the 1990).

Information about Earth is another velunicle commonly. The business of sensing Earth resources is big and galiting larger Accurate workwele crop predictions could avait such inscalaulations as the Pausain grant deal of a flow years ago

Helding second picco in the space moduly, but groung ground querk in thetonals processing. NASA with its coulteparts ascucht wind name of white proting and the second second second second under gastrage within its aroot. Resolutive processes too dangenous for Earth on the performation space withink paragraphic and performation space withink paragraphic hasks to our new of minor. Some phase materials to our new of minor.

As more and more people and in space, meri mare will have space reliated pole on Earth Barles and instanty will look for inwayment buyon the armosphere. Instnace companies—which already instanection suches agrind failure—will owner entro space fractione and upwers and operating and optimized and stanting became will be needed Lawyers and the legal and optimized cycletors that have in any optimized cycletors.

Duri hel fredding space factory, the space shutte will by this year to manifest in fully boolaide through 1964. In a few more years, there will be permissively maned space tectories. Other pecessing plants will be left on ther own tended penoteally by visifing workers. All there emolished will larm out, highly specialized products for consumption here on Earth.

Then the government – field is you and 1 collectively-well beign to incoup its investment in space from taxes on space products and renvices while wo-fields you and 1 individually – well benefit from goods sumpod wize is three **CO**



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CONTRACTO FICAL PAGE 14

possess the ability to detect the balls cry are reversifiernies of motion (namely Noctacker, Geometriciae, and Addada) none of which bound the considered sensus peels

When one of these right-from motion peaks up the cyst thisic events action which includes strap closes and enable being such action stand a much hater chance of surviving an encourse with a hungry bot them these that don't failed the Actualie even entries to the the Actualie even entries to the Actualie even entries to serve every threaty mostly fleption to action the actual the actual and the sub actual the actual the actual the sub actual th

As for comprucing an interd suppliert based on sound, an Utakone frequency generator was marked on the enry Seventres with clarms that is repeted the temate morphot testis operational Australia and New Guinas demonstrated that the repettent actually attracted the peeky Depters The device was remeated from the market and heart hear these theory bases.

Noverthelass McCown's FBI devenuer further research and is antitled to its runner up proce Omn's competitions are partiarily one reason why I pack it up month after month.

> William J. Harse Los Angeles, Calif

SUDDING

Year Description Decement optimic obtaintion (Dottoer 1990) was one and the most interacting passed live most in Orms, and I would live to concentre on it Prait. This is rather moved Larma Blackholtzaki hat the Egitates with heaves the desch of befort in azardogs, flying sources, elever Doothy prophesises and ownal-base you black the impair temporary outside the optimizaany and is anongly doubt that heave to on 1 d once when weath personal mining and doothy weath personal mining.

Nais, for what appears to be the some match, the dotter musices power as communication of the source of the source communication with one and/or source around of cousteer bedring different pointants are pering around director any dograng to be accorded for a write reliable or the source program and the source of the common coopyrity filted buy relatershall of any down and the source of index any down and the source of index always occurring productions. Like Rendis always occurring productions. Like Rendis always occurring productions. Like Rendis

> Steven Yztes Tulsa, Okia

Since some people choose to believe in the permittional, do matter what the "experts"



say, they unabuddeadly self not anjey our faccellaring interview with Jamas Randi in next month's Omini — Ed.

Incident or Accident?

In separate to the Three We Island issue Committeeations. October 1979). I would like to share with you the description of the ruleien accedent given to me by one of the spokgame, from the Boosthawin National Laboratory, one of the first groups to armie upon the spore.

These Maxistand has assist was more an relation: than an acadert. The movimum level of indivision immediate and the area of TML has explained, was only equal to the amount of indiation morecevel natirally but the resident of Derrier. Colonizate, and potentity less than the notlation the average New Works absorbs in this office during the course of a dury.

As fire up the black peaks accodent was concerned. In solar was not weekhort he three dealts were caused by any form of adminion relational mechanically buil whether it was released by accodent. The techne safety of runcher power as compared to found tanks worth as coal is shown by the runs of includer your as compared to found tanks with a coal is shown by the runs of includer your as compared to found tanks with a coal is shown by the runs of includer your as comresismon 1957. This shall coals an include black large or other raiks to the industry (of includer). What about Mere?

Environmentaliste, why did 2,000 of you have to pictual nuclear power on a platform that was one of the tex energy sait mandees left in the world? Nou remember Your next stop after Three Mile Island was Seatorop. New Harrophine

> Philip Remsburg Brookhaven, NY

Friendly Pactuation

You may be interested to know that I took the time to ente to Sensitiz Frank Church and Representative Don Fuqua on the Moon Teality as J Anderson Donten suggested in First Word (November 1979)

Mr. Euglal assured me that though his subcommittee was not checity involved, it had spoken out against agring a treaty that would intelf the access to space.

W Church sent me a copy of a very strongly worked letter writen to Secretary of State Cyrus Vance, dated October 30 1978 He made a companyon smiter to Mit Demant companyon the Selbed Tealty and tradition tomerators. He also suggestod that the USRH works accompt worket celestes locitors under the game of "locantitic near-oft".

Looks to me fike Cyrue Vance is the one who needs censulating

Andrew Heugel Packy Pant, NY

Not Created Equal

Seen Entroits year of an "Eguitarian Society" (Forum, December 1979) in which "opportunises for growth and development are provided orgrowth and istudents" seems perfectiv considered with whick (indexistand to be the intertions at Bronx High School of Science. The only change I would make in that quotation would be to substitute weivable for provided.

It is obvious to me that among artists, authors, and philosophism. If here is an eller to rightee this fact and force all people requirities of polionical into the same stain client public educational system is to deny the very people whom M* Exten seems to over som much about - The cervital public.

There has always been and is now an elite ismong us who by virtue of their ismstrively curvedy intelligence, and other qualities are capable of making for greater contributions to society than the majority can concernativ other

It is high time we abandon notices of equality for no two people are equal any more than any two sets of hegerprints are alike 1 donot see why we should want to be equal. Pyoe interpret Charles Darwen conrolly wantify in a species ensure so any well.

