

Stats / Co sist / 425

18-1-91

Dr Niranjan Joshi

C.E.S.

Indian Inst of Science
Bangalore 560 012

Dear Niranjan,

I was very happy to hear about your elevation to Assistant Professor's post. A well deserved thing, though a bit late. Pl. accept my congratulations.

Will see you on 28th.

Sincerely

Anil Gore

Dr. Niranjan Joshi

7-5-91

C. E. S. Indian Institute of Science

Bangalore 560 012

Dear Niranjan,

Enclosed is a note on Ranajit's assessment work on Konkan Railway. Could you please explain to him what I have written?

I am likely to go to USA for one year from May end. I will be at the Dept of Statistics, Uni of Arizona, Tucson. I hope to get stat. ecology text book written. Pl. convey this info to Raghavendra also (and Umashankar, Ganeshaaya). There is still a small chance that it does not work out (refusal of visa etc). I hope that does not happen.

Sincerely

Anil Gore

आणीबाणीनंतर जनता पक्ष निदान दीड वर्ष सतेवर टिकला. विश्वनाथप्रताप सिंग यांच्या जनता पक्षाच्या वर्षाच्या आतच गाशा गुंडळावा लागला. तेव्हा तुटपुंज्या काळातही रेल्वेमंत्री म्हणून जॉर्ज फर्नांडिस यांनी कोकण रेल्वेचा प्रकल्प पुढे रेटण्याचा प्रयत्न केला. नेहमी योजना बनते पण अंमलबजावणीला पैसा नसतो म्हणून यावेळी बाजारपुढे पैसा उभारण्याचे ठरले. राज्य सरकारचा सहभाग घेतला वगैरे. पण मग सरकारच कोसळले. अर्थात तरीसुद्धा योजना अगदी कचऱ्याच्या टोपलीत गेलेली नाही. थोडे-बहुत हातपाय हालवले जात आहेत.

हल्ली प्रत्येक मोठ्या प्रकल्पाबद्दल असाही विचार केल्या जातो की त्याचा परिसरावर काय परिणाम होईल ? त्याने प्रदूषण वाढेल का ? जंगले घटतील का ? वन्यप्राणिजीवन खचेल का ? यातील सगळ्याच प्रश्नांना झटपट उत्तर देणे शक्य नसते. पण म्हणून प्रकल्प रोखून धरणे हितावह नसते. यासाठी 'रिपड असेसमेंट सिस्टिम' लागते. तिला आपण 'तासणी' असा शब्द वापरू. तासणी म्हणजे तातडीचे सर्वेक्षण व निष्कर्ष. कोकण रेल्वे प्रकल्पाची परिसरावरील संपाद्य परिणामाच्या दृष्टीने (एन्व्हायरॉन्मेंटल इम्पॅक्ट असेसमेंट) नुकतीच तासणी झाली. तिची येथे वाचकाना ओळख करून देत आहे.

कोकण रेल्वे प्रकल्प म्हणजे महाराष्ट्रात रोहा व कर्नाटकात मंगलूर ही रेल्वेची दोन टोके नव्या लोहमार्गाने जोडणे. पैकी रोहा ते दासगाव आणि पणजी ते उडुपी एवढ्या भागाची तासणी दोन आठवड्यात पूर्ण झाली. तिला ३८ हजार रुपये खर्च आला. डॉ. रणजीत डॅनिअल हे प्राणीशास्त्रज्ञ आणि डॉ. सुभाष कुमठ हे वनस्पतितज्ञ या दोघांनी मुख्यतः ही पाहणी केली. हे दोघे कर्नाटकातील परिसरशास्त्रज्ञ आहेत. त्यांपैकी डॉ. रणजीत डॅनिअल यांच्या मुलखतीवर हा लेख आधारला आहे.

या पाहणीसाठी रेल्वेखात्याने नियोजित लोहमार्ग नकाशावर आखून दिला. त्याच्या दोन्ही अंगाला १०-१० मीटर रुंदीची जमिनीची पट्टी पूर्ण साफ केली जाईल. त्यामुळे कितपत झाडोरा तुटेल ! वाटेत जंगले कोठे, कोणत्या प्रकारची, कोणत्या गुणवत्तेची आहेत ? परिसराचे असे तुकडे कोणते की ज्यांचे आवर्जून रक्षण व्हावे ? अशा प्रकारचे प्रश्न रेल्वे खात्याने विचारले. पडिचरीच्या फ्रेंच

कोकण रेल्वेची तासणी

इन्स्टिट्यूटमधील डॉ. पास्कल यांनी तयार केलेले गोवा ते उडुपी या भागाचे झाडोऱ्याचे नकाशे सोबत मिळाले. त्यात उपग्रहानी काढलेली छायाचित्रे वापरून १९८२ ते ८४ या दरम्यानची जंगलस्थिती रेखाटली आहे. रोहा ते गोवा या भागासाठी 'सर्व्हे ऑफ इंडिया' या भारत सरकारच्या खात्याने १९६० व १९७८ या वर्षी बनवलेले नकाशे वापरले.

