

STRI newsletter

October 9, 1992

SMITHSONIAN TROPICAL RESEARCH INSTITUTE - Apartado 2072, Balboa, Panamá

No. 43

TUPPER CENTER SEMINARS

No noon seminar schedule for Tuesday, Oct 13.

Staff Evening Seminar

On Thursday, Oct 15, the STRI staff seminar will be combined with a meeting with the Panamanian Academy for Medicine and Surgery, Tupper Center Auditorium, 8pm (please note change of time).

Arqueología, Genética y Farmacología Poblacional de las Poblaciones Indígenas de Panamá

- Richard Cooke. *Aportes multidisciplinarios a la historia de los amerindios de Panamá y Costa Rica.*
- Tomás D. Arias. *Programa de colaboración con la OMS, Panamá.*
- Eldredge Bermingham. *Biología evolutiva y genética molecular en poblaciones.*

BAMBI SEMINAR AT BCI

Thursday, Oct 15, 1992, seminar speakers will be the gamewardens

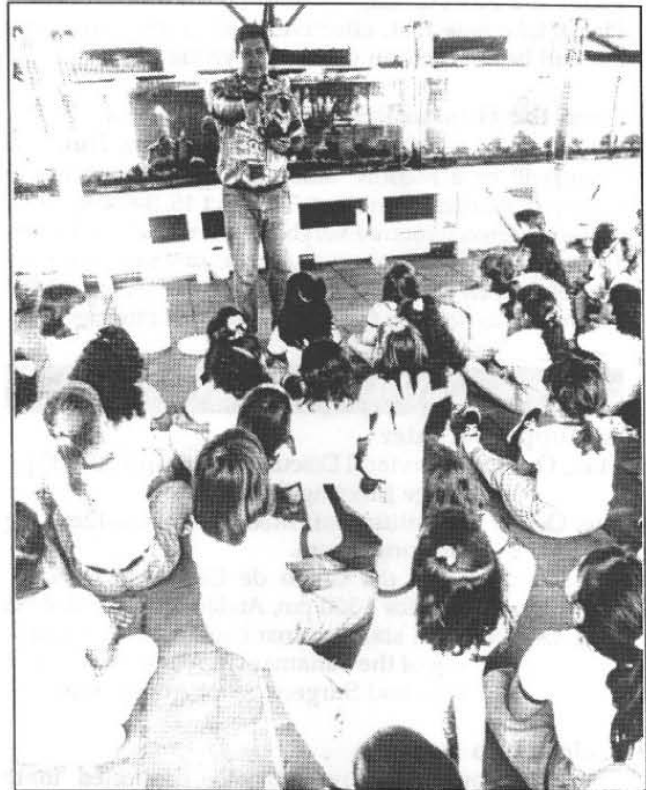
Protection of the Barro Colorado Nature Monument

Please contact Vielka Liao to arrange transportation.

PEOPLE

Arrivals

- Lucy Dorick, STRI development officer in Washington, Oct 10-18 to meet with various persons at STRI to discuss development plans and activities.
- Simmathiri Appanah, Forest Research Institute, Malaysia, Oct 11-Dec 10, to work on demographic patterns of dipterocarp species in 50-ha of Pasoh lowland forest. Dr. Appanah will be accompanied by his wife Esther and his 9-year-old son Sailendra Den.
- David Ellsworth, Univ. of Vermont, Oct 10-Nov 12, to continue work with M. Tyree on the evolution and structure of terrestrial ecosystems on BCI.
- Charles Handley, National Museum of Natural History, Oct 15-Dec 15, to continue work on the demography of figs on BCI and hunting behavior of bats on BCI.
- Elizabeth Kalko, National Museum of Natural History, Oct 15-Dec 15, to work with Dr. Charles Handley on BCI.
- Pierre Jolivet, Museum National Histoire Naturelle, Short-term visitor, Oct 10-Nov 10, to work on the biology of host plants, the taxonomy of leaf beetles and the biology of ant-plants especially Melastomataceae.
- Joshua Feingold, Univ. of Miami, Oct 12-16, to continue research on the effect of elevated water and temperature on corals.