There is no share in being less than equal to the intellect of an Einstein flae woardry of a Da Vinci or the games of a Nozer1 iso long as the contributions we make a nomital rhow mail. All least answer some of the quastions and encourage characts will repeat them.

> William M Reed Toronto Orc, Canada

Sasquatch Study

The story about the yeas by John Hurt I Unseen feet October 1979) was interesting, bad does it refly furnations enderpage

Let me put my nock on the chapping block try concertaining on the statiguistich if I may he all special salequadri saffring the animal is gone before an investigazio er mes on the source. The only evidence of the animal is presence is usually foetprints and a foul smell. Let me start small and working way up.

Something that seams to have been completely excitoked is the oddrithal is left behind. How does it compare with other object? Is it main mission or is if of a natural organ? A chemical analysis using a missi spectromolet, would prove interesting if nating else.

Then show that the looptimits could not have been naced by some mechanismical device Inbased of meleng planter cases of the particle to peeper along with the obtained interface. Them takes the particle them askess. They can be intraved and proserved by using standard antheological methods. These under the consuming and memoratics. Solid is the way things wild be not be denty and the observed to the other and the other

The one type of exidence that would contern eseguration existence, often than a body would be is blood sample, would be con clause exidence. Within a professional sample of this serum pictures would be possible to determine the chromosomal maksup of the cells and the number and types of chromosoma period. Its new cossible to apply special to party and the number and types of chromosoma terms. Its new cossible to apply special many services and the services and the party special many services and the services and the services the services and the services and the services terms and the number and types of chromosoma terms and the services the services terms and the services the services terms and the services the services terms and terms terms and terms stand our or not allog the circums to be the circumstance on or allog the circums topic attackment of the circumstance of the circumstance species related. The data editaned have the circumstance and barrier (Laternig) of the circumstance of the circumstance system of data that can have be sufficient to species of the gavate circumstance from an unincent source then you have benefits. If the the superfixed of a low benefit is the the superfixed of a low benefit.

> James D. Juptu Munciel Ind

Health Hazard

Sount Demond & Last Word | Nuchic, September 1073) was great, but i left mi with a thought that I connot suppress I an a dee pokey et an AM-FM statem Ewin day of my life I at parchad between a I GOD war. AM transmiser and a 300 GOD with FM tenso locker Oueston To with acter d into an them needstate?

> Terry R Mul WOHS and WKIP Shalby N C

Start Damped replay I called the US Environment Photoena Agency and asked one of the radiation asperts there whether you are in any dimper I expected there is a super in a say unequinocally no such others is a super a say unequinocally no such others is a super a say unequinocally no such others is a super a say unequinocally no such others is a super a say unequinocally no may be a painted arases. A painter the new bases of M asses

As for your working in that particular room there seems to be no danger from equipment. The transmission lower is a lifferent story. There may be very high reside of FM weeks at the base of the tower op to perfuse 30 means were 1 was told.

Extent Emain to alarm you: Chavy sense you have been working there for some time and haven Eyer failure over from the EM sate alson is most probably is not himmly. Bu is just one more unknown tok proved by technology and Einderstand that a control made story is may fooling at the subject.

If you want more information. I suggest you contact the local office of the U.S. Eosmomentary Prefericion Agency or the U.S. Occupational Safety and Health Administration. Either one will help to depermise whether use am or aw damptin DO

PHOTO CREDITS

Figst 6 The start with the start is figst where the start is the start

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- Alarmic Carbit set to any time within 1.24-hour period. At the designabit lines a pissual to definitive bucket senses is metted to audited yets
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Why Shap By Mar?

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To any one of an produce the 2014 days and/points and decays with the performance. Antenna of the any meson west to relate a product, we will related peer for members and





waters. If met a men who had studied attached electrodes to my own brain and upped them up to amplifiers and instruplayed the drums or goings, anything at all thet winesled

ext in the interplay of science and art " always thought the world was divided into two kinds of people-poets and placecal people-and that, while the practical about r. Now I reakze there is no difference

well play in tomotrow's world are of vital inata music from sunshine, in the windows of a Middelown Connecticut back For this instrument solar panels collect racksform and supply the power needed to drive a amplifier, and loudspeakers. The system procluces stating parterns of priches and the panels. The music is modified by the shadows of clouds, trees, buildings au-

One of the halimarks of Lucrer's compo characteristics shape sound Plavers of trachterial music taxes a hall with rescrat appliance in which every listenet hears the same thing Lucien by contrast, does not seek an accustically neutral space. He uses the screc characteristics of a given site as an integral element of his compossuch musical elements as phrasing and

Manag on a Loon This Was was one formed under a pyramid-shaped rook which more to about 75 teet. Many of the reflective surfaces inside the mall were made of concrete which, logether with the "Ive accustos While setting up the apparatus, Lucier discovered that it was pickof the rescount mail - baby crims, whether machine white, even strotches of Muzak from a nearby department store. Later this time within the electricitic environment of the prece. The high-lidelity phone lines pecked up skaling codes from switching substations, constrip auchble places in the foreseen adiations guite philosophically INC CRINI

mail's own sounds had lound their way rito.

In the Albuquerque prosentation, Lucas drew a sange of sounds from his mainusating tone, at other times the sound bar teled along ike an orchestra of Mack trucks. Transsons were gradual contrasts were made only over a long period of time.