पाहणीमधे रोज सुमारे ३०-४० किलोमीटर मार्गाचा अभ्यास होत असे. गर्द जंगल, झुडपांचा माळ, शेतजमीन, गावठाणे, वनीकरण केलेला भाग अशा विविध प्रकारांपैकी जे जे त्या भागात भेटतील त्यांचा एक नमुना जवळून पाहायचा. नकाशातील माहिती व प्रत्यक्ष वास्तव यांची तुलना करायची. प्रत्येक राखीव जंगलाला भेट घायची. त्याचा दर्जा तपासायचा. कसे ? प्रथम दर एकरी वृक्ष किती याचा अंदाज बांधायचा. याची सोपी पद्धत म्हणजे निअरेस्ट नियर मेथड. जंगलात एक बिंदू निवडायचा. त्याच्या आग्नेय, वायव्य, नैऋत्य, इशान्य दिशांना जवळत जवळचे झाड पकडायचे. त्या ४ झाडांची बिंदूपासून टेपने अंतरे मोजायची. वृक्षसंख्या जितकी जास्त तितकी ही अंतरे कमी असतात. या झाडांचे घेर, उंची मोजणे. ही जास्त तर जंगल चांगले. झाड कोणते याची नोंद ठेवायची. त्यावरून जंगलच्या वृक्षविविधतेचा निर्देशांक काढायचा. निर्देशांक जास्त तर जंगल चांगले. कोणकोणत्या जातीचे किती पक्षी दिसतात हे पाहायचे. तशीच बेडकांची पाहणी करायची. डॉ. डॅनिअल यांच्या मते जंगलातील आर्द्रता बेडकांवरून चांगली कळते. कोकणातील जंगलात दमटपणा खूप हवा. चांगल्या दाट जंगलात जमिनीवर उन्हाचे फक्त कवडसे येतात. वृक्षतोड होऊन छप्पर गेले की सगळे ऊन आत येते आणि जंगल कोरडे पडू लागते. ऑर्किड व नेचे या वनस्पतीसुद्धा चांगल्या दमट जंगलाची चिन्हे होत. अशा सगळ्या बाबी पाहून, मोजून निष्कर्ष, काढायचे.

काय दिसले अभ्यासकांना या पाहणीत ? महाराष्ट्रातील कोकणात जंगलांची एकंदर वाटचल लागली आहे. गोव्यातील जंगलांचा अधिकाधिक भाग काजू लागवडीखाली येत आहे. त्याची पुढे फेणी बनणार. त्या मानाने कर्नाटकातील जंगले

सुस्थितीत आहेत. तेथील नवीन लागवडीच्या कार्यक्रमात मात्र घोटाळा आहे. तेथे मुख्यतः ऑस्ट्रेलियन बाभूळ लावली जात आहे, त्याऐवजी त-हत-हेची देशी झाडे लावायला हवीत.

महाराष्ट्रात नियोजित रेल्वेमार्ग कोठेही दाट जंगलातून जात नाही. त्या वाटेत झाडांचे प्रमाण दर १०० चौरस मीटरला १ पेक्षा कमी आहे. ही झाडे खुरटलेली आहेत. गोव्यात काही प्रमाणात जंगलांचे लोहमार्गांमुळे नुकसान होणार आहे. विशेषतः कोटीगाव अभयारण्याला काहीसा धक्का बसणार आहे. अर्थात वाटेतील बराच भाग आज अंधिकाधिक काजूमय होत आहे. कर्नाटकात कारवार भागात प्रकल्पाच्या वाटेत सगळीकडे सुपारीच्या बागा आहेत. त्या वाचवण्यासाठी प्रयत्न केले पाहिजेत. या बागा आजच्या स्थितीत येण्याला अक्षरशः शतकांचा अवधी लागतो.

दक्षिण कन्नड या जिल्ह्यात लोहमार्ग समुद्रकिनाऱ्यांची काही मैग्रेव्ह जंगले नष्ट करणार आहे. त्यासाठी लोहमार्गाच्या कडेला मैग्रेव्हची लागवड करायला हवी.

