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About the Institute

The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

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Amine me progets a dectrinous people, I when they have at last created a toutra al made propagale for it through a stray agosted and his addent at unwitted followers, doubtry Thomases at intrudus are demineted with religious ardens to superind the survivel of the dotting all dottines & that down that are fields and have differents in your, are in science, never are primitted, pathys because the Amiles do not have the sense of human that they always like to talk about, contrary to the terms, who and were have sugar by fore the to say abit they two must lever ather, west I cart, that what is a blog truth in Heidelby is a said joke in dance. Have the old truth, however, continue as much through those small but stray muchs who sit in The sent portion for other dearns than agadenic broadwarded on and cogetance it decide we the distribution of research finds facilities by aid of - any peculiarly Amic system of soulded are allowed to, uneninously of course, assail it require remarch programs propried by those who done to doubt the work of the degree. When we are to America, there the fields in which we use which anich, winterested were still dominited by three dogmos that had by ago (tother dogs total de) T, See laid to vert any learned Europens. One of these was the the hypothesis of tabul rase, explained, it distribution of with the so is and I disjund of the south of the gravitan, with postimine sites to be gravital and and a print the gravitan, BOGL to y- Hugges Trappituder Law Bother Hestowed OR Internation above had assured a complete a genter later that distribute of aid Anim pate, and antiste Greated, a could be explained any by aid of this hypothesis, but the small seals who supported the way dopen ridicular him are after his death. And when we mathered the Apothesis, on them a rather fact of glavid award we should his treatment. Author was the old them of by distance disposed which was constant with the hypothesis of the court of the occas, the former have been done which was marily by Sintram students of migrating birds each this actury, the other have been laid to rest through the theory catent drift, which explained a single of his Torical tars what the old view could not. When we expressed the exprision that the continues were moving, the that - fast that also could explore the existence of lacher of that ghats disposed over help at ready as each floating of the ocean, but new we with birds a other miles agains as themat and itraying by Theties of the registre of small istall dose to large lady, the wise m in Amine turned they back to avoid laughing up in the face. We had the beging of this century that although antime selection articles into kend shown at the beging of this cating that although intered who had shown it offertive faith in creating interpetitle races at the which catering in a spectra faith is creating interpetitle races at the which of subspecific lead of the dimene species that are represented in defined by its specific derivery strictly defined species that are represented in defined one found on varies at the always cataity phicilly by days a the chorosters, either by societul setting that represente the chorosters at the oreals dysplicity or by originating. That did of come, not fit the days of the

or selections

the mesdamines that still down to an the gay mints, who do not done to be logical lent the might means but a Bright of Brightans. To when we say just that, we git - Creating and in the third of Brightans. give to Gildschildt, one of the first Europe southists ever to set fort - Anice ever a grinter ofthe his death, services in Berkely, the place that his research make the faces to Europe of Europe Sidopit find it necessary to make for of his correct ideas that still do -t fit they logic. Scaling of any bit they both other a far both with have standing polyphicky winderty mare throughly the here Arriver, I we have utilized all hads of mathends and logic to find meatines in the societied Happy phypothes that postulates that onlyplaidy favors plats grang whe extre culitors to that the fraguery of polyplints increase of such to math; with lope the deper are withed studies however, failed to find such weaking 10 we are a mode that it is correct. but Stations I search other require to are look at the date of catinue to a explain for instance the high frage of the fight the section this fragmenty away with a logic that depicts real logic - because - Aring dogue always must be deputed to the last straw. And I could cating that allowing. Last but ant least, whithere is the about of getologial studies at described the first and the Europe has been accepted approach to a scart departer of the spenses artigrapping that are the To de Hint Institute for Botafrant Det domentation - flors In Amore, where most seelled the with remain souther placeticity, which is a leaned made for antigenticists of less opene the demochant or Sycalish who there that were y chroning as aly - allitude thigh atter meraglin characters, aly two for manuals, are old for Quesee it asthe secont for Grande, with by Dush bit is an matter chromer. This gyrrouch is, haven, conduct as by as are does not draw for it any themand the conductors, as we have felt forced to do - especially since the soon rectiged that especially the lack of this opproach there explains why any at years had remain caribusty less dealy degrand the their Europe relations.

Alman Sillegists - selectivity, they rederiving, or ear phastical of the lunchists, alway to a selicip that the gradul selective procen is affective mainly within the grappool, a species, whereas the specieto process itself is catastrophic al caused by chapes in the character, either selection as that does calls what we previously called gradul spectrum (which is not as gradual or as blocked but len always the the follow), or chaps a domain - My which thereby a we have called alwayst specific.

The typeyon of an industrial is timeted by measure greatical a planetical plasters The type of an industrial is delicitely balanced by more greatical of planetical factors at its year is limited to a legth that is control in days or menths a control of the year of party of a legth that is control in days or menths a control of the species for years at rearchy in decades or catures. The types of a species, however, The lifetter of of - species once depictely established by the creation of a systematical days at the state of the species of a species of the state of the species of the state of the species of the species of the species of the species of the state of the species of the

It is - part the natural evolution process that when any method selection has at last completed its task to make a systemic dedicately adapted to its environment by proving most of its years into homography, the reduced providently of particularly to the unaverable days in the maximum remethor a link of particularly to the unaverable days in the maximum remethor a link of particularly to the analytic days in the maximum remethor a link of the all to extinute. That is the price for the provided of their evolution by other against that the model is under to find the set of the all to extinct the theorem would be under to find the set of the all the all to extinct a grant of the set of the provided of their evolutions. Due the all of grant is the theorem that day the set is a relation of any impacts increased in the set to preven have been a structure for the particular the rate. The species that the first the first approximate the rate in prevents that the first the relation of the set of the set the day the set of the part of the part of the set the prevent that the first the first provided interest the the the approximation of the part second allowers at the rate. The definition of the part second allow of the second allowers and the rate of the set of the remaind of hightly havened, all the second of definition of the part second allowers of the second of the method of the part second allowers of the second of the method of the first of the rest of the second of the second day have history. There result, haven grandler, the action of existing the has increased and the proved of the any part of the method of the second model of the second of the angle of the provides has it resulted dimension that have caused concern any for the angle of the method is of the action of the the second of the and of the provides action of conservation of results on the the second of the angle of the provides activity of the the second of the and of the second of a while the of the the top the datue betweed is histories and the ano

The first stops touch arents of life were taken like a the last center by giving law protector to certain wave and a plat that seend to be heading touch extinction become of here activities above. the print interact in suched adapted species is a remain for this print, althigh expression has show that such a protection to get to of allisted species to of a listed significance. (Inp.).

The first cutants with Amic - givings was that y discriminate. I had sport eight year, studying a fund when I returned to kell which had been accorport a protected of the United States for fair years. It astainly me to observe that those cooperating with the occupation Joces I gaining wealth through acting as assisted of signer y minons hind, were the sine persons al granges that had been the cooperating with the Germany syn the war. But it articul me man when the appoint a regreative of the Amin Entry told me that they had ignoring which should me to be a committed agreen enough to be a its black the the I was not tild for where such ing the Digitized by Hund Institute for Botantical Documentation acquisted with people in the ather ash the diverty about their religion or opinions, but I had no interest in this prote this neighbor, who had protected laded it the broken all promises to leave of the the war was over, I felt that I was in a good con with others - the list, which included by 7 the labelie prodution, most of the people who david to stal up I be cantal is free men I all it, caltured grants. And I will here be disappointed of my nee had see left at y this remains list although I can that myself as a find y all programin

In for your later I had a gost ity decided to leave an inight to land, the mathe nighter of the United States, I so had be appointed - prite a a andrike proprier at the University of Thits, a post I should take are in the full of 1950. Before leaving for - atomton a common Sind, I had be told by the president of the University of Mithin that the const it would be eariest for his I me to allow him to apply for my might with in Ottam, although my finds it the British Ending we legt for had a staged there for the saw, I returned shally legar and departer for Calde. But we were up for a supprise; two days lefue and Schippy, shall be shipped to Amic, I received -Digitized by Hunt Institute for Botantical Documentation this was cound by the well-lon Cartin subscribered I band an ignotion for the Amin Echang in Regligante as to any pulitical opinions - with other tend so my seal expire of Amin officials was now to be that of a miscarriage of justice. It was not their It took as search mathen it - year withit sday to get this Carding fodishers corrected, by aid of lattic. Furtish a Calin frind, but the Amicos the selves were gonty pleased that they succeeded in history there deprious politicing who had be so dimigrand by aid of subscriment - r pulsos and paid? - I altic informer.

Since I that did at myent fail play it theope did not correspondent the Easing application of a talegher catants, there is always a possibility that I have been take (hal) (fold) "deceased, tricked, doged, hoodwarded) hoodwarded (sy dirty trickers), polyos, the lated by the letter (exclush 5) which Swinch at least first resulted equart, it there may have bee other letters in that wir which I do not have y. So ever the sugging has one to my mind that all the times I believed I was talking to people at the Estimated be a fitting estimate of the series of dirty tricks where the dispuse y research suggest.

The main rear for that I have kept this for myself for more the five years is the fact that I cannot corresonate my story except any partially, in addition to the face that if it leaded out to improgre aprices it might not only add to my difficulties but also hart other, innocent or not, I I have near that been revergeful. However, since I trust that even the cover of as I like to call it, new is too all to hart even those I still believe were involved, at since I must believe that the stat real authorities at the best induced, a since I must interested

The use rains threats others the them matrial in theature letters, one doing that the CIA had here, igned " it would look ofter that I did not squeet," whereas I would get of to hite . . . and that its lay and would reach me gube chuld I, squeet.

Digitized by the the the stipster for Brokanigate Dige unertation I did not dare to give the more the - mining , i broky prosent, is - the And they use too conducte to true me to group - I have us avoid they Drive on the to evaluary havenne What hey where it now - they I really that a separate it so evolved that we I c-Naither ready more insertion - and the

Neither runds nor incetives - new thelen significant results - there had to be presented. Reading and any lappy - plat or ... - polyou the und .