Lucar charges fixetile scores to allow planning for the presentation. KUNM prospecify the duration of the piece. In his mitation to Luces. Subjette proposed the with an uninterrupted broadcast Lucier agreed The extended duration, he thought conchect the expansion New Mexserviern service of time. Portage this auaspectol the presentation KUNM transmitwith no interneticos or station identifications-a mode matching the slowly unfolding periods of Music on a Long This Wite The pace heightened the ambient cushty of racio, a medium transformed by time and technology The days when a racko a feverite program are long gone fockly driving, preparing a meal of wooding a carden. Listeners tend to use radio as background for other activities

the KUNM switchboard reported some calls from leseners bewildered by the sus-Operators encouraged such callers to tunie in at intervals, sampling the peoples it currous about the sounds and how they were produced

When these any correlants? 'Not as many as there might have been ' said Oliver Stone, KUNM's chief announcer and sort of thing hou see were a free-form format, the only moviable alternative to your here, and some isteners missed our usual that even the compliants were in a sense good for us

By the trust days of the performance. broadcast was afracting poulive alterno's was in tavor of Lucier's Long Thin Wire and of KUNM's courses in making it available. Ryal accounts KLINM's audiooce was to-Long Thin Wre had become a district presence in the community of istenets-in five days, a bacf period for accomplishing ruch a feat CO

In April the performers are ready, and the exhibition opens at the Museum of Act you are struck by a ourious double percepsemble those you might expect to see in a gatery of ptentive art, but they are obw-

The exhibit arouses your conosity you tronauts drift in an ammotic chamber

Here come the sationauts Luse select. ed as commander by the computer; Mina for their tasks, all constitutied to access a

The astronauts try to behave as if this were a routine mission - calm, cool, to be traction of the artifacts wears thatti down.

Lun who remonstrates with from Jay

Suddenly a bizarre tigure crupts into the zigd dance. Lute arms his laser prizal at r. it surverse off its headplace to revitel Jay

whopi sees visions of other places inhabited by beens robobs people in the sea through a timeless period where they become mobiles, crawing on a shote

them on the astronauts tail deeper and

others, but at last he, too, must surrender while he feebly protects, then they robe fam in red and gold. Having shungled to long he has no testaturce will when he looks thrauch the souloured wheel, the vision draws him into another reality.

The spoil is broken, the remaring anlonger willing to return to their mothineruled lives. Through their psychic invesion tiv applier culture, they have learned are unwilling to forsake this knowledge

They were charmers the people who morte this " Mire says. "They knew that

The astronauts agree that they will not parmit the computer to put them to sleep again, they will stay awake among the stars, learning, orowing, becoming themselves And samociay they will meet the deerners agen DO
STATE OF THE ART

EXPLOR/ATIONS

By Joel Davis

Section 2016 Secti

Today Weshington remains a maps central of samenes sind technology in the Seatther downess with dechnology in the Seatther area the Boeing Corporation busine (contentinal) and animatic pagebase floability studies of salar power asterline speaker table updates Cory of the other speaker table updates Cory of the other speaker table updates (cory of the other speaker table updates) and the other speaker table updates (cory of the dig conside of the MSB Werklink Fair in Seatth, the Pacin's Science Center continues to direct those such divisions about your with fill constitute and tables of hower.

Farther east, the Grand Doules Dam

Issa addaid a third power plant and opened a takensto new vectors center. The ample truth is that hydropower remains the cheapest form of analyzin the water-inch Pacific Northwest; and the Grand Couliee Dawnleads all others on the Columbia Rever in earling production.

To the southeast in the fin-Chee sales of Kennewick Peoposi and Perchand, the Hardrot Nuclean Reservation to the state of two new nucleon power plants and an expensestal electric called the Past Flux Test Floxiby in the oxy of Revinden that the cosy title Hardrot Science Center nucleor wind to calar biomast load to nucleor wind to calar biomast to get/homait.

Altrough Oympa is the capital of the staffs, Settlifers the uning purchasion capital of Watangton Nather Itanie the genoratio of the 1622 World's Fair degenerate the city Athens tamend he abar find a cartiar of interfers market education and offset of interfers index education and offset of the staffset carter is cere learning of the city intorceal poytion (the fast cere in the coarting) and the location of the ferrous Spece Needle account which we can work the staffset of the staffset of the ferrous Spece Needle account which the ferrous Spece Needle account which we have the staffset of the staffset of the staffset of the ferrous Spece Needle account which the ferrous Spece Needle account when the staffset of the staffset of the staffset of the ferrous Spece Needle account when the staffset of the staffset of the staffset of the ferrous Specific of the staffset of the staffset of the ferrous Specific of the staffset of the staffset of the ferrous Specific of the staffset of the staffset of the ferrous Specific of the staffset of Here are essurants and museums splicializing in the art fire engines, and typing machines. Here, I.co. is the Pache Science Center, a sub-bilding complex doctiniated by a control effecting pool and bestheting arches histoleyou! If hid the Esmacl/WeX Primetarum. The Boeng Spaceatium and a wate range of tissenating exhibits

The Edulation Cantale Degreenty features openhilis phromate al local market. The Mount Baker Volcano Watch process the moody Mount Baker Shore 1972 the Watching has been formed and backing the Addition has been formed and backing the guide home write in the same. Brough it will be the same the same state of the meetity. The environment of the same exclanations with and what paths in populative explored the clanes and what paths in populative explored.

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In reditter to its permanent attactors, the Paolite Science Conter mounts invering exhibits, such as its recent one encreativity. If conducts educational programm is science and exchencing for children and adats, and it sponsa's incluser, fim leaturis, and its ponsa's incluser, fim leaturis, and its ponsa's incluser, fim leaturis, and its ponsa's expectitorie such as its Petruary 1980 Solar Safar to Ance

The part Source commence the physical and psychological environment of Sautties Its learning from and human set the source for the Sautties Augustum: Incolect on the waterfront III; Plant SD: August short break augustum, you are greeted by works from Genesias. Which is part of Load moved begreining for is load moved to the source of the saut of the soft bits in mobile grimpers of the based of the movement of the based begreining the continemation



The orderwater dome at Sealthe Aquadum gloss an "in the round" wew of Puget Sound 5 sea life

Finding Yourself

an often heard phrase, but white does it really mean? The complexities of today's world leave many people feeling unable to cope and unave of their place. If your life seems more like a great struggle than a great obverture, let the Rostencian Order set you on the graft to a new self awareness.