On Thursday, Sep 22, a group of children from Las Esclavas visited the Marine Biological Reserve at Culebra. Arcadio Rodaniche attends these frequent visits as part of an educational program ••• El jueves 22 de septiembre, un grupo de niños de Las Esclavas visitaron la Reserva Biológica Marina en Culebra. Arcadio Rodaniche atiende estas frecuentes visitas como parte de un programa educativo.

(Foto: A. Montaner)

THINGS YOU SHOULD KNOW

From the Tupper Center Administration

De la Administración del Centro Tupper

The parking lot is only for the use of the employees during working hours. Please do not leave your cars in lots when on leave or long trips. Parking space is scarce and should be available primarily to employees of Tupper and Tivoli ••• Los estacionamientos del Tivoli y Tupper son para el uso de los empleados durante horas de trabajo. Por favor no deje su carro cuando salga de vacaciones o en viajes largos. Se agradece su cooperación en este asunto.

Monday, Oct 12 is Columbus Day and a holiday for all STRI personnel.

El lunes 12 de octubre es un día de azueto y no hay trabajo en STRI.

From the Accounting Office

Please take note that, effective October 1992, interest of 2% will be charged on 60 days overdue balances.

From the Human Resources Office**De la Oficina de Recursos Humanos**

There will be a Meddac nurse giving a presentation on noise pollution, in Spanish on Thu, Oct 15, 8-8:30am at BCI in the conference room. Everybody is invited ••• *El jueves 15 de octubre, una enfermera de Meddac hará una presentación sobre el ruido en el ambiente en español de 8-8:30 am en el salón de conferencias de Barro Colorado. Todos están invitados.*

ANNOUNCEMENTS**At Tupper Center**

- Mon, Oct 12 Behavioral Discussion Group 5:30-7:30 pm, Large Meeting Room.
- Tue, Oct 13 Scientific Staff Meeting 9:30am-12m Large Meeting Room.
Visita del Grupo de Centro de Servicios y Eventos 1-3:30 pm, Auditorium & Exhibit Hall
- Thu, Oct 15 STRI staff seminar combined with a meeting of the Panamanian Academy for Medicine and Surgery, 8pm, Auditorium.

Welcome to Internet

The Smithsonian is now officially connected to the Internet, the largest research and educational computer network in the world. This is the result of collaborative efforts of more than twenty SI staffers, which began nearly a year ago. Particular thanks is due to Barbara Smith, SIL, Bob Hoffman and Ross Simons, the assistant secretary and deputy assistant secretary for the sciences and to Vince Marcalus, director, OIRM.

At the Institution, Internet will be accessible from any of the several computer platforms—the IBM 4381, any of several VAX computers or via LANs. Information on Internet is available via your ADP support organization, SIL Branch Library, and the OIRM Help Desk. Additionally PROFS users can review this information electronically via the Internet Bulletin Board (PF7 from the PROFS Main Menu, then select "Internet"). Please review the document on the Ethical Use of Internet.

For Sale

- 2 Whirlpool Air Conditioners, both 10,000 BTU. One is a designer model, 3 months old (\$350), and the other is 1 year old (\$300), or both for \$600. Call Marivi Walker 63-4321.
- Pentax camera K1000 135mm body, Pentax lens SMC 50mm, f/2 and macro zoom lens 80-200mm f4.5, \$200. Call Marcos Guerra at 61-0701.

TRAINING OPPORTUNITIES

The National Science Foundation and the National Institute of Health announce that applications are now being accepted for the 1993 Summer Institute in Japan. Open to U.S. graduate students in Science and Engineering. Application deadline: December 1, 1992.

Program's Goal: To provide 60 U.S. graduate students with first-hand experience in a Japanese research laboratory.

Program's Elements: Internship at a Japanese government, corporate or university laboratory in Tokyo or Tsukuba; intensive Japanese language training; and lectures on Japanese science, history and culture.

Program duration and dates: 8 weeks, Jun 25 to Aug 21, 1993.