Stylen Lulquit, Veletice, Drihar, Hands,

The provides a well of wind size they have broken there. Joe by it any ever look a found as do all prevented, and that my Sources that was added helved of these - but here it is ---

Shitet :

Need Jos a passive waiting (Collected to) - any too much when me the fire years! ACLU with propried amistace by a situate e.g. In the ampires of the FAS, for instance your tooland dans, Chalse Heiser a Fran Styling property with any accept - the dy-ing letters it withit must ing the covering processes so that and mend will arrive to hant the any proms or to reveal mother that call be detrice the to Kyslow- Aring another or hart me as other more the drach dank. Dut the willing decent fair grown by Dalles also must be atthe allowed to I be due with "must," in whitend way that are be due (arithel). That will also grown a going make "it priville to regult a atthego that the file at the brithman, Bartolar I in my collection be destroyed her a agreent to make an homeste state has been stacked. Walk have told this ill to deny time it steen when I asked for hege of

Embedghet: discretion, testplanen, tact, delivery of feeling, (predence), consideratemen (he is a more of unmand diversity) Forthe apple remoch : no financial bookheeps required, another to physil the reserve presend in the applients to receive further typest when applient for later-Righty - no letters is togen since the my se - Deg Therest at the S.J. who could lead this To the price is the senters who grantly is your his scale because he sens To be the most apputse it most imaginative secrety the S.I. has ever hard. Ole-gendenters a queet shate my - but otherine though the discount actual of the HEW which a put y, aget to investigate coughly - I affectively the lagin of cases of discount to - I ather infingents of sules that another have been alsound but allowed to be annead by and inside which that never were they but courses - al of the one by the advertision of method and and a received that fragmenty has be and a for familier or dometry to bridge bridge of any reach to familitate the research for which it is give charged. Park on a minund practice dealer - but no thing is better for that other have she say a day, day, Was guledly new met to do as breather - but what yhad all Come are in - he had trethe there up topperty. I also there I do not unt to hat mydridy, but since I an carinal that he has been shalling treated, to put it wildly, I believe we are allowed to aspect - proper converter - e proper argument of a profing a for eacher his of respectibility cannot by the likel, (aregisterian), for whetere rear it was executed. That shall be proposition of the institution, (aregisterian), which appends hired all gave grows to catain prover of a character and community with what are sequented of there in higher position agains - but it is - the instruct to industrian and the catain of the prosting and the content of the second of the seco Digitized by Hunt Institute Tont Botatire alt Statistical If my work ate is to be judged, this should be done by real peaks, not Arian, but European, like Styler, Vilatine, Dalar, or others with south admitted with philosophy in biting it justices al of done to my age, Payan, Thracks my be grandes - who home ?? Dow -e di- light anticle As himsen said in the set forward to his Species glatan, it would be wise to wait for the gent you guildlike for a judgent of my works, but i) it is needed now, the and Europen colleagues of saider Theling on gratin and botting anget to be extended, e.g. Styler, Whatie, Myren.

What they call may a more down Charthen Swigt) The story of the projectual Arian relation to accept over ideas, we there by since accepted elsen here, when presented by marcars : Filly of a ship the true, at set sit, presented by marcars : Filly of the true, at set sit, presented of the start of th ind y there the may projer to with us have for more first-had review of the situation, since if it see as have to cartain junctions or anters, he could lose anothers by - but he mights proper to send the any artitude stant smithe with the builth in when with me What you have hered is my one part of a crussing affects for a doubterthe operation that would shall scientists everywhere if its details were made brown - it includes not any this hind of studies of likel but menons desit threats, se direct a st - greated through in Yyoshin - I Delle, other, anonymously Through the teleghine and it marons eccaring since 1973, the most react are the 18th of they stight, I do not mind the my South back/sites, the multitude of whom is - indication your greatures. But it want to for when brooks disquired of southits I peus antend with their deductive activities by aid of highly carrent politicans - and soulded digtor to. I have doubt up cylithing so straphy that I have for good anywhere it me in Anice 1 - c un intract and who has it dispired to and other to do for her what he would shall be for other. Hundlen, It would be in appropriate for me at the to be done the and an other the would shall be to the share of the state requise for last, the Quinter of Amon Southits - The agoing this that agoing the But the matter would be very different of a respectible colleague of your that the care match to protect as against pulsage despecte avoided who are defined the care match to protect as against pulsage despecte avoided who are defined the constant threads the fitter the despected the constant threads the second the protect of the second the constant threads the second the second the constant threads the second the I a not an interested in math uncerting the since rearing is not any in my vicility. But I think Amin since one, as a correction of a gology, I bust Smight of highting - consister al disposition of the hand have the to time as have form e I new thought such a hidean thing call hyper in this cartry -Ash Fas to help to its your and the tish for a palacing reason -The a for institution, a vitter sectled propring it security, who are great anope to be to televate an injust who is able to get unde the times before the they all last a nice providence and to be to televate an injust the case the great is great what that is their glants, with a sine providence and so which wants for the case having I never heart to be large the source by anter of price, or y ingle batto to the to make the source for the to a work for the to an angle what we the side is the to the imaginal with a side batto the imaginal with a start of the second for a last the second of the second of the second of the to a start of the second of the at new vijune a hind faithtrattland) grand frankstyr, - but I have you Jurgine the dalag - -. To investigate if anything burg has been dere, either to me a by me, and if so, suggest augustion if recommy. The shift that you had best suts the Arburn and have notional to increase of sche of som for the lady with by the belg to be beginning in the son for the lady with by the beginning to so the beginning to so

(althings I believe that you with To lova more indictors that you we concred, much more so the ar excelled colleges who have twend in the back as other chicken).

I have it in fact, something started and started a second log letters that have grow to considerable light but have at last carcheded that since I aly home about you concour it not if you are able to help us find the help we need, a shortne letter is in order at this stage - but be sure that we are say much pland with you Attitude which shows me that there are still in America people with the me consister I disposition that we use toget by ago, althe tranght up with by ego, altheft we have not see it previously a this contract. Parkings it diad soon you this acting command, but it evidently characterizes don Jawashi, who is - little you the you are, but some of Botish rights.

They may, pullings, have tried to look into the matthe without esting for my file of the story it, thus, may have be take what you haved, which sees to be a came there of presence it thus between the take on the file on the first and by the dama of that it to relate the second by the dama of that it to relate to matter becastly or the data of the political the activities of the political that it is to relate the second by the data of that it to relate the top of the state of the other of the political that it is the second of the political that it is another to and the political that it is the second of the political that it is a state of the political that it is a state of the political that it is and that it is a state of the political that it is the political that it is and the political that it is a state of the political that it is a state o

Incorportance, immorality, which characterize the faculty I administrate of the U. of C., with - for exceptions, so it was public to be expected that they resented and to call their size at which to be the size at which cost . why imigrate of a wy different it land. I but the size characterized there who decided over research suggest it faileting it the NSF, that Nith it the furthering on for -s and expression reached, it is more farce the the second per system of anarymous judges that there institution of Bitized by Harit Institute Botanizak Joangiantation at the results are according to it: any per coulded get themists have of ghits, ing for have a clustering for andusting at goty to got got and and and handly any have an interest sigge, at the recently published at much projugational southed but of and your of the southy checkbut of the With Arein flore are scaladourly free of motion learning in These fields, though They are say und as - said of denied of technical program - --

We appreced the Same it merows other Universities, and it Paragluing, where you were the any and tonly reportent situation allowed here a conduct othics when salestry you success - success the dective has seene coplete with the coplete incorporance al marchic decadence already offer three changes --

We have also exprised that must of an socialise colleagues in this can'ty me small souls that turn chicken whenever courage is maded - again, you are an initial acception - all that make withing but immend scoundwald without the constitute they see to require you all other im-And the southed statement of this bad dare to criticize other for immendity of underscript attitudes! Jun D. when I needed them most, they turned their back - me: Cragaist, dais, Junar, an Wiber ... will that I study

Mother of the per review.

In cytotekaning it the handling of the Europen flore I have no per a this article may may may a but that downs care, as close to being it as priville but which it the butter - but his opinion was suppressed so that I could be to condemnal when the builting scouldels water make once more a morehay of the soulded presveries at and it to take me love abound.

I have be thinking y what to reveal and withit with for others, even to you, it have one to the concluse that it get appice, to short just one stop a the by live of miscorrige of justice that had to my stopping the case disatland of my gent of resigning without cartest so that I state call and reaction have the induced signe the file years I growed to stay quitt had degred; now they have. Stargue, I - adapt a copy of a letter ... I it transfor -if that the time is not - serious case of the maticious list in Aman tams as it articly " The direct is not a second for the third will be the the the the the second is st actual because and se is a contry, I done to back that this is a lad of laws as so ofter daisned, because the apply at - which this is saved was not by a press (the daws in the of the gave colated a kin of positive judgets and ignered at at an anatively, it a little laws the direction at all of the positive judgets of any open, Dr. Paul thered, told Dr. Dillo Toner that this action had be browned by his]. So I what is a constant this action had be the to use this letter also to get everythe corrected with a function of reveal the continuents fince that what and so get to be for the to the type of the tweed the continuents fince that what and so get to be the to the type of the tweed the continuents fince that what and so get to be the to be type of the tweed the continuents fince that what and so get to be the to be type of the tweed the continuents fince that what and so get the formation of the to be typeden of her tweed the continuents fince that also here the south of the the to be the to be typeden of here that the to be presented of the presented to be the the to be the the to be the to be the to be the the to be the top t When a for which I have little feelings, I experially, the offerts of the Quint it seemed any of the follow scientists who are instructed in the chanker, became if this Agethe Christian the treatent bethe brow, all fragmes could book agen these Us actions a pocnitic.

1) tenne there graphe had to try to hetting - othick regarder wind they have that I a have in the world for art and him of grant in a standy as allocked in berkeys, not wing - that is a marijume or other drugs or grin s, not being here setted as many of the any new income with great the constitutes (see allage or balady was modeled by a last graph the try to be the for the for the for the constitutes (see all any or balady was modeled by a last graph to be the for the for the for the for the constitutes (see all any or be the the balady here the for the graph the for th

If I agree that there are indications that we have been treated by a type and the there is indication in the state of a type intervent in the state of the there are indicating in the the the term treated by a type of the the the the term of the the the the the term of the the the terms of the the the terms of the the terms of the the terms of the the terms of terms of the terms of terms of the terms of ter

(The testing any provided, evidence as Joyed lower quilted), her decounts are missing time they use news returned for requiring. Oright of crude abuse : D. - (Immored scoundrel)

I have had to do with immered standards at various places, but I have no derive to larear myself to their lard by fighting the with their rotten methods. Thigh that sees to be the caster in this (I of little lawyers a style the In my sendly this would be regulated as a very minural metican tible, her has strong to preside in the regulate as a very minural metican tible, her has strong to preside in the regulate as a very minural metican tible, her has strong to preside in the regulate as a very minural metican tible, her has strong to preside in the regulate as a very minural metican tible, her has strong to preside in the regulate as a very minural metican tible, her has strong to preside it the regulate date.