ही झाली लोहमार्गाच्या लगतची जमीन. त्याशिवाय लोहमार्गापासून अलीकडे - पलीकडे १० कि. मी. क्षेत्राचीसुद्धा धावती पाहणी झाली. त्यात महाराष्ट्रात भातशेती आहे आणि चराऊ राने आहेत. या शेतीचा दर्जा तसा सुमारच आहे. चराऊ रानातील गुरे लोहमार्गावर येऊन अपघात होण्याची शक्यता पुष्कळ आहे. म्हणून आधीपासूनच अडथळे बनवले पाहिजेत. उदा. घायपात वा इतर वनस्पतींची दाट लागवड, ट्रेन्च -कम- माऊंड वगैरे. ही झाली किनाऱ्याकडची बाजू. दुसऱ्या बाजूला आहेत डोंगर. त्यात अनेक निसर्गरमणीय जागा आहेत. त्यांचे सौंदर्य टिकवले पाहिजे. लोहमार्ग बांधताना निर्माण होणारी खडी, वाळू, माती, कचरा यांची नीट व्यवस्था करायला हवी.

अनेक ठिकाणी डोंगरांचा उतार फार तीव्र आहे. अशा ठिकाणी भरपूर पावसामुळे माती वाहून जाते. म्हणून लोहमार्ग बनवताना प्रतिबंधक उपाय योजले जावेत. छोटे बांध, रिटॅनिंग वॉल अशा सोयी करायला. पाणी वाहून जाण्याची वाट असल्यास ती तुंबणार नाही अशी काळजी घेतली जावी. एरवी पाणी अन्य रस्ता शोधून जास्त नुकसान करते.

बहुतेक ठिकाणी राखीव जंगले लोहमार्गापासून पुरेशी दूर आहेत.

रोह्याजवळ घाटात फार सुंदर सदाहरित जंगलाचा एक तुकडा आहे. त्यात अनेक वैशिष्ट्यपूर्ण वनस्पती, पक्षी व इतर जीव आहेत. राना केरलेन्सिस नावाची एक बेडकाची जात आहे. ती फक्त केरळातच सापडते अशी आजवर शास्त्रज्ञांची समजूत होती. अशी एक बेडकी डॉ. डॅनियल यांना रोह्याजवळच्या जंगलात एका ओढ्यात दिसली. विशेष पुरावा म्हणून त्यांनी ती पकडली. मग त्यांच्या मनात आले की रोह्याला अशा फार कमी बेडक्या असतील तर त्यातील एक नेणे अयोग्य होईल, म्हणून त्यांनी ती परत सोडून दिली.

उडूपीजवळ एक देवगई दिसली. हिच्यात महाप्रचंड आकाराचे वृक्ष आहेत. त्यांची उंची दहा मजली इमारती एवढी आहे. घेर ६-७ मीटर आहे.

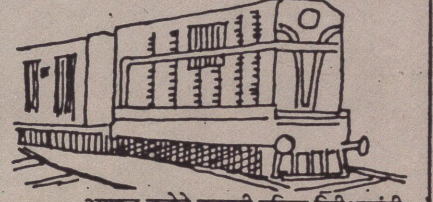
ही देवगई, रोह्याचे जंगल यांचे जतन झाले पाहिजे.

एकूण परिसररक्षणाच्या दृष्टीने कोकण रेल्वे फारशी त्रासदायक दिसत नाही. तासणीचा ढोबळ निष्कर्ष असा आहे.

हे वाचून कोणी म्हणतील की यात काय, इतपत पाहणी तर आम्हीसुद्धा करू शकू. ते खरेच आहे. परिसररक्षणबद्दल उत्साह, बऱ्यापैकी वाचन आणि भटकंतीचा अनुभव यांच्या जोरावर अनेकदा अशी तासण करणे शक्य आहे. आपापल्या प्रदेशात जरूर त्या जागी ज्याने त्याने असा अभ्यास करणे आवश्यक व उपयुक्त आहे.

गेली काही वर्षे हिवाळ्यात उत्साही पक्षीनिरीक्षक आपापल्या गावच्या तळ्यावर दिसणारे पक्षी मोजून ती माहिती बॉम्बे नॅचरल हिस्ट्री सोसायटीला कळवतात. तिचा उपयोग करून महाराष्ट्रातील पाणथळ भागांचे पक्षीजीवनाच्या दृष्टीने तुलनात्मक महत्त्व आता मोजता येऊ लागले

आहे. त्यामुळे असलेला मर्यादित पैसा कोणत्या जागांच्या रक्षणावर खर्च करवा हे ठरवता येईल.