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anell and coral reels of the Papilic

A magn attraction is a multiverticitiend determinal journals occan his to be weeked from above, to the sude, and from below Another equally attracting advisor to the focus finite, where intervals to the molganeous creation and provide and particity hands occan attraction occupies with participation attraction attraction occupies attraction attraction attraction attraction attraction attraction attraction occupies attraction attraction attraction attraction attraction attraction attraction occupies attraction a

The aquarium biready occupies hairly 9:000 square maters and it is expanding the sATE OOD project will include in new ropical Pacific exhibit and possibly a small short tank. It will be intalhed this April

Seattletes live to think of their city as the paleoting nerve center from which energy and visably activate to the foot of Weetington Babbelore the Spece Needle, before the Poptic Some of Center baloeithe against there was - Grand Costee Dan

And grand all the utility to the construction of the loog and till in reaching the constructed of more than the million cable constructed of more than the million cable observed on construction is to be boarded with one provide the construction of magnetists as the first area of the construction of the color analysed of the construction of the short and the construction of proves in the work of

This dam also plays a vital role in agreedute. Water impounded by the dam imp Frankin Received Lakes pumped to a holding use called Banks Lake which helps to impose more than 2006 600 hecroser of land in easilien and central Westergrap, the dates prime what or owns pres

With much tankers — and a lot of protect — the clam's construction bogan im tacks. The first power was produced in 1941. The mighty Columbia River hald been terned.

Today thousands of visitors can jour this grant hibble to manife control of hibble techniq at the new Visitor Armail Center The center boasts the usual exhibits photos and demonstrations, but the view from its participing windows is owe-inspiring

Tours of the new power plant as well as of the next of the dam, are face to the purples. They notice grimpers of the purplem generating plant. His high spelars, and a note down the face of the forebay claim is an elevator with glass and as

During this descent you will get a good look at the find power plant is facilities including the ganerations a monetous garray crane, the controls and the turnetike gatery at the plants theat These is able an excellent were of the fruor tubes that carry water from Picosevelt Lake up the mountain to Banka Lake and then on to the fields of eastern and central Waternaton

Scard Coulee Damis no longer the center of controversy that it was back in the 150s. That cubreve definition now rests upon the goings on at the Hanford Nuclear Reservation incer Pontiand

Located in the dru deterfields contresisten part of Washington, the Harrian Basanistion is the place where the nuclear operativ begin. The fastle material basanistic that a drug basanistic table on the adge of the Castrolia Plant. One of theoremeters, the Placehol table of the placetum and electrativ (or the Placehol Institutes beset of the

Links unaiting indices energy and ruckes weste gohand in hand. The sisters low-lyour incidear washed on poor lasting at Hanford Reservation is one of only three in the country (Gewartice Rey closed is about far more than a month in table and the country (Gewartice Rey closed is about far more than a month in table and the country (Gewartice Rey here toplang companies carrying away the washe Rey table moderned the family.

Despise inste troubles, construction of two power-producing residers continues at Hantors. Here also is the Fast Flux Test Facility an experimental nuclear inside that will be wreat to test pairs and procedures for possible Amenoan brender reactors.

Not fair from the Hariford Reservation. In Bichland, is the Hariford Science Center Run by the Diparitment of Energy the corrise roop trumpeted the wonders of atomic power but in micer years 15 had is major keep 41 Now I posents the pros and corris of a wide range of athility sciences.

Tabliad was a come of the city a federal buckship, the themas Sources Come is buckship, the themas Sources Come is backson account of the source of the backson account of the source of the backson account of the source of the consiste programmed with energy word parres and conserved (puzzles) multiple chases quates on submobile projects and other exclusional wideo games that provide anyoiner for those who pixel them

In one control size a full-sized operating modulp of a leader. This is the recrete-control claw this contents use to manipolate dam/genorely radioactive scopps (The norm dennah Tich a similar lobone) devices this described by Robert A. Herrient /Watch S the contex can use the work do to manipolate contex and set them solt.

Other exhibits show what solar energy, which power, pecthermal energy and attentions into any power generation can die. Some like wind and genthermal, pethage will become as paterninent in Weshington's future as hydropower and ruckaar energy are now **DO**

FILM

Heren's would profer to be entertained rector of challenged (as if the level were instantially exclasive). To the exclusion bootstacking years there there are the content of the position of the solar hugges content of the position of cause the solar hugges terradam gate not a worth-here account or entert in fluxion of cause three bootstantial terradam gate not an evel of the account in a strength and until here account in a strength and and here accounts of Water Alexan and Alexan areas account to interribution based of the acid.

The other that are not reave able to prevention the second read of the termination must be an effective at the termination that are an effective to the termination termination and the termination of the termination termination and the termination of the termination of the termination of the termination of the termination termination of the termination termination termination of the termination termination termination and termination termination termination and termination

But even bondesignal brisis as sole and where vpoorally hypod such full as Moonway or Mereor fails at the box office (enormously in the case of Meetry) and then the film community biams should be askers on The end of the orazio. The movimishas have guaration weither thay thomselves are a fault for many houses the movie of the second barries of the movimishas whether the second barries have been table social to poor movie weither that

Note of this is to say that the commutant Bahm down the performance depth of the internet sector of assume the feature that and the internet sector of assume the feature that is before an explosite the weath and only department of the sector of the sector of sector of the sector of the sector of performance the sector of the sector of performance the sector of the sect

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70

SONIC HOLOGRAPHY

INNOVATIONS

It is curp practice in the space to discuss products share in at halform or just as they became available to the public. It as the functional go local about an exoting new item and there lind out in the last pranageating that it won the available for a year or more. And it can be equally insidening to need a glowing "Yow in can be-resealed inport on a product that has being othering clust on the scheles of the neighborhood he-assi-climes for manths

suggest a satisfacture is earlier user, source encroduced with the sphath responding earlier (ade to use the and footh-o-tack) of two performance instant. Source incorduoed through the Caner C-Addo seems to compration a work, waterpercard pendama Instrument's and penformers are located whole, waterpercard the first of, between, basis, or both of the first of, between basis, or both of the speaker – in Arbot, snythere in a 180-degree and song the Instrement and endowed bits compreted the statistication of the instrement and source and the statistication of the instrement and the statistication of the instrement and the instrement and compreted the instrement and the instrement and the instrement and the compreted and the instrement and the compreted and the instrement and t

The effect is comparable to that defined by a holographic photograph. The full-dimensioned auxilitiasion is utharly conversing iso much so that when a solicit seems to be playing in the chair next to yours, your first institut is to move aside to make move room for hit.