study beine To instandly credul that are and Agentic and had be inverted the ght it is also (luntic) this courses and mother that can'd surroundy hant Amin relations broad to substitute the dain that this entire matter is a single of a witch it more serious the "exprised are by The Societ divider Sugar Tuke Production and whe parts of the scientific (and how here inderty protested. Does the Dible, so ofter mention by President Centre, with say something about the moster that is in "The drother's eye is the beau that is in you own eye? I selvere this is such - case, but modely have has an suspected it, antil you, althigh I must say that "Bill whom did so the says in the he news asked at I new offered him - gonthity To see The evidence I have also man, when I the fire years have gove that I provide my colleague in djulling to keep quiet, asked Dill to one at look through the metail, but he has not yet reacted, putyos he is conjused I with to avoid to do thathing way? And pathops you reaction will be much that it could have him, as you may feel three I Keel I 11 are straps me I setter gyrreaches that anget to be taken 40 so that we will not se but more by the cartainly un-Anasce crowd schod this, I set aly my sich, action against me articul) an autitudy night? I do not bailite to leave that to you judgent bind - ly expresse but would at the est in Decempre Attation is dilt yith I share it that a for a provide a with the accuracy of the decempre Attation require the learning of shirle of Jatitude of a Reason and a decempre in the Accuracy when I have no cartain. ethics Conspiracy added ? Dis has not an ent me to talk you appling, The does - Them you I has learned withinky means to trust of American - but I still trust a few, you are y the , so I all with the advice straticly. Cad Altruph I don't test I have been treated as an hunder you (an party) quest, I find it righter if I stud up to teach my vird juch jurger Schein - type others do, they's any you have for four you. Head you could not the sail of the for the parts - is hard with the I do not thank it is appropriate of me to track the Anian othics, through I do not Settine I ampt to take they to get stray colleagues as stry langer to fight for me oppilly. -141-But of for instance you feel, that this call be you role, any gratitude and is equival a worky. Her. Perhaps the most oppropriate first stop - ight se to present the herety of the hither with the evidence, promoting of anti- within our his sake, second 1 - in is dust the here not see ingred about the atroactives propried by his aboutinates although his within a the sector of at me critics a the Sente of at the many of working payment by his a Surdinates although his three attents in although The more methics. I have gother the injoint distribution of the first sector of the sector of the

despite the fast that we always have due and best - or gody is jot hearing of that since we as Shitsing treated at every level, I although a comple of our sociallad colleagues I finds have expressed sie hand of supportly to us, not a single one has shown the courage that is helping the dissidut Lews :- the Switt Union, where people seen to year the secont price of the price it to conductly less than the two branches of the search price have prove of the flow one expects to show fortitude They have at least show drawn the control of the stand drawn the control of the stand o 200 godden, recently fit they give me a methody to tell on side of the story in the hope that they find it weathy of reaction - they caule probably got they get see of and colleagues to help make much a study peer-oriented, all of I post it I would not like to give suggest of manes to avoid particulaty. I was brought up new to owlook the prominent injunctions to love and smarries of) to turn the other check, rejuring to regard in hind when one is to degrised, havned, or wayfully used. It becare agont that what was occurring was, as Beter Tamber said, antry to three faith los at least to my faith in build deriving a fairen) Surcanceratic rule Bit she for and it was the first the former of the former and the former and the former and the former of the form soul shand the course which I thight was the hallmark of Americans. The way and I ask, I Interstate is I ger ainly stylle sine of inhurt whepen cin, al mis so front ant. It En for a signily alles it i Averilan kunshe agan fan 3 Sir groender filst oalle oar lignile helder súbjest and & hage amouston high is regret ment filmennshe perre, in high it I afre ingje up ulmes

We are to Amic- Second we believed it was the haven of presh - - (the home of programme it light science. We soon interstand that an draw that see matter ; but it took the decades before it touch at into maken all as exprised that we had are to a lad where freder is that granding, not y raget, I where ever course has the into converdice. I have see withing the story of an J-ity, - hind of a Forsythe say-, and which is anythering more office, to not and in the part which relates to on Singraphy: in it as more and charged it no masteres security and - I have by heart a diag. I a grategul for you findship as shan by the fact that you are the any me of my Amic acquaintances who has rejurned to selice whetew Hales that may have see disposed as a coverege by those who, in my eyes, have put & the regulation of Amicians as haven all law about people to share. I enclose me good copies of the popular which I have trangthe go in your consistion I would appresiste your adrice of help, of possible, they I reitige that you have never experienced anything similar except in stories that go did not because were true, as 8 also I an chaim. But I do not acquit that for you, the except that you be cautions with this omitmic since we may be dealing with seasoned desperados if I a allowed to deduct their approximited the procedures desperados Dightered Bigue Hoppit the Shiftute for Borcarrie at August And I trust you wide I fastitule We shall have rectined that the heart of the start fines Anim remain as heart to the night of they were to the places -Soth are still regular a lover beings, especially by those who are maller marks, at they have right my to be sound at valued at libelled, it decived. New trust - Eylah - Anie - there a weather signed. We reday, I so do other, that are leng I handlight I bolister the old evert " law": give him - Jair trid it by him - thingh we get as third but that of older it a baily in the back. We shall have realized that we use any to the lad of The Hu-Miselle we expressed that the or deally on did the negross poor regross. The fast time to Militian tibel first for The Enlang :- 1950.

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S. S. KUMAR, Investigator Incharge Botany Department, Panjab University, Chandigarh-160014.

Dec . 20, ... 197 8.

Dear Prof.Love,

l am sending to you an enclosed list of chromosome number reports for publication in the "Taxon". 1 hope you will find it in order. Thanking you and with best regards.

Yours sincerely,

12.1978 2.0 (S.S.KUMAR)

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- This model thus explains low-dose linearity for 32 This model thus explains low-dose linearity for nutagenicity in some cellular systems and non-linearity for carcinogenicity in mammals by the existence of deactivating mechanisms, such as detoxification by the liver (T > 0) in the latter, but not in the former (T = 0). A striking ex-ample of this is given by Hsie (22), who studied the mutagenic effects of ethyl methanesulfonate in Chinese hamster ovary cells both in vitro and in vivo. The doser esponse curve for the former threshold. The preparation of this mamerine as uncert
- threshold. The preparation of this manuscript was support ed by NIH grant 15191.

entific enterprise. Some even go so far as to ask whether it does not contain the potential for destroying civilization.

In this article I center my discussion on something which I shall argue is common to each of these problems, namely, the operating and ethical code of the scientist. First, I discuss some aspects of the situation of scientists and the possibilities for preserving the norms of science. Second, I deal with an even broader question: could there be a relationship between the ethical stance of the scien-

> fostering humane socioeconomic development? In turn, these reflections will prepare the way for a brief examination of the possible relationship between science and a unified world-order of some type.

Formulation of an Operational and Ethical Code of the Scientist

Scientists have developed characteristic rules of procedure that help to produce the intended outcome of their activity, which is certified knowledge. These rules also guide the conduct of individual investigators toward each other in their capacity as scientists. In 1942, Robert Merton formulated these rules as the

The author is professor of medicine emeritus and special lecturer. Columbia University College of Physicians and Surgeons, New York 10032 and chairman of the Editorial Advisory Board of Mara and Medicine. The Journal of Valuer and Ethics in Health Care. This article is the edited text of an advess delivered on 27 May 1977, at the Memorial-Sloan-Kettering Center's "Symposium on Medical Ethics: Statistics and Ethics," held at Rockefeller University.

The Code of the Scientist and **Its Relationship to Ethics**

André Cournand

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Several decades ago, Paul Valéry, poet and essavist, declared (1):

Never has humanity known so much power and so much confusion, so much worry and so much play, so much knowledge and so much uncertainty. In equal measure does now anguish, now futility, command the hours of our

These words were undoubtedly appropriate when Valéry gave pen to them. Yet today they are perhaps even more apposite. Indeed, they seem to apply to three distinct spheres of human action.

In the first place, we live in a time in which the industrialized countries are experiencing unparalleled technological development, in large part the fruit of science. However, the benefits of new technologies are distributed in a grossly unbalanced manner, not only within individual industrialized countries, but also among all the nations of the world. Overcrowding and environmental degradation are already significantly reducing the quality of life in the developed nations **18 NOVEMBER 1977**

and give stark evidence of their inability to confront the problems of the future and its planning. Excess population and famine are on the increase in some regions, while in others there are those who enjoy material goods and leisure as never before. In a word, our inability to regulate the processes of cultural and technological development poses a grave threat to our ability to achieve a decent and humane future.

In the second place, as we all are aware, the trends toward nationalism. and its opposite, multinational industrialization, are growing. Many will agree with me that if a universal world order of some type is not achieved by agreement based upon reason and economic justice, the prospect is that it may be imposed by force.

And third, science is now in a state of siege. Those who in the past have praised its contributions to human understanding and material well-being are now questioning many facets of the sci-

TEN COMMANDMENTS OF A SCIENTIST

- 1. Do not feel absolutely certain of anything.
- 2. Do not think it worth while to proceed to conceal evidence, for the evidence is sure to come to light.
- 3. Never try to discourage thinking for you are sure to succeed.
- When you meet with opposition, endeavor to overcome it by argument and not by authority, for a victory dependent upon authority is unreal and illusory.
- 5. Have no respect for the authority of others, for there are always contrary authorities to be found.
- Do not use power to suppress opinions you think pernicious, for if you do the opinions will suppress you.
- 7. Do not fear to be eccentric in opinion, for every opinion now accepted was once eccentric.
- Find more pleasure in intelligent dissent than in passive agreement, for, if you value intelligence as you should, the former implies a deeper agreement than the latter.

itized by Hunt Institute for Botanical Documentation 9. Be scrupulously truthful, even if the truth is inconvenient, for it is more inconvenient when you try to conceal it.

> 10. Do not feel envious of the happiness of those who live in a fool's paradise, for only a fool will think that it is happiness.

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Evolution and Tinkering

François Jacob

Some of the 16th-century books devoted to zoology and botany are illustrated by superb drawings of the various animals that populate the earth. Certain contain detailed descriptions of such creatures as dogs with fish heads, men with chicken legs, or even women without heads. The notion of monsters that blend the characteristics of different species is not itself surprising: everyone has imagined or sketched such hybrids. What is disconcerting today is that in the 16th century these creatures belonged, not to the world of fantasies, but to the real world. Many people had seen them and described them in detail. The monsters walked alongside the familiar animals of everyday life. They were within the limits of the possible.

When looking at present-day science fiction books, one is struck by the same phenomenon: the abominable animals that hunt the poor astronaut lost on a distant planet are products of recombinations between the organisms living on the earth. The creatures coming from outer space to explore the earth are depicted in the likeness of man. You can watch them emerging from their unidentified flying objects (UFO's); they are vertebrates, mammals without any doubt, walking erect. The only variations concern body size and the number of eyes. Generally these creatures have larger skulls than humans, to suggest bigger brains, and sometimes one or two radioantennae on the head, to suggest very sophisticated sense organs. The surprising point here again is what is considered possible. It is the idea, more than a hundred years after Darwin, that, if life occurs anywhere, it is bound to produce animals not too different from the terrestrial ones; and above all to evolve something like man. 10 JUNE 1977

The interest in these monsters is that they show how a culture handles the possible and marks its limits. It is a requirement of the human brain to put order in the universe. It seems fair to say that all cultures have more or less succeeded in providing their members with a unified and coherent view of the world and of the forces that run it. One may disagree with the explanatory systems offered by myths or magic, but one cannot deny them unity and coherence. In fact, they are often charged with too much unity and coherence because of their capacity to explain anything by the same simple argument. Actually, despite their differences, whether mythie, magic, or scientific, all explanatory systems operate on a common principle. In the words of the physicist Jean Perrin, the heart of the problem is always "to explain the complicated visible by some simple invisible" (1). A thunderstorm can be viewed as a consequence of Zeus' anger or of a difference of potential between the clouds and the earth. A disease can be seen as the result of a spell cast on the patient or of an infection by a virus. In all cases, however, one watches the visible effect of some hidden cause related to the whole set of invisible forces that are supposed to run the world.