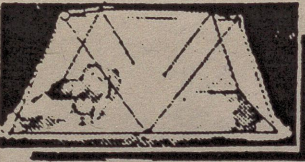
अशाच तऱ्हेने उत्साही परिसर निरीक्षकांनी आपल्या भोवतालच्या विविध औद्योगिक योजनांचा परिसरावर कसा परिणाम होत आहे, याचे संशोधन केले पाहिजे. ज्याला स्वातंत्र्य हवे त्याला पहाण ठेवावा लागतो (व्हिजिलन्स ईज द प्राइस ऑफ प्रीडम) असे म्हणतात. त्याच चालीवर आता म्हणावेसे वाटते की ज्याला चांगला परिसर हवा त्याने पहाण, पाहणी आणि तासणी करण्याची किंमत घ्यायला हवी.

‘बर्गे’ यामिनी सारखी दुसरी तच्छरदाणी नाही.



पांघरुणासारखी अंगावर घेताच घुमटाकार होते.

भिंतीचा आधार लागत नाही त्यामुळे कोठेही वापरता येते.



विक्रीसाठी संपर्क :
उत्पादक -

बर्गे यामिनी
२५७, नारायण पेठ पुणे ३०
फोन - ४४३६९८

उपलब्ध : * मुंबईत : कुमकुम - डोंबिवली, समर्थ भांडार - ठाणे, बॉम्बे बेडिंग वर्क्स - सिटी लाईट सिनेमाजवळ, एन. व्ही. गोखले - प्रार्थनासमाज * पुण्यात : मं. स्वींद्र - डे. जिमखाना, पराग/ व्हरायटी - लक्ष्मी रोड, बॉस्को - शनिवार, शानहिरा - कॅम्प, रॉयल ड्रेप्स - ढोले पाटील रोड * कोल्हापूर : जनता बझार.

प्रत्येक कुटुंबाची गरज



कैलास जीवन

मल्टिपर्पज् आयुर्वेदिक क्रीम.

मूळव्याध, हातापायाची आग/भेगा, भाजणे, मुरुम/पुटकळ्या, जखमा, कापणे व शांत झोपेसाठी.

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TUCSON ARIZONA

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March 25.

Dear Nirangan,

The enclosed clippings from our student newspaper may be of interest to you and others.

There is really nothing new to report. I am in the last phase of my stay. Veena and Rama are here. Rama will return by middle April, ahead of us, to get started with her 12th std studies. Veena is getting to know some people in Civil Engineering here.

The weather is fine. We enjoy our frequent outings. But now I am ready to return home.

I will of course get in touch with you all after return.

Sincerely,

Anil

UA professors' work suggests sex stems from DNA damage

By Karen Idelson

Arizona Daily Wildcat

The force that drives us to make love can seem as awesome and irresistible as any of the forces ruling the universe on a given day. And the explanation behind this desire certainly seems no less mysterious.

Whether it is one of life's more tantalizing or more frustrating questions, the reason for sex may lie in something surprisingly smaller than men and women.

In their recently published book *Aging, Sex and DNA Repair*, University of Arizona microbiology professors Carol and Harris Bernstein — and in an essay Mr. Harris published with UA evolutionary biology professor Richard Michod — suggest our desires may be brought to us on a sort of molecular love boat.

"Sex evolved as a DNA repair process," said Mr. Bernstein. "Without that benefit, it would be pretty hard to justify sex."

Sexual reproduction is actually a rotten idea for an individual organism despite the obvious pleasure involved.

In sexual reproduction the individual gives up time to find and select



David M. Gill/Arizona Daily Wildcat

Husband and wife Harris and Carol Bernstein, UA microbiology professors, are investigating the molecular basis for sex. Their work has taken them to understand an evolution of sexual reproduction as being a DNA repair process.

potential mates and then only passes on half of their genes. Asexual organisms, in addition to reproducing in a rather trouble free method, pass along their entire being. So a strong genetic need must be fulfilled somehow to make the sacrifice of sexual reproduction worthwhile.

The Michod and the husband and wife research team believe environmental damage to DNA creates that need.

"Through everything from sunlight to the intake of oxygen there are about

10,000 damages per day to your DNA. And this damage is a pervasive thing that all organisms have to deal with," Michod said.

By creating a new individual from two sets of DNA, odds increase that the being will be able to find all the undamaged genetic information it needs to be functional.

"That makes your partner a sort of spare-parts shop," Mr. Bernstein said.

But the theory is not entirely unromantic.

"We like to think of it as two individuals mutually

healing each other and passing along the benefits to their progeny," Ms. Bernstein said.

This theory brings the sexual drive to a molecular level as our DNA searches for a way to repair itself in the next generation. Taking those desires to this elemental plane goes a long way toward explaining why we do what we do every spring.

"Sex is very costly," Ms. Bernstein said. "You have to have a powerful force that makes you want to overcome all the troubles of finding and keeping a mate and a molecular force could make you want to overcome all those crazy little mating rituals and frustrations."

Being sexually motivated at the most basic level has impacted each human being's existence, to be sure. Perhaps the greatest influence it has is the power it has over our minds.