As implessive as the C-4000 s Sono-Hologram Ceremotor is other least include aspects of the SBST Carver paramptifier are lately to have dimost as much influence on the fature of person p elegan in this plast leavy each that thend in audo in as boen to so called addo risk, until shaft can be added to ain studio system to impreventia unany of ways the system is bound. reproduction capabilities. The most papalite add-ons and employed to hold teactual noise to expand optimits nange, and to create a time-calleged signal for the content of concert hall here of the tent sound in the constribution of the tent sound in the calleged of the tent paytem position cert layering of a couple through dislars and nocessiths a wring solvere that could battle NASA.

Bit flot Canar his designed bit daminto his C-4000 costing a pear patient bit in more buy a complete secura-curit or damit than anyting else we've apart in the market later to table. Until now mercuratly has been used to create menduated components—write a scalar targets to pearts. Canar 5 authors they correctly end to table. The approach is an one common orsers to use of auch creating to pearts. Canar 5 auch creating to pearts and the approach is an denicated second will.

Canvar has already received, from Audio Video International: a Special Catalon for Advances in Audio Technology. With the C-4000 preamp, he has created is whole new direction for the audio inclusity.

Fixed to server include to down who anythrage object information and a stratus, but we prover to them activity, but we prover to them activity, and reaching any melectrane down conflicted multitere to them activity and the terest and them any the terest and the server and the terest and terest a

Facturing large digos LID readouts easy to see even in complete districes, this minutecomputer will operate in depths up to 250 leet. With this dive computer frem Daces Davy Jones might have made it book from this locker. Co



Microalicality in the Carver C-4000 create the abasian of thear dimensional sound 34 Gebs



FIELD TESTER CAP

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CONTRALED FROM FASE 22

Instead of creating ifusions, we reactually trying for readily. Some of our models see so finely detailed that we can bring the camers in real tools.

"Near take the shot for eventes, firmt and forested theming of its as comentations and provide theming of its as comentations array and the shot and the firmt anaxed barry made in a recording shado and as expanse takes, and when all the different moves have been recorded. Its payed badw with the comment standing these areas any problems you can change ong or many problems you can change ong or many problems you can change ong or many problems you can change and then the

Simily parties to a meanly electron or issument. This bay is our label peech of appropriate the similar mean of processor capabilities of many a vinety of movies making up to three models and a content parties the labor electronic bactors appendix the labor electronic appendix the labor electronic

'Dur comens operations have loarned to become pomputar tochnickers the added They ve realized that the only way to get what they want on thim is to know what the india going to look like before they shaot.

And this is only the beginning of Heinland We wilk through the model shop and alse spaceships in all stepper of construction, from rough models to Timished standisce. Each the postine look of kotacks onlipp is gone row as a modal maker 'drites up a securi craft to topper to beren through the wars.

Farther along we see the matter department, where a Hartiner data (creates a pareing of an artifield that will shore be another than a structure of the structure of foregopound model is matuteritic desort to on another wald. This general to be on another wald. This general of even alongents and the structure of alongents of store on passing. and Hystitated antity to composite a vareing of alongents that have all been humed out by in-tourse skill monthems is what makes the labeling so special.

Garber stad. We now even have the capability for vances cameta units to talk electorically long enclose Their person a lot of possibilities as large able to program seally compliant mores cameta. We libe forcing what they doling Cope Encounters for only a small fraction of the creat."

Ten years ago Kutnok sent a lot of would be literatives back to the drawing board to the literatives back to the drawing board as the literative out, as while a drawing to know as we enter the literation and literatives as Wayne Smith and David Garbar are slowly expanding existing methodo as they area for the next genume and the bland Sav Ways DO

A public achies of this public time



Try our brand, the 21st-century supermarket

COMPETITION

By Scot Morns

Readers who tid not write in to Competition will and suggest Lease Rezon for the docest of thismen. Mowbot: the automatic grain cutter and Costmade the energy dirik for moonvelliers, should be congrinitated for their velocity.

In this Competence announced in August we asked for the branch rannee of products their will be fixand in beinty final contury supermarkets. We suggested Check M&N a computer controlled check particle. Preparation #7 a Listenart for robots, and Orcipos Pyrex: gites breasts for turking leet-tube balaxies.

The most appealed product knowcen by our readers was a margic orillinst would a provide wateries (Thrinking Cape Knowcid Food for Thought) is ourie for impolence (Regelated Emotion Homo Errectus), brith control (Anochevitable Anad the table). Mic Ködelig Antigrevs/V) and offspring determination (Bay Stanser Kait Bascett from Garage or Ub)

We asked for two cleas per card in this competition and feworids extract with two shong deas on one card. Most of the proposals below are unique in a low cases we've choren the carlier positivativ of two similar cleas. Congratulations whomes and benefits of a

GRAND PREZE WINNER (\$100)

C-Gee Whitz - Zero graining toxidits Hyper-Dyper-Meyer most box first and Keeps baby deer and newer meads changing. The load energy to posses through to another space and time. " - Sharen Resonand time." "Probably Needs", New Jessey, 1968, but its hand to regulate an insurger of reson.

Beleigeuse -- Instant spiece drink made trom meeta Pinal Solution -- The universal solwart _- Carr Carson, Riverside, Call

Valum of the Dolls —Robot tranquilizars Plankton Helper — Protein extender —Michael W Jenkins, Bruai, Ind Master Barter – The ultimate in hand hold tahing gear Too Nells – For use in low gravity seusons – Diane Doss (Avsto) Team

Whenevel -- Computer dating service for lycarthrophics Teacepool -- Device for catching zools

- Kity Balaguer Brooklyn NY

Mrs. Pauli's Fission Chips-High-energy snack.