The World View of Science

Whether mythic or scientific, the view of the world that man constructs is always largely a product of imagination. For the scientific process does not consist simply in observing, in collecting data, and in deducing from them a theory. One can watch an object for years and never produce any observation of scientific in-

terest. To produce a valuable observation, one has first to have an idea of what to observe, a preconception of what is possible. Scientific advances often come from uncovering a hitherto unseen aspect of things as a result, not so much of using some new instrument, but rather of looking at objects from a different angle. This look is necessarily guided by a certain idea of what the so-called reality might be. It always involves a certain conception about the unknown, that is, about what lies beyond that which one has logical or experimental reasons to believe. In the words of Peter Medawar, scientific investigation begins by the "invention of a possible world or of a tiny fraction of that world" (2). So also begins mythical thought. But it stops there. Having constructed what it considers as the only possible world, it easily fits reality into its scheme. For scientific thought, instead, imagination is only a part of the game. At every step, it has to meet with experimentation and criticism. The best world is the one that exists and has proven to work already for a long time. Science attempts to confront the possible with the actual.

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The price to be paid for this outlook, however, turned out to be high. It was, and is perhaps more than ever, renounce OI ing a unified world view. This results from the very way science proceeds. Most other systems of explanationmythic, magic, or religious-generally encompass everything. They apply to every domain. They answer any possible question. They account for the origin, the present, and the end of the universe. Science proceeds differently. It operates by detailed experimentation with nature and thus appears less ambitious, at least at first glance. It does not aim at reaching at once a complete and definitive explanation of the whole universe, its beginning, and its present form. Instead, it looks for partial and provisional answers about those phenomena that can be isolated and well defined. Actually, the beginning of modern science can be dated from the time when such general questions as, "How was the universe created?

The author is a professor of cell genetics at the Institut Pasteur, 28 Rue du Dockteur Roux, 75015, Paris, France. This article is the text of a lecture delivered at the University of California, Berkeley, in March 1977.

Human Issues in Human Rights

The experience of the Committee on Human Rights of the National Academy of Sciences.

Robert W. Kates

To be active in defense of human rights is to confront human issues both disturbing and difficult. For almost 2 years a committee of the National Academy of Sciences (NAS) has sought to develop a sustained program of human rights activity appropriate to its membership and its tradition of concern for the rights of scientific workers.

The Academy Committee

The Committee on Human Rights was chartered by the council of the academy and is composed of seven members of the academy and three liaison members from the National Academy of Engineering and the Institute of Medicine (1). Exundertaken of the fate of scientific workers in different areas. When a case of severe repression has been identified, we begin a further pro-

been identified, we begin a further process of inquiry that always involves consultations with a responsible spokesperson of the country where our colleague resides or is imprisoned and, where possible, with members of human rights organizations and scientific institutions, with a representative of the U.S. embassy in the country involved, and with the victim's family and friends. A great deal of care goes into these inquiries as we try to maintain the same standards of evidence, balance, and open-mindedness that characterize academy assessments on scientific matters.

When a clear-cut case has been devel-

Summary. The National Academy of Sciences' Committee on Human Rights and its 350 correspondent academy members seeks to ease the plight of individual scientists, engineers, and medical personnel suffering severe repression. It has engaged in a program of private inquiry, public remonstrance, and moral support in behalf of individuals from 11 countries. In developing this activity, members of the committee had to engage in a series of troubling issues related to the nature of human rights, the choice of cases, and the format of protest. But most troubling of all are the issues raised by the profound distortions of humanness, nationhood, and science that follow in the wake of repression.

> ceptional support is given to it by the staff of the Commission on International Relations (2). The committee received financial support from the academy's endowment funds.

Our activity focuses on the plight of individual scientists, engineers, and medical personnel suffering severe repression. Such cases may originate in the files of Amnesty International, with the initiative of a member of the academy, in a letter from a victim's friend or family, or in the informal reviews that we have

The author is University Professor and Professor of Geography at Clark University, Worcester, Masschusetts 01610. This article is adapted from a paper presented on 17 February 1978 at the Annual Meeting of the American Association for the Advancement of Science in Washington, D.C.

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oped-clear-cut in the sense that there is a strong basis to assume that an individual is, indeed, undergoing severe repression-we formulate a series of requests appropriate to the case and prepare a public statement. The statement and the requests are reviewed by the academy's 12 elected councillors; when approved, sometimes after revision, they are made public. Once this is done, our committee tries to undertake a sustained effort in behalf of the aggrieved individual, combining public remonstrance with appeals to the concerned government, their national academy if such exists, or other scientific institutions, and providing moral support to the individual and his or her family.

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A major feature of the committee's effort is our correspondent network of some 350 members of the academy who have volunteered to receive communications from the committee and to act upon them. Thus, the efforts of the committee are amplified as correspondents write or cable governmental representatives, offer support to families, and call attention to the plight of individuals within their professional societies, at their workplace, or through their international contacts.

Currently, inquiries and other efforts are being directed in behalf of individuals in 11 countries, and public statements have been issued in behalf of 18 individuals: Federico Alvarez-Rojas, Claudio Santiago Bermann, Gabriela Carabelli. Juan Carlos Gallardo, Antonio Misetich, Eduardo Pasquini, and Elena Sevilla of Argentina: Vladimir Lastuvka and Ales Machacek of Czechoslovakia; José Luis Massera of Uruguay; Sergei A. Kovalev, Yuriy F. Orlov, and Antoliy B. Shcharanskiy of the U.S.S.R.; T. W. Kamil, I. Made Sutayasa, Bursono Wiwoho, and Kamaluddin Singgih of Indonesia; and Ibrahima Ly of Mali.

The last five cases, which we have just formally adopted, can demonstrate some of the committee's process. The Indonesian scientists have each been held incommunicado from immediate families and relatives for long periods of time. They are representative of a much larger number of Indonesians (3) who also are being held, often without trial, without access to legal counsel, and without other er opportunity to have thein artest and 11 detention clarified or adjudicated.

T. W. Kamil, about 50 years old, is one of Indonesia's leading linguistic scholars from the University of Jakarta; he studied at the University of Michigan. He was arrested on 30 October 1965 and has been detained since that time. He is reported to be held at Nusakembangan prison.

 Made Sutayasa, believed to be about 36 years old, was an archeologist employed at the National Research Center of Archeology until 1975 when he was arrested in Jakarta upon his return from a conference of archeologists in Australia. He has not been formally charged or tried; it is believed he is being held on the island of Bali. He is married and has four children and may have been a member of the Indonesian Communist Party before it was banned.

Bursono Wiwoho, about 55 years old, was professor of educational psychology at Gadjah Mada University in Jogjakarta, Java. Professor Wiwoho had been a member of the National Planning

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Book Reviews

Memoir of a Physicist

Why I Left Canada. Reflections on Science and Politics. LEOPOLD INFELD. Translated from the Polish by Helen Infeld. Lewis Pyenson, Ed. McGill-Queen's University Press, Montreal, 1978. xii, 212 pp., illus. \$16.95.

Leopold Infeld, who died in 1968 at the age of 70, was a well-known Polish physicist whose scientific contributions were mainly in the field of general relativity. The paper "The gravitational equations and the problem of motion" (Ann. Math. 39, 65 (1938]) by Einstein, Infeld, and Banesh Hoffmann is a recognized classic, and the problems raised (and partially solved) in it occupied Infeld to the end of his life. Outside of relativity, his paper with Max Born, "Foundation of the new field theory" (Proc. R. Soc. London Ser. A 144, 425 [1934]), in which an interesting modification of Maxwell's theory was proposed, attracted the attention of physicists in the middle and late '30's. Distant echos of this paper are still occasionally heard (see for example p. 579 of G. B. Whitham's excellent book Linear and Nonlinear Waves, Wiley-Interscience, 1974).

Infeld also had a considerable literary gift and the kind of ego that finds an outlet in autobiographical writing. In 1941 he published *Quest*, a brilliantly written account of his struggle to do science, and in the '60's two slim volumes, in Polish, updating and enlarging upon *Quest*.

The present volume is a translation into English, by Infeld's widow, of parts of these two books. (Actually only the chapter on Oppenheimer is taken from the later of the two, *Kordian and 1*: the rest is from the earlier *Sketches from the Past.*)

The most distressing chapter is the one that gives the book its title. It is a blowby-blow account of a campaign of harassment and vilification to which Infeld and his family were subjected in response to his request in 1950 for a leave of absence from the University of Toronto to enable him to spend a year in Poland. Infeld finally felt compelled to resign from his post as professor of applied mathematics at Toronto and de-6 APRL 1979 cided to remain in Poland permanently. Eight years later in a lapse into barbarism the Canadian government, through a special act of the Council, deprived Infeld's native-born children of their Canadian citizenship.

In Poland Infeld became a major scientific and political figure. He was instrumental in raising Polish physics from the ashes to which it was reduced by the war and German occupation, and until his death he represented Polish science in both the East and the West. He traveled freely, met with scientists and government leaders of many lands, and was one of the Pugwash "regulars." Glimpses, maddeningly brief, of Fock, Kapitza, Landau, and Tamm on the scientific end of the spectrum and of Chou En-lai and Bierut on the political end are scattered throughout the narrative; because of illness Infeld missed meeting Khrushchev in May 1959 at a congress of the World Peace Movement, which was held in Stockholm.

Still, the most interesting parts of the book concern Einstein. Einstein was the dominating influence in Infeld's life from the moment of their first meeting in 1920, when Infeld was briefly a special student in Berlin, to the day of Infeld's death. Lewis Pyenson, who edited the book, remarks in his most helpful introduction that "Infeld is Boswell for the mature Einstein." There is little doubt that future biographers of Einstein as well as historians of science will find Einstein's letters to Infeld (quite a few of which are reproduced in the book in translation as well as in the original German) enormously helpful in forming a picture of the man and his work.

The reviewer cannot resist two brief quotations. First from a letter written in April 1946:

Please don't be angry with me that I have written you so infrequently; the devilish passion to find a solution for these most difficult problems has held me pitilessly in its clutches and has forced me to make desperate efforts to overcome the mathematical difficulties.

This is Einstein at 67, locked in struggle with the unified field theory. And from a letter of 6 March 1941:

Our work on the equations of motion, surprisingly enough, has aroused greater interest than we had anticipated then.

This is Einstein, human after all, and like the rest of us not above taking notice of having been noticed.

Einstein's estrangement from the mainstream of physics and his opposition to quantum mechanics are a recurrent theme, but the puzzle remains. Perhaps Einstein felt that when he created general relativity he heard the voice of God and that he listened in vain for that voice in the noises of contemporary physics. This is anyway the impression left on this reader.