"This means you're going to spend a lot of your life thinking about sex," Ms. Bernstein said, but added that it's nothing to worry about.

"After all, it's for a beneficial purpose," she said.

Oldest Douglas fir found by lab team

By Sarina McCann

Arizona Daily Wildcat

UA researchers have found the oldest living Douglas fir tree in North America surrounded by a lava bed.

On one of North America's most massive lava beds, a three member team from the University of Arizona Tree Ring Laboratory cored the tree that dates back to 1062 in July at the El Malpais National Monument, just south of Grants, N.M., said Henri Grissino-Mayer, a graduate research associate in the UA Tree Ring Lab.

It is unusual for the tree to be growing in the bed of lava, where there is no soil. It is theorized that the lava provides an environment protected from fire, predators and humans, he said.

"The findings are important because it provides a continuous unbroken tree record that dates back to prehistoric time in the southwest," said Rex K. Adams, a research specialist at the UA Tree Ring Lab who was on the expedition in July.

The date of the tree provides researchers with information about the area's climate in the past, present and may help predict the future, Grissino-Mayer said.

He said the climate is recorded by the amount of growth each year, which is related to the width of tree rings.

Because of present concern about how humans and natural phenomena affect the climate, research can be done to see if phenomena have happened in the past.

This tree and others in the area are 25 to 30 feet tall and have a diameter of about three feet. The trees are boojum shaped, like an upside-down carrot with a wide bottom that tapers toward the top, Grissino-Mayer said.

Normally, Douglas firs grow to be 75 to 100 feet tall and are six feet in diameter, he said.

Before this discovery the oldest-known living Douglas fir was from 1080 located at Nine Mile Canyon in Utah, which was discovered by a UA Tree Ring Lab scientist, Edmund Schulman, about 50 years ago.

UA library to replace cards with computers

By Juliette Jordan
Special to the Arizona Daily Wildcat

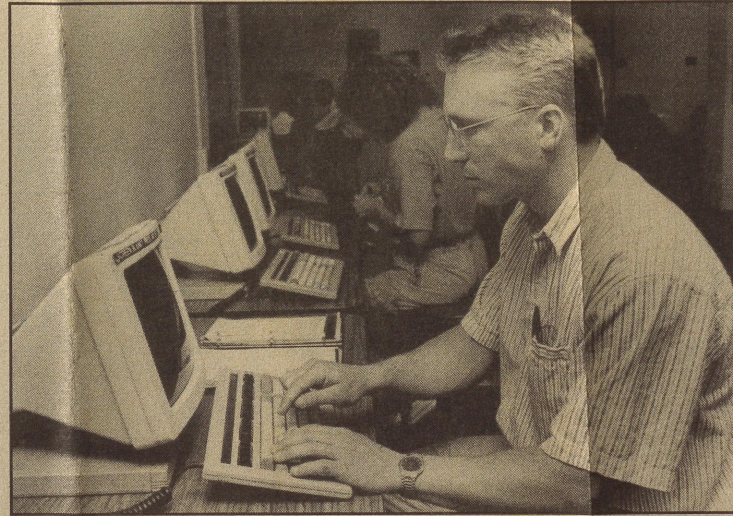
The UA library will begin replacing card catalogs with computer terminals next fall as a step toward modernization, which some librarians have said is overdue.

The University of Arizona's library is the last research library in the country to convert to a computer automated system, said Ruth H. Dickstein, central reference librarian.

If the computerization continues on schedule, by September librarians expect fewer people will need to walk into the library, as those with access to a personal computer, modem and a telephone can dial into the library files from their home or office.

Students can "search for what books we have and switch to see what articles are on the same subject," Dickstein said.

Until all books and journals are recorded into the network, students will have to supplement



T. Layley Haggood/Arizona Daily Wildcat

Dan Tarico, an engineering student, searches for books on the Inopac computer system at the engineering library yesterday. The Inopac system will take the place of the card catalog system in the UA libraries.

their search with the card catalogs and journal indexes, said Karen A. Williams, head of the central reference department.

Williams said the librarians have anticipated converting to

the computers since 1983 and have been steadily recording the new resources they have received on computer tapes to speed the conversion.

President Manuel T. Pacheco

allocated \$1 million to begin the process last year, she said.

"When you come back to this place in three years you won't even recognize it," said Sara C. Heitshu, assistant university librarian.

Consistent funding is needed to complete the computerization process, she said.

"It's a huge system and you usually don't get everything all at once," Williams explained.

In the fall, those interested will be instructed in how to use the system, which Williams said is a relatively simple process.

Dickstein said the true reflection of a library's worth is no longer based solely on its collection, but also on whether it has a sophisticated computer network that facilitates speedy access to those volumes.