Eligibility requirements:

- U.S. citizen or permanent resident.
- Enrolled in one of the following: a U.S. institution in a science or engineering Ph.D. program, an M.D. program and have an interest in biomedical research, and an engineering M.S. program of which one year has been completed by Dec 1, 93.

For application materials and more information: request NSF publication number 92-105, 1993 Summer Institute in Japan, from NSF's Publication Office at pubs@nsf.gov (Internet) or pubs@nsf (Bitnet) or call 202-357-7668.

STRI NEW PUBLICATIONS

- Adler, Gregory, Telford III, Samuel R., Wilson, Mark L. and Spielman, Andrew. 1992. "Vegetation Structure Influences the Burden of Immature *Ixodes dammini* on its Main Host, *Peromyscus leucopus*." *Parasitology* 105: 105-110.
- Dudley, Robert. 1992. "Aerodynamics of Flight." In: *Biomechanics (Structures and Systems): a Practical Approach*: 97-121, edited by A.A. Biewener.
- Gradstein, S. Rob and Salazar Allen, Noris. 1992. "Bryo-phyte Diversity Along an Altitudinal Gradient in Darién National Park, Panama." *Tropical Bryology* 5: 61-71.
- Martin, Andrew P., Naylor, G.J.P. and Palumbi, S.R. 1992. "Rates of Mitochondrial-DNA Evolution in Sharks are Slow Compared with Mammals." *Nature* 357: 6374.
- Rodda, Gordon H. 1992. "The Mating Behavior of *Iguana iguana*." *Smithsonian Contributions to Zoology* 534: 1-40.

FROM OTHER SOURCES

A Cool Damp Breeze of Doubt

From The Economist, Sep 12th-18th, 1992

In northern climes, the ice ages lived up to their name with stark simplicity. Glacial sheets rolled down from the pole, draping the higher latitudes in dazzling white. But the glaciers held sway over only a relatively small fraction of the earth's surface. Elsewhere the effects were more subtle, and more varied.

When the earth warms up and cools down the effects tend to be strong at the poles, weak at the equator. Indeed for a long time researchers believed that the tropics passed through the ice ages with their climate all but unchanged, oblivious to the chilly desolation elsewhere. Then came the idea that the tropics were unusually dry in the ice age. Now the story may be changing again. There is some evidence that, in the Amazon basin, the most recent ice age was wet and cool rather than warm and dry.

This revision, if it turns out to be warranted, matters quite a lot. Climates past are the key to climates yet to come. A climate model which can mirror the intricacies of today's climate and, given different parameters, work out what the ice ages were like may have a good enough grasp of the mechanisms underlying the climate to predict the future. You cannot test the model, though, unless you have a detailed record of the ice-age climate.

Another riddle may also be solved by detailed knowledge of the ice ages. That life shows a great diversity in the tropics is beyond argument; the reasons for the display are argued over endlessly. Climate may provide a clue. High biodiversity might be the result of stable tropical climates; on the other hand it might be brought about by a series of climate changes continually pumping novelty into ecosystems that would otherwise have remained relatively dull.

The thriving life that gives rise to the question is ceaselessly erasing the past, thus making it hard to answer. One



Paul Colinvaux, standing, readies equipment to take a drilling core from the bed of an ancient lake. The work is aimed at creating "vegetation maps" of the ancient flora of the Central American isthmus. (Photo: Nicholas Carter)

solution is to look at the only parts of the tropics ^{that} which are not stuffed with life: the oceans. There, floating near the surface, are tiny shelled creatures called foraminifera. Different species of foraminifera flourish at different temperatures; having flourished, they fall to the floor of the ocean, where their tiny shells accumulate in layers of sediment, recording the sea-surface temperature. Studies of these sediments show that the tropical seas were no more than 2° C cooler in the ice ages than they are now.

Other evidence comes from pollen drilled out of lake beds. In the 1970s John Flenley and others used pollen to show that, at high altitudes, the ice-age forests in New Guinea were adapted to a climate considerably cooler than today's. On the face of it, these results -chilly heights, warm seas- may look inconsistent. But studies in Africa by Dan Livingstone also showed that the tropics were drier in the most recent ice age. Dryness can reconcile the other results because it can affect the "lapse rate" -the rate at which temperature drops off with altitude. In a dry atmosphere, the lapse rate could be greater, so cold heights and hot lowlands could co-exist (though the degree to which the lapse rate can be changed is a matter of great debate).