Of the "sketches from the past" mention should also be made of a touching tribute to lofted's sister, Bronia who perished with her family in the Holocaust; a study in hopelessness, about the Polish town Konin, where Infeld taught for several years in a secular Jewish school; and a portrait of Wladyslaw Natanson, for many years the professor of theoretical physics at the University of



"Leopold Infeld with a student in Warsaw." [From Why I Left Canada]

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> I received your letter of January 20 regarding the protest by the FAS in the Kovalev case. Although I am in full concordance with your action, I hesitated to send my signature because I had already joined half of my fellow members of the Icelandic Academy (Societas Scientiarum Islandicum) in a similar action to be handed over to the Soviet Ambassador to Iceland, However, Fince the shockingly limited membership of the FAS may cause that your protest gets fever signatures than it ought to have, I enclose your envelope with my signature, in case you Find it appropriate that my name then may be on two

Naturally, I am in a strong agreement with the purposes of the FAS, although I have not been aware of its existence until now. However, at present I cannot afford to join even at the cheapest level, because of the results of a longtime and theality increasing and unbelievable witchfunt to prevent us of a fonguine and even living, supported by a skilled combination ofdouble standard, miscarriage of justice, conspiracy, slander, entrapment and you name it which reminds a good deal of what you describe from the Soviet Union and The same what we had previously heard about from Hitlerland - indirectly supported A spring by the fact, as Lloyd George once phrased it, that when discrimination strikes and a spring by the fact, as Lloyd George once phrased it, that when discrimination strikes and a spring your friends turn chicken, supporting the older claim by Edmund Burke, that a fact a spring when the only thing necessary for the triumph of evil is for good men to do nothing. I add you have been been be the small exception from this rule; and it may be significant he fact most of your board members are chemists or physicists and only two are +

environmental-evolutionary biologists: Borlaug and Ehrlich, both great minds.

Since our experience "cannot happen here", you may tend to think that this must be our imagination, but if you feel competied to look into an American case the correction of which might strengthen even your Russian protests, Start I believe that you could get my hotion of a witchhunt confirmed by contacting the only two of our colleagues and friends who are great enough still to dare to show us some friendship; however, to avoid scaring them, such a contact must preferably be made through a phone call to their homes and with a clear promise not to get them involved more than they wish to become. These friends are: Dr. William A. Weber, University Museum (home phone (303)), and Dr. Jack D. Ives, Institute of Arctic and Alpine Research (home phone (303) Whatever you feel should be done, I hope you are careful not to cause that we be hurt more than we have already experienced, and that institutions rather than individual to corrected, because I am a firm believer in the principle. the Robert Browning once phrased so nicely, that it is good to forgive but bester to forget, although I must admit that I have not met others who believe in that kind of ethics since I left my little homeland, or the mine ethic, which , the state of the s

so that we again can afford to join our colleagues, the FAS will be the first society we become associated with; hopefully as active members who can at least in our fields that they ought to join the only 6500 courageous FAS members so that it can most effectively protect all kinds of scientists at home and abroad against persecution, The greater the membership the stronger the voice.

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Der Dr. Stare;

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Naturally, I am in a strong agreement with the program and purposes of the FAS, although for some reasons I have not been aware of its existence until now. However, at present I cannot afford to join you even at the cheapest level, because of the results of a longtime and unbelievable witchhunt, supported by skilled combination of conspiracy, & slander, entrapment and you name it, which reminds a good deal of what you describe from the Soviet Union and we had heard about previously from Hitlerland indirectly supported by the fact that none of our colleagues seem to dare. to become involved by reacting as men , or, as Lloyd George once phrased it, we have experienced the truth of the fact that when discrimination strikes, even your friends turn chicken, at the same time as we found the correctness and the claim by Edmund Burke almost two centuries ago, that the only thing necessary for the triumph of evil is for good men to do nothing. A FAI The same standing of the triumph of evil is for good men to do nothing. A FAI The same standing of the same standing o

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Der Dr. Stores

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Der Dr. Stone:

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Der Dr. Stars

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LETTERS

AAAS Human Rights Activities

Three letters to the editor (15 July, p. 216; 12 Aug., p. 604) have commented on the human rights activities of the AAAS. As chairman of the subcommittee of the AAAS Committee on Scientific Freedom and Responsibility, which is responsible for developing guidelines in this area, I have discussed with the AAAS staff the philosophy which guides our concerns, and we have prepared the following statement.

This philosophy stems in large part from our strong belief that the AAAS, as well as its affiliated societies, have an important role to play in responding to government restrictions that interfere with the work of scientists and engineers. That role also includes responding to reports of irresponsible scientific behavior that violates the human rights of others, such as medical participation in torture or the involuntary hospitalization of individuals for political rather than genuine medical reasons. Our subcommittee is particularly concerned with the problems of foreign scientists, and we have learned about the harassment and imprisonment of scientists in many countries, including the Soviet Union, Argentina, El Salvador, Chile, Uruguay, Pakistan, and the Philippines. We initially struggled with the task of defining an appropriate role for professional groups in responding to the flagrant violations of the human rights of scientists and others, in these countries. Should we focus solely upon those violations that significantly and directly stem from the professional activities of the victim, or should we include all human rights violations under the scope of our review? Should we concentrate our efforts only on a few cases of the better-known scientists in the hope of achieving some effective change in their personal situation, or should we examine a wide range of cases, recognizing the strains this task would place on our limited time and staff resources?

These are not easy decisions, and we have not formulated a precise response to the task that confronts us. We have been greatly assisted by the thoughts of John Ziman (I), Robert Kates (2), and others who have established a philosophical foundation supporting the human rights work of professional groups. We have sponsored symposia at the AAAS annual meetings to encourage public discussions and attention to these questions. We have worked closely with Ammesty International, the United Nations

Commission on Human Rights, and other public and private organizations whose sole mission is to attempt to reduce human rights violations throughout the world, both in order to inform ourselves about their work and to define for ourselves a role that would not duplicate their efforts.

The charge to our committee from the AAAS Board and Council states that the creation of the committee "marks a very significant as well as a potentially controversial role for the Association." We see our mission as one of collecting information about cases in which scientists and engineers experience serious violation of their basic human rights. We do not attempt to determine whether such violation occurred as a result of the scientist's professional or personal activities. For us, the result is the same: a colleague is in serious trouble, and the circumstances of his or her situation violate standards embodied in international law.

We do not pretend to argue that scientists are more deserving of human rights protection than others. We work on behalf of scientists because we share a professional identity with them and because we feel that they are often targeted for repression due to their professional visibility. This is not to say that they are more sensitive to political oppression or more conscionable and outspoken, and for that reason likely to be targeted for harassment or persecution. Scientists share their discoveries and views with a community that is international. They pose a threat to totalitarian regimes because their criticisms may be heard worldwide (3).

Some of the cases that come to our attention are sent by individuals who studied with the victim; others are forwarded by former teachers or by scientists who attend a professional meeting in another country and learn that another participant was imprisoned without charge or trial. As members of a professional group, we are often in a position to learn quickly about circumstances that might take months to come to the attention of appropriate officials through bureaucratic channels. We see our role as one of expediting this process: summarizing the details of a case as best we can, forwarding it to the appropriate national and international officials who may be in a position to take positive action and, if necessary, publicizing the case for the education of our colleagues and others so that they too may assist in seeking remedies.

From time to time we will urge the AAAS governing bodies to express serious concern about particular cases. For example, at the last AAAS annual meeting in Detroit, the Council adopted our committee's recommendation urging that special efforts be made by the AAAS on behalf of 11 individual scholars from the countries of El Salvador, Pakistan, Philippines, Poland, the Soviet Union, and Uruguay. These scholars were selected for special action because they are all experiencing serious health difficulties during their imprisonment or repression.

The letter from J. Lavon and M. A. Collins (15 July, p. 216) urges the AAAS to do more to encourage speaking out about government abuses in El Salvador. It might be worth calling attention to the recommendations of the report of the medical mission sent to El Salvador by the AAAS and several other scientific and medical associations (4). The report's findings state that "the weight of the evidence clearly suggests that certain elements within the [Salvadoran] government and its security forces were directly responsible for" the disappearance in 1982 of 11 of the cases of health workers investigated by the mission delegates. The report called on the Salvadoran government to honor its obligations under international humanitarian and human rights agreements by ending the practice of torture and by allowing doctors and health personnel to provide relief to the civilian population without intimidation.

The work of professional organizations in the human rights area must clearly go beyond assessing blame. In addition to performing a fact-finding role, the AAAS works with its affiliates and other professional groups to bring effective aid to victims of repression. The El Salvador report, for example, encourages medical and scientific organizations to assist in providing basic teaching materials and equipment to help rebuild the National University School of Medicine in that country. In recent months several U.S. medical institutions and individuals have responded with donations of medical supplies, books, and subscriptions to journals. A complete burn unit is now on its way to El Salvador from a donor in Michigan. We recognize that these efforts are grossly insufficient and that additional aid is needed. We have officially questioned, and some of us on the committee strongly oppose, the Reagan Administration's policy of sending military doctors as a way to provide medical aid to Salvadoran civilians. More appropriate would be allocating funds to the International Committee of the Red Cross and other religious and humanitar-

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leagues were able to collect tissue slides from more than 80 percent of those cases, which they proceeded to evaluate to see whether their opinions about the size and nature of the cancers matched those that were on the record. They paid particular attention to cancers reported to be found by mammography alone; that is, tumors not detected by manual examination (palpation) of the breasts.

What the Thomas group discovered was that a fair number of tumors 2 cm or larger in size were missed the first time around by both mammography and physical examination. For example, 41 percent of women with tumors 2 cm or larger had negative mammograms. Furthermore, there were 19 tumors listed in HIP data as being found by "mammography alone" that turned out to be relatively large-3 cm or more. Inasmuch as every woman who had mammography also had palpation. Thomas concludes that "It is difficult to understand how or why these could have been missed on clinical examination." Thus, the Thomas group decided that those 19 cases said more about the skills of the examining physician than they did about the virtues of mammography and deleted them from the "mammography alone" category. Taking all things into account, the group concluded that the original inferences about the benefits of mammography drawn from the HIP were overblown. However, Thomas emphasizes the fact that the HIP study never was designed to separate the value of mammography from clinical examination and says that, were new data to show that mammography really can pick up very early infiltrating cancer, he would be ready to change his mind about its value in screening.

The arguments against mammography screening appear to be based on cool scientific logic. Those for it often seem to be intuitive and come from physicians and surgeons whose daily business is the treatment of breast cancer. They maintain, though they do not have the hard data to prove it, that they are finding cancer earlier than ever before, that they, therefore, can offer women less mutilating surgery than is necessary for advanced cancer; and that—in the end they are prolonging lives.

The fact of the matter in this terribly difficult case is that there is no objective way to say who is right. Radiobiologist Upton calls this a "paradigm of the kinds of problems we're facing on the uses of technology versus social costs." Neither the HIP study nor the NCI-ACS screening project were designed to answer important questions about the benefits of mammography, or how often it should be used, or on what group of women. NCI is under considerable pressure now to initiate such a study-or possibly studies-to find out Acting Director Newell supports that idea, saying "We really have to get some clean data on this, which probably means we'll have to start some completely new controlled clinical trials."

Brian E. Henderson, an epidemiologist at the University of Southern California at Los Angeles, who was a member of the NCI's epidemiology-biostatistics working group, strongly endorses Newell's view. "I think we should use mammography as little as possible until we learn how to use it," Henderson says, adding that for screening purposes he thinks it should be used "only in controlled clinical trials—even for women over 50."