Ideally, the library's automation will get to the point that students can access book and periodical indexes at other universities as quickly as those at

the UA, Dickstein said.

Speedy access to outside collections would greatly improve loans between libraries and enable libraries to compensate for the effects of budget cuts, which otherwise might devastate a library's collection, Heitshu said.

"We're going to be moving into an information-based society, in which the people who make it are the people who understand and can access all kinds of information," Heitshu said.

In addition to listing the books and periodicals in the library's collection, Williams hopes other information will soon be added, she said.

The catalog also could list upcoming events, faculty salaries and any other information that is on the public record to give students easier access, Williams said.

"We have very exciting plans, but we just haven't been able to bring it about before," Dickstein said.

Putman

from 1

Putman.

In a taped interview, Putman initially denied stabbing the couple, but later said Danziger fell on a knife after Danziger turned to attack him.

During his taped statement, Putman insisted he had brought a pocketknife, not the kitchen knife used in the stabbings, for protection against Danziger, who sounded angry during a phone call he

made earlier to set up the deal.

In the interview, Putman gave several versions of his actions that night. He eventually said he managed to flee the Danziger's vehicle after he was attacked, but later returned to the site to find Danziger and Vinnik dead.

Putman said he lacked recollection of stabbing Vinnik. But if he did, the action was "unconscious."

Throughout his statement he insisted he did not take any money, though he looked for some in Danziger's car.

Assistant Public Defender Richard L. Lougee Jr. said the idea that Putman intentionally killed the couple was "preposterous" because of physical evidence presented during the case.

He said the front seat of Danziger's Volvo lacked blood and Vinnik would have fled had she witnessed Putman's attack on her friend.

Vinnik died attempting to pry her friend from Putman, Lougee said.

"You don't need to think about premeditation, ladies and gentleman, because

it wasn't first-degree murder," Lougee said.

"You will not determine you like what happened. You will not determine you like Heath Putman," Lougee said after asking the jury to look past the fact Putman looked for money and took Danziger's vehicle after he claimed to have found the bodies.

Judge Pro Tem Howard Hantman of the Pima County Superior Court will continue to listen to rebuttal arguments this morning.



A scientist's view

Ants offer insights into human behavior

By Michael Bezdek
The Associated Press

CAMBRIDGE, Mass. — Edward O. Wilson wrote a big book about ants and a small book about human nature, and he won the Pulitzer Prize for both.

He worked for decades as a myrmecologist, ant doctor, one of only about 100 in the world, but he broadened his theories to a way of looking at life that has affected thousands of scientists in dozens of disciplines.

He has long spent his days kicking around with a handful of colleagues the idiosyncrasies of *Myrmica rubra* and *Polyergus lucidus* and others among the 8,800 ant species, yet he is a polished writer and dazzling speaker in any crowd.

He is the toast of Harvard University Press along with co-author Bert Holldobler for "The Ants," the first full catalog in 80 years on one of the most diverse and complex life forms on Earth.

And, typical of the vicissitude of Wilson's career, the book not only won this year's Pulitzer Prize in general non-fiction, but it is popular — an extraordinary exacta for a university press book.

"The Ants" is expensive, \$85, but of incalculable value as a shared wonder in science, accessible and entertaining, and certain to enrich readers of all ages and all levels of interest.

It is also a consummation of a life

in natural science that, like so much of Edward Wilson's meanderings, ended up far from the way it appeared it might.

It began inauspiciously at the age of 7 when Wilson was reeling in a fish too vigorously and a fin struck him in the face. It caused a traumatic cataract that left him blind in one eye, and might have understandably turned him off to the ways of nature.

But Wilson, now 62, says it only helped him focus better, especially on insects. And soon he knew he wanted to be an entomologist.

During a recent visit to his expansive laboratory and office, the awe of sudden discovery came over him as he directed attention to a box of leaf-cutter ants and extolled them as a colony that "can reach 2 million and more. They dig tunnels 20 feet down, moving more than 40,000 pounds of soil to make their nests. It is the Great Wall of China, from an ant's point of view."

Then he pointed out the large, muscular — for ants — soldiers.

"They live to fight and they are well-equipped for it. They are the Arnold Schwarzeneggers of the colony."

He exhaled into one of the clear plastic tunnels set for the colony: "This will bring out the soldiers. They don't like changes in currents."

Sure enough they began to march, some of them strutting out from the

tubes into an open area, anxious and combat-ready.

It is an example of the altruism of ants, the aspect of their lives that most fascinates Wilson, thousands upon thousands of them in a colony, workers or warriors, all related and all living and dying willingly to serve the queen.