- Richard P Karasik Saratoga, Calif

Trac III -- The test black puls the windows. In a second one cuts them, and the bird one test them into ittle bundles. Pathy larger is a forming. Child

Oy-Borg — The brance terms partner — John and Estate Bosksmoth Sente Brase, Cali

Sea of Tranquility-Bath salts -Hershel Cohert Oak Park Mich

CONORABLE MENTION

Cymonize and Brass Plus -- Two leading brands of robot polish -- Gregory Greanborg, New York, N.Y.

Solar Flexus – Sun powered exercise equipment to fatter the stomach Sober-Up – The carbonitised Un Torocant – Dana Magel, Charbony Lako IV 1

Mental Floss -- For removing extraineous material from brain calls -- S. Cop. Prince Rupert, B.C., Canada

Cosserver Dodp -- Human-poworod arplane for people who are alreed to fly -- Petrock Underwood, Grapalend, Rev

Cyber-Knot—Zopers Kodedone—Ouplicating film —D and E Marshall Portland: Oreg

Suture-Bell — At home surgery kit — Sara Ascalon, Brons, NY

Every Day in Every Way I'm Gotting Beta and Beta -- Bioleociback device Sic Transit -- A pill to counteract discrimination in space lawel -- Robert J. Rommer Library Pa

Bartisstar Galoxative -- Fushes cut starship engines (and bad TV series) -- Mark Little Sacremento: Cell?

Mass Confusion — Pill to relieve disonantiation traveling too close to the speed of light — Per Brazenzal (LaPorte . Ind

Proparation A -- Sherrive setero da -- Watern Huwowk Manchester Terre

Nop and Glow -- Official foor wax of the Three Mile Island cleanup Islam -- C. Novakowski, Florissant, Mo

Soybeen Queen — Arthcual-fast-food chem whose slogan "Billions working to be served "nover quite caught on — Archard Aram, Chemy Hit NJ

C-SPU -- Decidorant for robots -- The Softwartz Aerely Cheltanham Pa

Alpha-Seltzer -- A triblet that inductio a meditative state

D Petolino, Newark, N.J.

What's Who-Armual book issing world renowned robots - Ration Harms Los Angeles Calif

CyberNot-A robot repellent - Kesti Kennedy Chonnatir Cho

Sqwerty—A computer term nal keyboald stred down for use by children — Pay Sterrikovstr, West Senerce NY

Dry Sackhante - The first suger-free wine - Josh Rosenberg, Betheode, Md

- Tota wostuped), prevence wo

Lightening Rods - Tasty antigravity bats

138 CMVI

IT'S NOT TOO LATE TO BUY BACK SOME OF THE FUTURE!





SPITTMENT 20



NOVIMBLETT



JANSIARY NO.

PERSONALY

OMMI, the magazine of tomarrow, mean't back issues and/owell be ahead art, instead of behind the imagliand at supplies of the above issues are still availabove issues are still available at \$3.00 each including pairage and handling. List the issues you've missed and need, enclose your check or mane and address and mail to OMM Back issues, PO. Bax 903, Farmingdaie, N. Y1737

We'll rush you the magazines of tomorrow that were on sole yesterday.

for the weathless-webcher	
Garry Meade - A line Pitsner beer chi	Asc.
in liquid methano	
-Stan Energinan, SummarRed	14

Para Time Mesed — A video disc ol all o last work s programs — Jim Hanopute Taliphassen, Pe

Calculater -- An adding machine for procristinators

Puppy Caso -- Canine contraceptive -- M. A. Conway Tancos, Flo

Im-Taters -- Petero aubatitute -- Art Opten Jr. Kenosha Wi

Elfer-Oar -- The thruster to get you aroun in the void of space

-oursones countries on

Apollo Capsules — The contraceptive that makes each reportry as eals as the first — T.J. Allen, Leohawanne, N.Y.

Liver Come Back to Me - A regorierative pd for heavy dimkers

The O O B Method -- Instruction manual for out-of-body travel

- U S COWER, EAST ENGINEERICK, IN .

Mik of Amressa — To help you forget the problems of the day. — Charlis F George Rochester N

Didges - Pickled deer meat on a stack - Doug Store South Lake Tables Gale

Getweer-Ptemum RNA beverage - Charles Parker, Winnigton Do

Sky Labe — Government-trained dogs for stnewing spacecialtiparticles — Reging J. Vaniform Northwele Mich

Tidy Hole -- Singularity deodorant -- C. Newmark: Los Angelos, Calif.

Liquid Pro Quo -- Water sub struite -- Andrew Romanov Advigtori Ma

No-on-H -- Electrostato tape crosor Piolo up Sticks -- Amphetamine-lacad organistics -- Honkotos Colambo Pia

Make-Bell – A fast-lood chain specializing in sharkburgets Nay-Lox – To televe yearning far koshar fasel

-Joseph Thomasino. Bel Av, Md

Plutanium Blonde -- Radiant new hair odler

Erosol -- Spray aphrodused -- Byl Cope, Fort Worth, Tex

14D CMAN

Bermade Thangles -- The breakfast cereal to make pounds disappear without a trace

-- Rooky Shephord, Grooneville, John

Queesar - Space alckness pris - D. C. Poole, Sumse, File

Tender Vitale - Spare parts for calls - Janer Bover Johnstown, Pa.