The justificiation given for screening women over 50 is that they are more likely to get breast cancer than younger women, and that, because of changes that occur in breast tissue after menopause, it is easier to get a good picture of their breasts than it is in younger women with denser, more hormonally active breast tissue. In addition, Upton reports that there are some data suggesting that a woman's risk from radiation exposure decreases with age. If that is so, women over 50 are less likely to get breast cancer from the x-rays of mammography. On the other hand, Henderson points out that there are data that indicate a synergistic effect between radiation and hormones. Inasmuch as many women over 50 take estrogens, thereby approximating in some ways the hormonal status of a younger woman, there may be an argument against mammography in at least that group of older wom-

The upshot is that the situation is extraordinarily confusing. It seems that there is no evidence that is clear-cut, and the answer to the "should she or shouldn't she" have a mammogram question is that nobody knows for sure. Given the present state of affairs, the NCI's position seems eminently sensible.

The resolution of the controversy is not in sight. But the next chapter will be written in September when Donald S. Fredrickson hosts what is euphemistically being called a "consensus" meeting on mammography. Among other things to be decided then is the question of whether the NCL, with of without the ACS, should embark on controlled trials, the results of which would be a decade in coming.—BARBARA J. CULLITON

Smithsonian: "The Nation's Attic" Undergoing New Federal Scrutiny

These are trying times for the Smithsonian Institution. It is being pecked at by the Washington *Post*, poked into by the General Accounting Office (GAO), grilled in Congress and—the latest insult—has received Senator Proxmire's Golden Fleece Award of the month for allegedly worthless government projects (in this case, a Tzotzil dictionary).

Criticism has been directed both at the 20 MAY 1977

allegedly cavalier modus operandi of the secretary of the Smithsonian, patrician ornithologist S. Dillon Ripley, and at the way the institution handles its funds, 87 percent of which are supplied by the federal government.

There have been no formal accusations of illegality or impropriety in the Smithsonian's operations. Yet the cloud of question marks has prompted the institution's own Board of Regents to propose contracting for an independent study in order to clear the air. The GAO study continues.

As a semipublic, semiprivate organization, the Smithsonian has an unusual relationship to the federal government. It has always enjoyed considerably more flexibility in the use of its money than have federal agencies. In the past year or so concerns have been raised in Congress about the commingling of public and private funds; about whether the Smithsonian is relying too much on its own discretion in acquisition and disposition of properties that receive federal money; and about the nature of two private corporations administered by the Smithsonian.

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2C Tuesday, July 28, 1987 San Jose Mercury News

Cover story

Peer review can kill unusual but promising ideas

REVIEW, from Page 1C small."

Biòlogist Margulis of Boston University argues that if scientists are "too original, too outside, too different ... they're just not going to be counted. Whether they're right or not, they're going to be Ignored."

ignored." Gold, recently retired from Cor-nell.University, said: "It's like reli-gion: Heresy is thought of as a bad thing; whereas in science it should be just the opposite." Daniel Koshland, editor of Sci-

ence, the nation's leading scientific journal, strongly defended the peer review process. But he added, "I think, it's fair to say that a new idea, something that confronts ex-isting dogma, has an uphill road but not an impossible road."

In the view of many critics, this tendency has far-reaching effects.

"The quality of science depends on innovation," said sociologist Edward Hackett of Rensselaer Polytechnic Institute. His research has found cases where scientists suppressed innovations in order to produce grant proposals that were more likely to be accepted.

Indeed, significant technological and scientific progress of recent years has come from outside the peer-reviewed realm of academic science or government-supported research. One of the greatest technical developments of the last de-cade - the personal computer was largely originated by two college dropouts, Apple Computer's Steven Jobs and Stephen Wozniak, working independently.

And one of the greatest basic scientific discoveries of recent years - high-temperature superconductors - was spurred by experiments at a commercial laboratory; where researchers were pur-

suing a line of research that may have been too risky and unpredictreview

The peer-review process is sim-The peer-review process is sim-ple: A research report, grant, pro-posal or request for time at a re-search center is sent to respected scientists in that speciality. Usually this at least two are consulted, and sometimes at many as 10. Office, at least one of the reviewers is picked from a list submitted by the appli-

recommended for publication." Mahoney's findings struck a able ever to make it through peer perve. Within three months after he presented his results last year, he said, he "received probably 200

Research has found cases where scientists suppressed innovations in order to produce grant proposals that were more likely to be accepted.

is picked independently by the agency staff or the publication's editors. The reviewers, who are unpaid, usually submit a detailed critique along with a recommendation.

Sociologist Michael J. Mahoney of Pennsylvania State University was one of the first to examine how well the process works in evaluating scientific papers. In a landmark study, he sent copies of one paper to 75 reviewers but doctored the results so that in some cases the research appeared to support mainstream theories, while in others it ran against them.

"When the results ran contrary to the reviewer's theoretical beliefs," Mahoney reported, "the procedures were berated and the manuscript was rejected. When the results 'confirmed' the reviewers' beliefs, the same procedures were lauded and the manuscript was

cant, and usually at least one other Foundation, the agency charged with dispensing most government funding for basic research.

The competition there is intense with an overall acceptance rate of about 30 percent of all proposals submitted. In some fields, the rate is as low as 10 percent.

In 1970, biologist Margulis was not only denied funding but subjected to intense scorn by reviewers at the foundation. The theory for which she was denied funding then - that cells evolved through a symbiotic union of primitive or-ganisms - has now become dogma, cited as fact in recent textbooks.

"I was flatly turned down," Margulis said, and the grants officer said "that I should never apply again."

In an interview, NSF Director Erich Bloch agreed that "the peer-review process sometimes doesn't let the risky proposal get

through. I'm concerned about make discretionary grants - up to that." He added, however, that grant decisions are in the hands of 150 individual program officers, each of whom has his or her own views.

University of Chicago paleonto-logist David M. Raup says efforts to reduce the federal deficit have contributed to the problem. "Ten years ago the federal government had more ability to take risks, and therefore they were able to gam on young people and screwy ideas. With Gramm-Rudman and budget cutbacks, funding agencies are sort of retreating to sure things."

One problem with peer review is that, especially in a time of limited funds, the "peers" in any field are also competitors for grants. Said astronomer Burbidge, "As the competition for funds gets more and more severe, people think, put most crassly, 'If I knock this, then there's more funding for me.' "

Some scientists worry the situation will get even worse, with the advent of ever-larger national research facilities, such as the Super-conducting Supercollider and the Space Telescope, for whose use there is likely to be fierce competition.

Howard Gobstein, an expert in science, technology and public policy who recently worked on a major study of the peer-review sys-tem for the General Accounting Office, the investigative arm of Congress, said that while peer-re-view bias has been widely recog-nized, "many people admit we are still groping to figure out what to do about it."

One attempt to address the problem is a new system at the National Science Foundation that allows directors of some of its divisions to

10 percent of the division's total budget - for "high risk" proposals, without the formality of peer review by scientists outside the agency.

The agency is currently evaluat-In the agency is currently evaluat-ing the access of this program and is considering extending it to all divisions. It is described as a way of stimulating "innovative and ex-ceptional proposals" that have a high risk of failure but also the potential for making significant contributions if they succeed.

But the program is still just a drop in the bucket. While the foundation awards about 8,000 research grants per year, only about 30 have been awarded so far under the new program, foundation di-rector Erich Bloch said. And presently, the program applies only to engineering grants, which Margulis said are inherently lower-risk than those in areas such as biology.

In addition to this formal system. Bloch said he has encouraged all 150 foundation program offi-cers to take risks. "The program officer doesn't have to follow the peer-review recommendation. If he thinks it's too conservative, he can overturn it," he said. But, he admitted, "It doesn't happen that often."

Another suggestion is to consider adopting other countries' procedures.

One common practice is the awarding of grant money on the basis of an individual scientist's past performance, rather than on the basis of a specific proposal. As astronomer Gold put it, "One should take people by their track records. If I've worked in a field for a while, I know more about it than any referee to whom it is

sent. If scientists have done good work then we should trust them just on their record."

the second standards because

Others say such a system raises problems of its own. Sociologist Patricia Wolf of Princeton, for example, said, "If you take material from people just because they are established you could be accused of hero worship." Even well-established scientists can sometimes have ideas that are not worthy of serious research, she said.

To address the problem of peers denigrating the work of competitors, the trade newspaper the Scientist recently suggested that peer reviewing be made international.

The paper's European editor, Bernard Dixon, cited a Finnish experiment in which grant proposals from that nation were reviewed by a British team. The assessments were unusually frank and objective. "Is there not a principle here that should be enshrined in all peer review?" he wrote. "After all, no one relishes the discomfiture of receiving really trenchant criticism from the laboratory next door."

Another, perhaps more practical, way of addressing the same problems, some scientists suggest, is for peer-review to be multidisciplinary, or at least to include some review by scientists outside the immediate specialty involved.

Whatever system is used, the Sigma Xi chapter's report suggested, "the important thing is to circulate new ideas."



Call Mercury News

and Isaac Newton.

"It will really be the first time anybody has made a serious attempt at high-precision calculations over long distances of the gravitational constant," says team leader Mark Ander, a

The force is thought to be one-hundredth the strength of new natural force gravity.

geophysicist at the Los Alamos National Laboratory in New Mexico. "Any variation would imply the existence of something new - some hitherto unseen."

Scientists today recognize four basic forces that govern all matter in

the universe: gravity; electromagnetism; a "weak force" that causes some forms of radioactivity; and a "strong force" that holds together the nuclei of atoms.

But last year, scientists at Purdue University suggested the existence of a fifth force that, unlike gravity, repels objects. They based their revolutionary idea on slight but significant discrepancies in a classic gravity experiment, which measures the Earth's gravitational pull on different materials such as wood, metal and even suet.

The so-called fifth force is thought to be only one-hundredth the strength of gravity, which is the weakest of the known forces in the universe.

If it does exist, the fifth force may be so subtle that its effects are infinitesimal. But at distances of 1,000 feet or less, it might be strong enough to measurably affect gravity, perhaps causing objects of different mass to fall at different speeds, in direct contravention of a fundamental tenet of physics.

Scientists at Princeton University and the University of California contend that the idea of a fifth force has no more substance than the breeze

They say the discrepancies that intrigue the Purdue physicists may be the result of faint air currents caused by subtle temperature variations.

The Greenland experiment may provide the last word in the controversy.

"There is a great argument going on in physics today as to whether such a force could exist," Ander says.

"We are not trying to get embroiled in that battle. Our intent is to do the most careful

By Sarah Rabkin

See FORCE, Page 3C

Creativity quashed 'Peer review' can kill a maverick's bright ideas

By David L. Chandler Boston Globe

STRONOMER Halton C. Arp, described by colleagues as one of the world's best observers, was barred from major observatories when he came up with a radical theory about mysterious objects in space called quasars

Thomas Gold, a distinguished astronomer who had a novel theory about pulsars and neutron stars, was denied the right to speak at an important scientific meeting.