Wilson's fascination with natural history flourished when his family moved from Alabama to Washington, D.C., opening up what he calls the "world of Oz" of the museums and the National Zoo. Then he read a National Geographic article on ants by William Mann, director of the zoo, and he was forever fixed on bug life, particularly ants.

He was one of only 20 myrmecologists in the world then and got what he calls "tutorial attention" at the University of Alabama, from which he graduated at the age of 20.

He went on to get a doctorate from Harvard and then a teaching position there. In the meantime he met Mann, who soon gave him his entire library on ants.

He began what appeared to be a career of pensive and somewhat obscure study. Then . . .

He won his first Pulitzer in general non-fiction in 1979 for "On Human Nature," the culmination of a period during which this guileless man created a firestorm of protest with his book "Sociobiology."

His book was an analysis of the social behavior of ants that led him



The Associated Press

After decades of study, Edward O. Wilson is still fascinated by ants

to postulate that genetics plays a role not only in animal evolution but also in man.

Liberals everywhere were up in arms, claiming the notion — it was called "genetic determinism" — meant that man couldn't improve himself. Wilson, a quiet, studious entomologist, had become a target of the political left.

His ideas on social biology are

now widely accepted, and he has an entire shelf of books filled with variations on his theme. Many of those books have never been opened; he simply cannot keep up with all the offshoots of the field he fathered.

He is still, as few headline writers have been able to resist calling him, "The Ant Man," indefatigable in his work and his enthusiasm.

UNIVERSITY OF POONA
DEPARTMENT OF STATISTICS



To avoid delay in reply, please quote

Ref. No. : Stats. / Ecog. 54

Telephone Nos. : 336061 to 336069
Extn. 19 & 44

Telegraphic Address : " UNIPUNA "

Ganeshkhind,
PUNE - 411 007.

Date :

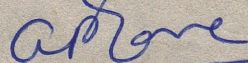
1st July, 1984

Dear Sir,

The enclosed letter is self explanatory. I suspect it may not have reached you since the Unesco office used an inadequate address. Kindly acknowledge receipt and confirm your availability for the January workshop.

Thanks.

Yours Sincerely,


(A.P. Gore)

To

Dr. N.V. Joshi,
Centre for Ecological Sciences,
Indian Institute of Science,
Bangalore. 560 012

UNIVERSITY OF POONA

Telephone Nos. : 336061 to 336069
Extn. 19 & 44

Telegraphic Address : "UNIPUNA "



DEPARTMENT OF STATISTICS

Ganeshkhind,
PUNE - 411 007.

Ref. No. : Stats. /⁴⁰⁰.....

Date : February 17, 1995

To
Dr. Niranjana Joshi,
C.E.S. I.I. Sc.
BANGALORE 560 012.

Dear Dr. Joshi,

University Grants Commission's panel on Statistics has specified "Ecological and Environmental Statistics" as an area on which special stress should be placed in teaching and research of Statistics. The panel has asked me to write a report on the present status of this matter. I have therefore decided to approach both statisticians and ecologists for their views. Some questions that come to mind are the following :

1. Is statistics relevant in ecological and environmental studies ? If so, in what way ?
2. Which aspects of statistics are used frequently in ecological work and which only occasionally ?
3. What reading of ecological matters is necessary for a statistician to be useful to ecologists ?
4. What are the deficiencies if any in statistics training today for the viewpoint of ecological applications ?
5. What are the job prospects for a statistics student who decides to take up study of ecological statistics ?
6. What complementary skills should the student seek to acquire ?
7. How can one get work experience in this area ? Are there possibilities of summer traineeships etc. ?
8. What are the ecological problems for which suitable statistical techniques need to be developed ? What are the potential areas of statistical research that can benefit ecologists ?

9. What are the likely sources of funding for interdisciplinary research in Statistics and ecology ?
10. What are the currently available facilities for training ecologists in statistics and statisticians in ecology ? Are these adequate ? What needs to be done in this area ?
11. There is a syllabus (copy enclosed) of an elective course on Statistical Ecology ^{for statisticians} recommended by UGC. What are errors of omission/commission in it ?
12. Which are the principal centres of activity in quantitative ecology in India ? What arrangements do they have to fulfill their needs in statistical analysis, modelling and interpretation ?
13. Which are the journals in quantitative ecology that have articles with considerable statistical content ?
14. What advice will you give to a Statistics teacher in an Indian University who wishes to initiate some activity in the area of ecological and environmental Statistics ?

May I request you to respond to as many of these questions as possible. Please write in as much detail as is possible given your busy schedule. If there are any other inputs you can give that may be useful to UGC panel, please feel free to do so.

Thanks,

Yours sincerely,


(A. P. Gore)

P.S. If you suggest names of environmental scientists who may be sources of information I would write of them as well.