Gay Abandon -- Homosexual repellent -- Remve Lexite, Rockaway Park, NY

Quarkber-The candy with favor and charm

-- Bill Stamile Inwood NY

Spray Shade -- The aerosol parasol -- David Jabson Lansing Mich

Freeze a Johy Good Fallow -- Cryonics unit

-ANDIAGO MARIE TIME AND DRAW

-Ketnath Singlet Minds

Clearasol - Sunspot remover - Steven Date Testientif Tube Okto

Dead Ernest - A male doll that simulates records

Reentry-A surgical apper - Carl Garson Prverside, Calif

Type-righter -- Typewriter that corrects spalling grammer typos -- Gary Rosenbeum Dallas Tex

Malig Not - A cure for the common cencer - Benne A Savage Charlotte N C

-Bonne A Savage Chanolle N C

Andromeds Stam - Hair color that makes you'rock like a starr C. Rema Complex Medi

Cracking Callists -- Exoto wate for that poval occasion distilled by Gall o line -- Element Lancis Los Acardos Call

Resurrectol For prompt temporary relief of death

-Stephen C. Pover, Newbury Park. Calif.

Quan-turns — The ultimate rokel for unstable digestive states — Den Neveriny Riverside, M

Mc Squaros -- The breaktast snack that equals energy -- Reure Ration, New York, NY

Mother's Mik Heiper-Baby s first dietary supplement - Wheney Young Lawion Mich

ONNI Grita — Byte-sized capsule summaries of the first magazine of the teenty second century — Lynn Cavol. Los Angeles, Calif. DO

COMMUNIC/ATIONS

COATINUED FROM (NEE +2

shorty levels are elevated in many people just before a classifier occurs. A rate few oven "see" the event: A study of the sensory systems of such people is not just logical, but obvious

Jack E. Byst Recine Wis

Solar Living

As a subject of architecture, I appreciate frontial Dearts anche "Orsen House" (November 1009) Sensore Instity has exsenders on the architect surregration for soit one Who architect surregration for weeks monohogs have to be ugiv? Wey not mode the units have a selecture teaching the provide the units have a selecture and beging unit, which is not only practical but also pleaking so the ugiv?

However, while caulding designs can be revised, people can't. The final decision whother people will live in the coldnass provided by undependable loss flugto on the eastmith of 5 billion years of the sums heat is ther own choice. I have already made mine

J C Rau Los Alamitas, Calif

Bravel

I want to nee and shour bravo for Omerica pictonials With beautiful pictures and qualfly oblic you're bringing science magezines out of the Stone Age

Oristifialis us where we're going it refects the total picture of the luture. It is prophetic, it is wonchoss One can't help comparing it with L. Frank Biaum's Land of Oz.

Terry G. Pagitt New York, N.Y.

The front covers of Ormir have really been curstainding. The December 1979 issue was something to behald. I refer to David Eggle a scryte panting Usanus from Umboard. It as mathematicaes of pasce art

Alphonso Mantgamery

Successful Conductors

I take issue with the report on longewity "Did Conductors" (Continuum August 1979) I must conclude that Dr Donald H Altas is an amateur researcher in addeen to being an amateur recents

Did Dr Atlas's conductors live longer than average bacause they are conduclots, bacause they are lamous, or both?

I would fail more confortable with Atlies's conclusions if he had compared faifocal individuals in several professional categorias (e.g. artists writers physcare) with his group of conclusions to see whill the inserved fragment several

The successful individual in a profession that does not mandate seriament at sonyfive lives longer than the average person Pethaps this is because of a biseculty strong constitution, a high motivation and energy lavel, and the satisfaction of being successful in ones test of enderwor

Aftest's approach is fascinating and should be further researched, since he isover so many utersweeted quadrons.

> Neil Cronkite Spenderport, N.Y.

Better Crizero

The staff of Citazens for a Batter Environment (CBE) apprecision the article about Devid Campy by Kenneh Brower (Earth, November 1979). Wa wonaler why these was no mention of CBE: the organization that Campy headed as areeutive director and president from 1976 until he deed

Dream their correction Mr Brower assystiat to crane has intered at flox light (in controllion) with Davids auto accordent) and the first expension and independent in writing three resemble and independent in writing three resemble and independent in they office light was brocker up to prawing weary caller maps news model. Sundothis, Risuraines companies, and all others both, resulting companies and all others companyed Others for a Barter Brutonment.

Bob Faregezzo Sen Francisco, Calif

Tale of Two Celture

I read with interest about the updating of the Harvard curriculum (Continuum, Sep tember 1979) whereby no student can graduate now without passing computatory science courses, including computer programming.

While applauding this move by Harvaid to heal the split between the two outsides. If tous if it will also be mandatory for supercomyprate take a create course in the tumentike, so that the illentit sciencist will be a obsolete as the unterement humanet.

> Margaret Buhager East Premantie Western Australia

Genila Foundation

As a cost to my prece on Koto and Wathon ("Tak to the Aritretia, Junuary 1988), Usanto note that Remy, Bon, Koto, Wathon (Tak to the Aritretia, Junuary 1988), Usanto note that Remy, Bon, Song Wathon (Song Koto), Song Koto, Immaa purchased by the Sontha Fondatom, a unail nonprofe organization matimate approximately the Sontha Fondation, and the sonthal sonthal sonthal times portunes to implayee exercised faul wave their sonthal sonthal sonthal faul wave the sonthal sonthal sonthal faul sonthal sonthal sonthal faul sonthal sonthal sonthal faul sonthal sonthal sonthal faul sonthal sonthal faul sonthal sonthal sonthal faul sonthal sonthal sonthal faul sonthal sonthal sonthal faul sonthal faul sonthal sonthal faul so

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Eugene Linden New York, NY DO



The advanced grant is deviated in advanced the second seco













PHENOMENA

OMNEMONICS How to remember everything



By Scot Morris

Yes had on otherway encodyrand any presented to here a week a month a year or green many years assilter - A R Luna, The Meter of a Movemental, 1968

been devised to keep all such sequences

each letter is important. More often, only

nech monotos below The anawers, and oppd 14-16 escellent 17-18 laniastic 19 recossive literally, 20 incredible

1 Roy G Riv

2 ___ Spring forward I at back

3 Every good boy deserves tavor

4 ____ Do men ever visit Boston?