Lynn Margulis, a biologist whose theories on how living cells evolved are now universally accepted, was turned down repeatedly for research funds and told never to apply again.

These were not perpetrators of scientific fraud, nor were they scientists whose credentials or abilities were in question. Their only crime - for which they were sentenced to work without major research facilities and whose

tunity to communicate with their peers nals, was that they disagreed with the scientific mainstream.

Historians and philosophers of science agree that much of the progress of sci-

ence stems from such challenges. Yet a growing body of research, and the experiences of a number of prominent scientists, indicate that the way science is governed and funded in the United States today systematically, if unintentionally, thwarts the work of such mavericks

Recognizing the importance of scientific progress, many researchers are beginning to examine seriously how the business of science works and how it might be improved.

At the heart of the issue is the process called peer review - the scientific equivalent of the jury system - which is usually decisive in determining who gets research grants, who gets to use

funding or facilities or denied the oppor- work gets published in scientific jour-

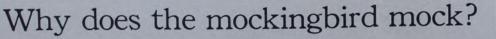
"Peer review works against the really creative people who come along with new proposals that go against the main-stream," said astronomer Geoffrey Burbidge, former director of Kitt Peak National Observatory.

Peer review enjoys overwhelming support: In a recent survey of 4,000 of its members, the national science research society Sigma XI found that 86 percent favored the use of peer review. The process is seen as a quality-control system that prevents the waste of time and money on ideas that are trivial or without merit.

But the same survey found that 67.5 percent of its members agreed that in government agencies that use peer review, "the chance of any non-mainstream proposals being funded is very

See REVIEW, Page 2C

Chuck Waltmire - Mercury News



With more AIDS tests

Public health

serves to keen away competitors for food

CARL J. TOLONEN

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Academic Freedom Under Pressure

No lvory Tower, McCarthyism and the Universitics, ELLEN W. SCHRECKER, Oxford University Press, New York, 1986, x, 437 pp. \$20.95.

"McCarthyism" is a generic term. In this valuable account of American universities from the 1930's to the mid-1950's Ellen Schrecker, a lecturer in history at Princeton University and the New School, uses it broadly to describe the academy's eviction of suspected Communists from its midst, in collaboration with the red hunt being waged by state and federal agencies and in violation of its hallowed canon of academic freedom. The necessity of squaring the principle of academic freedom with the practice of repression (for never did the academy cease to uphold the principle) provides a central element of tension in this book. Schrecker's contribution is not so much to have added another piece to the picture of the national phenomenon we call McCarthyism as it is to have raised anew questions about the character and conduct of the American university, particularly under conditions of stress.

The sources for this subject are diffuse and often fugitive. Schrecker was able to draw upon a large, albeit uneven, body of secondary literature on American Communism, anti-Communism, and McCarthyism in its various guises. The primary sources were harder to come by: the American Association of University Professors only opened its archives when her manuscript was in its final stages; universities were "haphazard" in granting access to their records (p. 350); and it took the combined skills of "journalist," "detective," and "pest" (p. 343) to locate individuals, correspondence, minutes, transcripts, and other memorabilia for a subject about which reticence persists. Oral history was an invaluable aid; Schrecker identifies by name 138 people she interviewed (others, she says, requested anonymity) and cites 28 interviews conducted by others (for example at the American Institute of Physics and the Columbia University Oral History Research Office). When the record for an important subject is incomplete, as, for example, it is about the blacklist, Schrecker reluctantly and responsibly draws conclusions from inference and speculation. This book is informed by a very clear judgment: for the academic world to have succumbed to anti-Communism and purged its ranks of suspects, particularly during the

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McCarthy years, represented an abdication of principle and a failure of nerve. But it is not a judgmental book; its aim is to describe and explain an important chapter in American academic history.

Schrecker does not attempt a survey of American colleges and universities to determine systematically the number and kinds of institutions that committed abuses of academic freedom; she moves back from the academic freedom cases to the institutions where they occurred. In this respect the book lacks methodological rigor; yet it makes a compelling case for the ubiquity of abuses and the variety of institutions in which they took place. About 100 individuals lost their jobs in the campus purges; there is reason to believe that this number would be much larger if we could count the untenured faculty who were dismissed simply by not being rehired; and we never will know how many people lived in dread of being fired if their past political associations and activity became known.

The activity in question was membership in the Communist Party, during the 1930's and 1940's. Schrecker describes academic Communists as "neither dupes nor conspirators" but serious men and women drawn to the party through the trauma of the Depression, the rise of fascism, and the Spanish Civil War. "They did not let the Party interfere with their academic work and, in fact, consciously strove to keep their political activities separate from their scholarly ones. . . . they did not proselytize in class or try to subvert their universities" (pp. 61-62). The American academy never welcomed left-wing radicals, but Schrecker points out that it did not go after even known Communists on the faculty until outside pressure to do so became intense. Then there was a two-stage process, by which suspects first were identified by legislative committees and then were fired by their institutions. By the time the purges were at their peak, around 1953-54, the American Communist Party had long since lost its effectiveness and appeal, there was no organized political activity on campus, and most academics had left the party by breaking with it or by drifting away. But by then the view of the Communist Party as a conspiratorial organization, under the Soviet Union's thumb and requiring that its members engage in subterfuge and deceit, appeared to render Communists morally

and professionally unfit to teach, and the academic community was caught up in the nationwide inquisition to ferret out the ludden enemy.

The story is grim. Communists were not in the majority of cases allowed to speak on college campuses. No institution would hire a known or suspected Communist, and college presidents made it clear that academic freedom would not protect the jobs of individuals who belonged to the Party. To retain their jobs those who were called before congressional investigating committees on suspicion of being Communists had to Amendment right against self-incrimination was for a long time treated as evidence of guilt), and they frequently were under constraint by their institutions to inform on others. Not only were academics being victimized by their institutions for what they might have done in the past, they sometimes were fired because of what they might do in the future-that is, refuse to become informers. This was such a bizarre perversion of academic personnel procedures that administrators used subterfuge to accomplish it, for example giving bureaucratic or personality reasons for the termination of employment. Here Schrecker makes a cogent observation: administrators, she says, engaged in "furtive behavior" at precisely the time "they were imposing an obligation of candor upon the rest of the academic community." This contradiction "suggests how seriously the nation's colleges and universities had been compromised by their collaboration with McCarthyism" (p. 266). Fired professors were unable to find other university positions in the United States (the evidence for a blacklist is intangible but suggestive) and had to improvise to earn a living until the witch-hunt abated, in the late 1950's. By then, ruined lives and a badly compromised academic community were testimony to McCarthyism's toll.

This summary should not be taken to suggest that Schrecker has painted a monochromatic picture by building a case on generalization. To the contrary, her description of academic institutions' responses to outside assaults on their members includes full and fair accounts of differences within and among them. When it comes to explaining what she so well describes, however, she is less successful.

Schrecker correctly perceives that institutional loyalty crippled the will and capacity of faculty and administrators to defend individual rights, but she does not take this observation far enough. She blames faculty and administrators, "who could have, had they wanted to, prevented much of what happened," for reacting to outside pressure

in ways that would best "protect or enhance their school's reputation." This, she concludes, rendered academic freedom "an essentially corporate protection" (pp. 11, 23). The real dilemma McCarthyism created for the academy and the real conflict it provoked in individuals need more serious consideration. As the institutional home of the higher learning, the university provides and protects the conditions necessary for scholar-teachers to work. For that reason institutional autonomy is as essential to academic freedom as individual rights. The American university always has had an uncertain and uneasy relationship with society. The McCarthvite attack on the academy presented a real Catch 22: it appeared necessary to sacrifice individuals to protect institutions that were necessary to protect individuals. In the 1960's when the university no longer was perceived as the protector of humane values, for several of its constituencies institutional loyalty collapsed.

Schrecker is particularly concerned about the failure of faculty to stand up for their colleagues. Among her explanations for that failure are agreement with the verdict of the firings; persistent "gentlemanliness," which made professors reluctant to attack presidents; belief that it was more effective to work behind the scenes; fear of getting fired; and the AAUP's abysmal failure "to perform its expected function," which, she says, "contributed as much, if not more, to the inability of the nation's college teachers to protect their colleagues as the shortcomings of individual professors and faculties" (p. 315). Schrecker's description of "bureaucratic torpor" at the AAUP, particularly under the last years of Ralph Hunstead's general secretaryship, makes a real contribution to knowledge. But her observation that AAUP censure, when it finally did come, proved to be little more than an "irksome annoyance," undercuts her charge that the organization bears a central responsibility for what happened.

At bottom, "most of the men and women who participated in or condoned the firing of their controversial colleagues did so because they sincerely believed that what they were doing was in the nation's interest" (p. 340). If it is so that the academic community really believed that national security was at stake in the search for subversives, we need look no further for explanations of why it collaborated with McCarthyism. The episode is as much a reflection of credulty and provincialism in the American academy as it is of faint-hearted commitment to principle.

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Physics of the Early Universe

Inner Space/Outer Space. The Interface between Cosmology and Particle Physics. Enwakti W. Kota et al., Eds. University of Chicago Press, Chicago, 1986, xii, 638 pp., illus. \$55; paper, \$25. Theoretical Astrophysics. From a conference, Baavia, IL, May 1984.

In 1958-60, when I was a graduate student, the big news in cosmology was the measurement by William Baum and Rudolph Minkowski of record high galaxy redshifts, z = 0.3 to 0.46. (1 + z) is the ratio of observed to emitted wavelength of a feature in the spectrum of the light from a distant object. At z << 1, z is proportional to the distance of the object. In conventional cosmological models, 1 + z is also the factor by which the universe has expanded since the time of emission, so z can be used to label an epoch in the early universe.) Now measurements of galaxy redshifts at $z \simeq 0.5$ are, if not routine, at least commonly done, and there is a rich web of data to z = 4 from observations of absorption by material along the lines of sight to quasars. We have learned that we are in a smooth bath of radiation with a blackbody (statistical equilibrium) spectrum at a temperature of 2.76 ± 0.02 K. Since no one has been able to think of a way radiation with this spectrum could have been produced in the universe as it is now, this is generally thought to be tangible evidence that the universe expanded from a hot, dense state where radiation could have relaxed to statistical equilibrium. If we trace the expansion of the universe further back in time to a redshift $12 \le 10^{10}$, when the temperature of the heat 1 bath would have been $T = 10^{10}$ K = 10^{6} eV, we find neutrons and protons reacting to form light elements up to lithium in amounts that agree with the observed abundances in the oldest stars. This is evidence that we understand the outlines of the behavior of the universe when it was just 1 second old, a remarkable accomplishment indeed

On extrapolating still further back in time we are led to consider a phase transition prior to which neutrons and protons were decomposed into their parts, an almost free gas of quarks; an earlier transition that may have fixed the baryon number density out of entropy; and a transition that may have produced the entropy of the heat bath out of a high-energy state of the vacuum. This vacuum energy would have driven the universe to inflate through an enormous expansion factor that obliterated all traces of past imperfections, including perhaps a time when space behaved as though it had more dimensions than the three we know or even dissolved into a quantum space-time foam. Other phase transitions may have left topological defects: magnetic monopoles that would be readily detectable if they were present now in sufficient numbers; massive domain walls that would seriously distort space if too abundant; and massive cosmic strings that act like magnetic flux tubes in a superconductor or like vortex lines in the rotation of superfluid helium and that may have been responsible for the formation of galaxies and clusters of galaxies. And all this may have been accomplished by the creation and annihilation of a host of particles that have not been observed, including perhaps some that survived to make up the dark matter needed to account for the observations of dynamics on the scale of galaxies and larger.