Syllabus included in the report of the
Curriculum Development Centre
(Sponsored by UGC) November, 1988

DEPARTMENT OF STATISTICS
UNIVERSITY OF POONA

E-19 : STATISTICAL ECOLOGY
(ELECTIVE)

S-01	Population Dynamics : Single species-exponential, logistic and Gompertz models, two-species-competition and competitive exclusion, Predator-prey interaction, Lotka-Volterra equations.	10L
S-02	Estimation of Abundance : Computer-recapture method, line transect methods, nearest neighbour and nearest individual distance methods, analysis of bird ring recovery data, open and closed populations.	10L
S-03	Survivorship Models : Discrete case-life table, Leslie matrix, continuous case-survivorship curve, hazard rate, life distributions with monotone and non-monotone hazard rates.	10L
S-04	Ecological Community : Species abundance curve, broken stick model. Diversity and its measures.	OBL
S-05	Renewable Resources : Maximum sustainable yield, maximum economic yield, optimal harvesting strategy.	OBL

BOOKS :

01. Begon M. & Mortimer M. : (1981) - Population Ecology, Blackwell.
02. Burnham K.P. Anderson D.R. and Laake J.L. (1980) : Estimation of Density from Line Transect Sampling of Biological Populations, Wildlife Monograph No.72.
03. Clark C.W. (1983) : Bioeconomic Modelling and Fisheries Management, John Wiley.
04. Elandt-Johnson R.C. & Johnson N.L. (1980) : Survival Models and Data Analysis, Wiley.
05. Hallam T.G. & Levin S.A. (editor) : (1986) Mathematical Ecology, Springer Biomathematics Vol. 17.
06. Kapur J.N. (1985) : Mathematical Models in Biology and Medicine. Affiliated East - West Press, New Delhi.

07. Maynard Smith J. (1974) : Models in Ecology
Cambridge University Press.
08. Morgan B.J.T. and North P.M. (editors) (1980) :
Statistics in ornithology, Springer Lecture
notes in Statistics, Vol. 29.
09. Otis D.L., Burnham, K.P.1, White G.C. and Anderson
D.R. (1978) : Statistical Inference from Capture
Data from Closed Animal Populations, Wildlife
Monograph, No : 62.
10. Pielou E.C. (1977) : Mathematical Ecology, Wiley.
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Wiley.
12. Maynard Smith J. (1968) : Mathematical Ideas
in Biology, Cambridge University Press.
13. Poti S.J. (1983) : Quantitative Studies in Life
Sciences, Vikas.
14. Seber G.A.F. (1976) : The Estimation of Animal
Abundance, Hafner.
15. Morgan B.J.T. and North P.M. (editors) (1980)
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10. Pielou E.C. (1977) : Mathematical Ecology, Wiley.
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D.R. (1978) : Statistical Inference from Capture
Data from Closed Animal Populations, Wildlife
Monograph, No : 62.

SA/SA/956

27/3/95

Dr. N. V. Joshi

C. E. S.

I. I. Sc.

Bangalore 560012

Dear Nirayan,

Many thanks for the report on the LAD manuscript. It is quite useful and adequate. I know that you are not familiar with the area. I do have another referee who is in theoretical stat. In my report to the editor I explain the background of each referee. For me you are "Quantitative Analyst in Biology". I will see if we can make the authors change the style to a more biologist-friendly one.

Mrs Paranype & I will attend the entire BS1/ZS1 workshop. We will reach Bangalore on April 3 by 10918 from Pune. Can you pl- check if accommodation is reserved for us and if it is

possible to send transport?

I read with interest the paper on groundnut. It is very interesting to see that forecasts are irrelevant for some problems and relevant for others. I would have written the probabilities somewhat differently

$$\text{e.g. } P(\text{wet spell occurs} / \text{wet spell predicted}) = p_{w1} \text{ say}$$

$$P(\text{ " / dry spell is predicted}) = p_{w0} \text{ say}$$

The one rule used throughout is that a strategy which has lower average loss_h is to be adopted. Strategy 1: always spray. Average cost = c. Strategy 2: don't spray: Av. cost = p_w L (p_w = long term or climat. prob of wet spell & L = loss due to wet spell)

Strategy 3: spray if wet spell is predicted. Av. cost = c p_{w1} + L p_{w0}

So we choose the strategy with least Av. cost. But all these are matters of style and presentation. We like the term conditional probability.

In any case this is the first time
I see a concrete case with all costs &
benefits spelt out and a forecast
dependent action plan developed. I
liked it.

More when we meet.

Sincerely

Anil Gore.

P.S. Copies of People of India manuscript
were received on time. All 3 of us are
reading it.