5 ___ Red right returning

6 Some officers have carly extrain her to offer attractors

Nevro Ipent Tibe a parts. Mother

My very extremt mother and perved

10 HOWES

12 ___ D C Ven Dessel

13 Bad boys rape our young tirrls, but

15 Carriels often sit down catefully

16 How I wish I could recollect of circle

17 ____PAL

19 Blass my dear Aurt Selly

20 ___On old Olympus tereleratopa/A

B Edent of the visible spectrum, from

1 The proer of polor opding on electrical

P. Packan order of Branch premipe

R Navarator a poerations to determine

S. Moha a solalo of maneral hardness from

T Taconometric functions in a right

and the \$2 in the bellocy a pocket makes

2. Securize What is the patient of this progression of numbers?

3 Now many F s² (Sent In by John Krikland: of Santa Bartasta: California) Read the sentence below cire/uly. How many limes does the latter / appaar? Count them once indenty once

> PRIMEMED FILLS ARE THE RE BUILT OF YEARS OF BELENTE IN BELEVE COMBINED WITH THE DESTREMENT OF MANY YEARS

4 No A, E, FO, U. W or Y Name a common English word that has no vowels

 Rhymeless Name three common English words, of five or six letters each that have no English drymes

READER ORIGINAL

Exercise the find source of Centry recorder towns even in threads puzzles for use in this column. So far we have not been printing these in any systematic way, but starting with this issue, we will present one reader puzzle in such issue, topo permitting. Beaders whose organitigations in bases for this lensing will service \$25

To start off, here's an original progree son sent in by Michael K. Herson, of Chicago. What is the next figure in the sones?

- E. O. L. S. S. E. ?

MNEMONIC MATCH-UP ANSWERS

1.B. Noy or bit is the man who remarks you of the color spectrum red oxange, yellow green blue incligo violet.

2 O To remember how to set your clocks for a Daylight Saving Time change think of this. Spring forward, fail back

3 A Entry good boy deserves favor represents the Their on the trieble clipt teacting from bottom to top E, G, B, D, F For the spaces between the tries it's one word, lege 4 P. Domenever wat Boston? provides the ninking of English sities cluke. Terows, early veccuri baron.

5.1 When you face server from inside a bottom molecular and back bodys are on the left and back bodys are not the right conner awayates were this shough are not the right conner benefits an end of the Cub manget at 8.4 or C (Secretarian and Protective Debe of Elect), as initials for Stock part on enforces.

B-1 Same encodes have carly aucum has to other assuces or break into one into finde to get the trigonomistics functions in anglet triangle size – opposite and/hippotensial octame – adjacent side/hippotensial contain – adjacent side/hippotensial contain – adjacent side/hippotensial contains – adjacent

7.M. Anatomy studencia know Naver lower Take s pants. Moher might come horse to rocal the eight outpal (wriet) boree nerectire, tarete triangular pisiform, muhangular/jatenter mutrangular/losser, capitos hornete.

4-1. Wy vary earned mother part sorved as non-polies localis the most poliests, assisting out from the sun. Mancury, Vanue Earth, Mais Jupier System, Uranus Nephure, PUIO Mary other is entences have been deviced for this social untring them, Mary way assign makes John sond them. Mary way assign makes John sond.

COMPETITION #12 OWNEWONICS

The winners of our competition for brand rames of the future appear this manth starting on page 138. Next month watch for stumming "classignitures", the results of our contest for symmetric and uphild down littlemo desame.

The Interface competition is too immonices. The gaze all with labeled with and others mail carry starting the heads and the minimum and the head to head to make the type ensure. But the job heads to make the web (council other name croups that the web (council) person of the facure should know. Many sequences on out for good memory aids How, for example, can one keep these things streigh?

 Metho prefixes of dapwasing quantity dep: (1/10) cord (V100) milii (1/1000), micro-(1 millionth) nano-(billionth) picothilionth) lanto-(quadhilionth)

 Metric prefixer of increasing quanty devia: (10x), hecin (100x) kits-(1000x) mega: (1 million x) giga: (1 billion x), tera (1 million x)

 Policy hands one pair two pairs three of a kind straight flush full house four of a kind straight flush royal flush.

 Millotty runki prvatile corponil sergener Avestra officer levanant, ciptian major optimel general Boerg weight classis: flyweight battamweight festerweight lightweight wobarweight, mobleweight hervyweight Hotsegars walk gallop, hot center owee run

 And so many others the BH of Rights the Ten Commandments the sowah dauby aris, the Bayen Wacdets of the Anzent World the astronauts who waked on the moon, the conferences and clivicums and National Focubat Largue testes, the members of AND the 15 congreat Amenes optimes the fee Canadian Drivings

The Comparison There is growing which of the growine works in them, with the them is works in the second web Them all stranger. Restress are well web Them all stranger. Restress are set to other pertode to be called to be intermediate second to be the second that areas to emerson ceeds that that areas to emerson ceeds that that areas to emerson ceeds that that areas to emerson ceeds and the second to be the bead on ongraphy celevens is and the bead emerson cells to be being the certain the second the second to be being the certain the second to be being the second to be being the cer

LAST WORD

By Martin J. Pitt

n anciaments about whether or not

Consider what would happen if tak than cosmetic surgery

poplital party or a crowd on the street would be unbearable. Receiving other

 Consister the practical implications Frankfurt in the mediat of a million or so other mends in the area? Could one distant.

vote dwert the recipient s attention away

Preturnable out brain wayos would have

telephone¹ In fact, by converting voices to boosted brain waves are ever lively to be

dalays are spont part only to astronauts been suggested) the human bram would transmission of navigational data from computeria

Consider too, shall telepathy would not laws of the universe. Even if a new means would probably be kented to the speed of

telepath cally to the IRS and trying not to

would chied mental communication really

intriately connected with language The children learn them, suggests that necessary to have language in order to an have shoughts not just to express that

probably manifikely to require a common accident that Impuists speak of Thinking in a foreign language, the way you arrange subincts in his mind because they have been taught in different languisgee. This is

no reason for you to meet Einstein since would need his wealth of experiance and twincrafter also it to difficult to see how such

The effects seem to be weak, occasional

look down on the earth through the magic cargina We perpaye grants in faraway

true, but we we been too busy to notice DO