All this heady stuff, and not lacking in a substantial dose of public relations puffery, but still it is based on a clear and pressing need and opportunity. We know enough about the physics of the universe now and at modest redshifts to be confident that we can extrapolate its expansion back in time to a state whose physics we know we do not understand. The expansion of the universe carries the 2.76 K heat bath we observe back. in time to enormous values of the energy density in the heat bath, and, with what is believed to be the appropriate equation of state, to energies per particle that are vastly larger than anything available in the present universe. For example, the Fermilab TeV I collider produces proton-antiproton collisions at 2×10^{12} eV, and the proposed Superconducting Super Collider accelerator would reach collision energies of 4×10^{13} eV. The most energetic cosmit ray events (thought to be protons) have energy seven orders of magnitude higher than that, at about 1020 eV. But the Planck epoch in the early universe would have had characteristic energy another eight orders of magnitude beyond that. Thus it seems that if we are to understand the early universe we will have to borrow the expertise of particle physicists, and if we are to push research in highenergy particle physics beyond the limits of what can be reached on Earth we will have to rely on the "ultimate accelerator" of the universe

There have been many conferences and workshops on this proposed symbiosis of cosmology and particle physics, and inevitably, many published proceedings. This book is among the best of the lot. The conference brought together a fair sample of the people working on the subject and produced 90 interesting papers covering all the main topics. The editors have helped us by providing thoughful commentaries. If you follow developments in the physics of the early

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Author slams the 'publish or perish' phenomenon Burying academia under a mountain of paper

By Jonathan Yardley

THE MAIL has brought a document that should be astonishing but that is, in the climate of contemporary American higher education, all too depressingly commonplace. It is the program for an "Anne Tyler Symposium" last month in Baltimore. It is an unwitting parody of the literary life as it is lived these days in English departments.

TI if Anne Tyler is one of our outstanding novelists is beyond dispute; her work is — or in due time will be — deserving of serious study. But she is also a writer at mid-career, to subject her now to scrutiny comparable to that accorded, say, Lord Byron or James Joyce is, to put it charitably, premature.

Yet the conference brought together academics from a number of obscure universities, who came bearing titles such as these: "The Mean Between Extremes: The Role of the Mother-in-Law in Anne Tyler's Fiction," "Anne Tyler's Artists' Ways of Coping. Pathos and Comedy in the Journeys of Ezra, Macon and Maggie," "Dancing Out of Sync: Missed Connections in the Novels of Anne Tyler," "Something Out of Nothing: Creative Crazies in the Fiction of Anne Tyler" and "Macon Leary: A Character in Search of His Anima."

The temptation to make fun of these papers and, by extension, those who delivered them, is well-nigh irresistible, but resist it I shall. For all its self-parodic aspects, this symposium is so much part and parcel of contemporary academic life — in almost all departments, not merely those connected to literature — that it must be viewed as symptomatic rather than freakish. For what the Tyler symposium and all such gatherings are truly about is not the study of literature, or anything else, but the pursuit of academic careers, and it is upon papers such as these that careers are built.

Obscure and original papers

The titles of those papers may seem to the outsider obscure and pedantic, as in fact they are, but they fulfill what academic life demands: They are, within the narrowest imaginable definition of the word, "original." It is a word discussed to great effect by Charles J. Sykes in a stupendously provocative and entertaining book called "Prof-Scam: Professors and the Demise of Higher Education" (Regnery Gateway, 250 pp, \$18.95), in which he writes: "No matter what an individual's capacities or talents, the academic culture demands that every professor and would-be professor produce research that is 'original,' breaking previously uncharted ground. Unfortunately, originality is no more commonplace among academics than among any other sector of the population. But the requirement in the universities today is universal and en-



forced without exception or appeal."

The key, as Sykes puts it, "is originality, whether that originality is applied to an incredibly narrow sliver of knowledge and whether it has the slightest importance or interest for anyone other than the author." Thus it is that candidates for English doctorates, rather than being required to display their comprehension of Shakespeare and Milton, are expected to produce "original" research in their dissertations.

Never mind that, as Sykes puts it, "few academics bother to read much of what passes for scholarship these days, even as the number of journals continues to mount."

What matters is that the work be done and that, however obscure, it be "original." This being the case, who can blame the professors or would-be professors who, trying to carve out careers for themselves, seek out subjects as yet undiscovered by other professors and appropriate these subjects unto themselves?

Sykes quotes J. Scott Armstrong of the University of Pennsylvania's Wharton School, who "conducted his own analysis of academic writing and concluded that professors who wish to be published in the academic press must: '(1) not pick an important problem, (2) not challenge existing beliefs, (3) not obtain surprising results, (4) not use simple methods, (5) not provide full disclosure of methodology, sources and findings, and (6) not write clearly.'"

This is the true oddity: Though academic convention requires "originality" of subject matter and interpretation, it has little or no room for anything that is genuinely original or inventive. In Sykes' scathing critique, nothing is more devastating than his depiction of the conformity that is imposed by the "brutal socialization processes" of the graduate schools and "professors in the promotion process." Sykes writes:

"No matter what image they might present to the outside world, an ingrained sycophancy is at the heart of the professors' culture. No peasant furiously tugging at his forelock as his seignior passes reflects the soul of feudalism as enthusiastically as a junior professor in the presence of his betters. If absolute power corrupts absolutely, academic power tends to corrupt absurdly. One of the inevitable signs of academic prospecity is an invitation to deliver papers to conventions of one's peers, a ritual in which professors bore other professors by trading aloud obscure products of their research."

Teaching suffers

All of this takes place within a culture in which research, however mindless or irrelevant, is given pride of place ahead of what outsiders assume to be higher education's primary obligation, teaching. There have been many accounts of the effects of the publish-or-perish syndrome, but none is more withering than Sykes' presentation of "dramatic, irrefutable evidence that the academic culture is not merely indifferent to teaching, it is actively hostile to it."

Sykes claims that."In the modern university, no act of good teaching goes unpunished" — a generalization that cannot be proved and to which innumerable exceptions can be cited. Sykes is guilty of broadsides such as these on several occasions, and he fails to acknowledge the existence of teachers who do teach and departments where serious scholarship is pursued.

These sins of commission and omission may make it too easy for critics to dismiss "ProfScam" as what it most surely is not, a more polemic. For all its faults it is an immensely important book, one that cuts to the heart of America's academic darkness, and it deserves to be taken seriously by anyone who cares about universities.

Yardley writes about books for the Washington Post

San José, Aggust 17, 1984.

Dear Harlan and Margaret:

Thanks for the card from Denver - and I am sorry that the distances even within California prevent us from coming straight south to hug you properly to show how glad we are to know that your two decades in the desemt are at last over and you back to the situation of our youth, when we first met in Svalöv. Now I only dream of that you will find time (I know you have the courage and fortitude) to help us find out what went wrong with our happiness and caused what we see as a miscarriage of justice of a Sakharov size and our wandering alone ostracized in the desert almost since you were instrumental in getting us to Boulder, which never became the stepping stone to the reasonable situation you then mentioned. But you may not want to become our fimile Zola of Dreyfus fame...though I dare to hope so from my oldest American friend.

Your return to the situation of the good old times hopefully soon will result in that you bring out the great material from old experiments that needs to be evaluated for the use of future botanists-geneticists. Although we slowed down (but never stopped as some hoped for) during our exile, we have tried to Digitizagve some of the old material, so recently I have been informed that my 95 page 100 conspectus of the Triticeae in my new genomic system has gone to press...though unfortunately without me reading the proofs for socalled expediency ... and that it will be printed in the October number of Feddes Repertorium, the classical European taxonomy journal. We are still looking at the confused generic situation that the Hooker dominance caused in some large families a century ago, since we believe that the genetical evidence of almost a century of studies and experiments can solve their monumental problems... just now we are looking at the genera of the Crassulaceae and Gentianaceae that we believe can be given a reasonable limitation by aid of objective genetical rather than subjective socalled phenetical or phylogenetic thinking by aid of basic numbers and genomes - though that may of course be the old vanitas vanitatum, though we hope not. And now

and then I have the unpleasant duty to write obituaries, I enclose the one about our dear Tyge. Life goes on.

We hope to see you soon for more than a day or two, though our facilities for travel have been curtailed by poverty for too many years since our socalled American dream tyruned into a nightmare for reasons that we still do not know and hope were not envy and politics. Our very best regards and hugs.

For ever,

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	8-WEEK SUMMER HALF-SEMESTER 19	SUMMER OTHER THAN 8-WEEK HALF SEMES- TER BEGINNING	(MONTH) (DAY)	TYEAR) AND ENDING_	(MONTH) (DAY) (YEAR)				
	INDICATE THE APPROPRIATE TERM OF APPOINTMEN								
2.	Be TRANSFERRED FROM	DEPARTMENT OR PROJECT TIT	LE)	(ACCOUNT NUMBER)	(POSITION NO.)				
	TO:								
	AT A SALARY OF \$% OF TIME FER (ACADEMIC YEAR, SEMESTER, OR TERMI								
	AS OF	REASON			NAM				
Di									
13.1 Stanged in RANK DRITITLE IOISTITUTE FOR BOTANICAL DOCUMENTATI									
	AS OF	REASON							
4.	Be CHANGED IN SALARY, FROM \$ 18,540 AT 100 % OF TIME PER								
	% OF TIME, AND/OR PERIOD OF TIME TO S AT NO OF TIME PER								
	2411 1172		// OF TIME FOR	LACADEMIC YEAR	R, SEMESTER, OR TERMI)				
	AS OF	REASON	crease		DEN 7				
5.	Be GRANTED LEAVE with full Pay with Half Pay without Pay FOR								
	REASON								
0	Be TERMINATED	ST DAY OF SERVICE	UNIVERSITY ANOT	HER UNIVERSITY INDUST					
7.	Be CANCELLED: APPOINTMENT DATED_	FOR_	(period of time)	, REASON					
SPECI	AL CONDITIONS: CONCURRENT APPOINTMENTS, FULL-T FOR CONCURRENT STAFF APPOINTMENTS, GIVE PERCENT		THER INSTITUTIONS, STUDENT	NUMBERS FOR STUDENT A	PPOINTEES, ETC. (SEE INSTRUCTIONS.				
PROJE	ECT DIRECTOR	DEAN OR ADMINISTRATIVE OFFI	CER						
		APPROVED FOR THE EXESTIDENT O	1000	FUNDS VERIFIED BY RESE.	ARCH ACCOUNTANT				
JUAS	RTMENT CHAIRMAN	ATTROVED FOR THE DESIDENT O		SHOT COMED OF RESE					
	PPOINTEE								