The idea of a dry ice age proved inspiring to those studying the Amazon. The Amazon forest contains some areas in which the biodiversity is particularly high. Perhaps the forest was richer in these regions because the local climate allowed it to survive there even in the dry ice ages. The history of the Amazon would thus have been one of ebb and flow. In the ice ages the savannahs spread and the forests

retreated to their ancient redoubts; in inter-glacial periods the forests broke out again. Such cycles of isolation followed by intermixing might drive up the level of biodiversity.

This idea of a network of "refugia" inside the Amazon rainforest has become widely accepted, but it is not unassailable. Some zoologists question the idea that refugia can explain the distribution of species in the Amazon. And now pollen analysis by Paul Colinvaux, of the Smithsonian Tropical Research Institute, and Mark Bush, of Duke University in North Carolina, suggests that the forests stayed their ground in the ice ages, even though the weather was cooler.

The new data have come from a handful of sites. One in the heart of the Amazon basin, but not in any of the putative refugia, reveals that 11,000 years ago, at the last gasp of the most recent ice age, the area was covered with rich, semi-deciduous forest, not dry grassland. Then there is a site at the foot of the Andes which has yielded ice-age pollen from alders and magnolias, trees today found 1,500 meters higher, where the temperature is 6° C lower.

The presence of alders in the foothills does not necessarily contradict the foraminifera's tales of balmy seas. The Andean site is far from the ocean; its ice-age climate might have been due to some local abnormality, perhaps caused by the mountains themselves, then resplendent with glacial crowns. However a deep core taken in Panama reveals oak forest, again with alders, which suggests much cooler conditions than today's in close proximity to not one ocean but two. The researchers have now taken a core from the picturesquely named Hill of Six Lakes between Venezuela and Brazil. Dr. Bush thinks that this core will also show ice-age conditions cooler than today's, but still wet.

This is hardly an avalanche of data, particularly as the area under consideration is the size of the continental United States. Studies of North American forests have looked at sites and pollen cores by the hundred. But it is hard to gather data in the Amazon, and not many are trying. (As Dr. Colinvaux points out, all biologists like the idea of the Amazon but only a few choose to experience it first hand.) And finding the best places to drill for pollen is a fine art even in less cluttered landscapes. However, more sites will be studied, and not just in South America. Next year Dr. Flenley, now at Massey University in New Zealand, plans to drill in a lake bed in lowland Java. He will not necessarily see what Dr. Colinvaux has seen; one message from this research is that the different regions of the tropics underwent different ice-age changes.

If the Amazon lowlands were indeed cool and wet in the age, then it may be that the foraminifera data are wrong. For 3m years ice ages have been the rule,

interglacials like the current one the exception. Perhaps—a notion of Dr. Livingstone's that Dr. Colinvaux likes—today's foraminifera are struggling to get by in water too warm for them, evolution having adapted them to cooler climes. If that is so, then the temperatures foraminifera live at today may give a misleading impression of their preferences. The thermometer may be badly calibrated.

If things were colder at every altitude including sea-level, there would be less need to monkey with the lapse rate, a practice that many climatologists are dubious about. But the foraminifera may not be lying. It is possible that the pollen records minimum temperatures, and the foraminifera average ones. Dr. Flenley thinks that other factors which influence the composition of forest, and thus of the pollen they leave behind, should also be considered. He is looking at the changes in tree population that come about when species which have adapted to the upper slopes' high levels of ultraviolet light are obliged to migrate downwards, and thus lose their comparative advantage.

As is often the case, there are no answers, only ever more questions—a situation that normally excites researchers. It is sobering to bear in mind, however, that these proliferating, unsolved questions must be answered if climate and the origins of biodiversity are to be understood, and no other area of research offers any more promising way of answering them. Few subjects can be more deserving of future work—if people can be found to do it, and if bulldozer, fire and chainsaw leave them anything to study.*

