

# Science for Nicaragua Newsletter

Volume 2, No. 4

July- August 1988

## Nicaraguan Social Scientists Confront Shortages, Statistics Two Letters from Jennifer Strickler

*Sociologists Jennifer Strickler and Gil McCann, both of Burlington, Vermont, are currently finishing their second semester at the Universidad Centroamericana (UCA). Jennifer, who spent most of May recovering from hepatitis, sent us two reports which graphically convey some of the difficulties experienced by academics trying to adapt U.S. methodology to Nicaraguan conditions.*

April 14, 1988

Dear SftP--

Here's a progress report:

1. **Class.** I'm teaching Statistics II (inductive) to a class of 39 second year social work students. The students have had one semester of basic math and one semester of descriptive statistics, but they still haven't dominated negative numbers or decimals. We have one textbook (donated by SftN; I bought it in Costa Rica), *Fundamentos de Estadística en la Investigación Social*. Since Gil has SftP toner and paper for the sociology department's Xerox machine, I have been able to xerox some pages of the text. Otherwise they would have to do without any reading material, since the school of social work has neither a photocopier nor a budget for photocopying. Students seem very interested and animated, but the pace of the class is very slow.

2. **Monographs.** The first set of monographs is being finished this month. The students have to do an oral presentation and defense to a jury of three faculty members of their choosing. My judgment is that the quality of the research, with a few exceptions, was low; however, they will probably all be accepted...

3. **Prácticas de Producción.** This semester I am supervising first year students who spend one day per week working in a factory or cooperative. So far it has not been very successful. Of the six faculty members originally assigned to this group of 68 students, one has left the UCA to go to the UNAN, two have been removed from the *Prácticas* for health reasons, and one, a new cooperant from Holland, arrived speaking insufficient Spanish. So we are left with two supervisors for 68 students who will be placed in 6 or 7 different locations, which means that they will only receive supervision once every 3 weeks. To make things worse, the Nicaraguan government is currently conducting a program of consolidation ("*compactación*"). All the factories we have placed students in in the past have been state-run, the very factories which are being consolidated; thus they are unable to take student interns. Because of this, we are now in the fourth week of classes and we have only placed 20 of 68 students. [*But things picked up a few weeks later, as we read in the June 2 letter below, Ed.*]

4. **Superación (teaching teachers).** Gil and I started this work team-teaching a course on Methodology of Scientific Research to 29 teachers from a variety of departments at the UNAN. It's still too early to judge how the course is going. The course runs from 4/12 to 6/30, with a total of 48 hours.

### 5. General comments about my department.

A. Severe crisis of staff. Of the 10 professors who were here when I began in September, 4 are gone and have not been

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## Use of Antibiotics in Cases of Diarrhea

by Lic. Teresa Rivera Bucardo (1987 Kovalevskaia Prize),  
Research Collective on Infectious Diseases

*The Kovalevskaia Prizes were established by the Seattle-based Kovalevskaia Fund, in recognition of distinguished achievements by women scientists in developing countries. Prizes are currently being awarded annually to women in Vietnam and, since 1987, in Nicaragua. The report on biologist Rivera's prize-winning work, excerpted here, appeared in the January-March 1988 issue of NEXO, (see p. 2). More information on the Kovalevskaia Fund can be found in Vol. 2, No. 1 of the SftN Newsletter, and on p. 4.*

In developing countries, acute diarrheal diseases (ADD) represent an important cause of morbidity and death. Infectious agents are of different types: bacteria, viruses, and protozoans. The physiopathology of infectious ADD depends on the mechanism used by the agent, either enterotoxin production or the invasion of the intestinal mucosa.

A study of the etiology of ADD, initiated in 1984 at the Perla María Norori Health Center by a team of microbiologists and pediatricians, measured the incidence of various organisms among children with ADD who came to the Center in 1984 and 1985 and who had not received antibiotics. According to WHO criteria, and in view of our results, only 10% of the children in the study should have been treated with antibiotics, which are only indicated in cases of diarrhea produced by invasive organisms. It was also observed that, during the same period, a great number of children who arrived at the Center with the same symptoms, but who had been treated previously with antibiotics. It is undeniable that, in our country, antibiotics are abused in the treatment of acute diarrhea, for reasons including the haste of doctors to prescribe antibiotics, insistence on the part of the patient, and the uncontrolled sale of these drugs. This has brought about the development of strains resistant to these drugs. One study in 1986 found that, of 10 shigellas isolated, 9 were resistant to ampicillin, 7 to trimethoprim sulfamethoxazole (TMP/SMX), and 1 to gentamycin; similar results were found with salmonella and invasive strains of *E. coli*.

**Definition of the problem:** Our study noted that the majority of cases arrived having already been treated with antibiotics. This situation represents a problem of great importance, in view of its likely pathological and economic consequences, including: lengthening the course of the diarrhea; increase in bacterial resistance; increase of the risk of iatrogenic diarrhea; the risk of colitis pseudomembranosa (CPM); alteration of intestinal flora; and economic harm to the country.

**Objectives:** (1) Determine the frequency by type of antibiotics used in treatment of diarrhea, and the appropriateness of their use; (2) Determine the frequency of use of antimicrobials in combination; (3) Determine the origin of the prescriptions of antibiotics; (4) Evaluate the appropriateness of the use of antibiotics on the basis of microscopic characteristics of feces; (5) Understand why the mother doesn't go to the Oral Rehydration Unit (ORU) before beginning treatment.

### RESULTS AND DISCUSSION

The antimicrobials most frequently used were TMP/SMX (41.5% of cases), ampicillin (29%), metronidazol (18.4%), and gentamycin (5.5%). In therapeutic tests, TMP/SMX has been found

*continued, p. 2*

## ANTIBIOTICS, continued from p. 1

effective in diarrhea caused by shigella and enteropathogenic E. coli. However, information is not available on tests which might confirm the effectiveness of TMP/SMX on strains of enteric pathogens present in our country. On the other hand, tests conducted in 1986 showed that 7 of 10 samples of shigella isolated in HEODRA were resistant to TMP/SMX. In any case, given that among the children we studied only 15.5% had diarrhea of the invasive type, it is clear that TMP/SMX is used inappropriately.

Similarly, ampicillin is usually indicated for treatment of diarrhea with mucus and blood, produced by shigella, salmonella, and enteroinvasive E. coli. However, the HEODRA study found most samples of these organisms to be resistant to ampicillin.

As for gentamycin, although it is extremely effective against gram-negative organisms, because of its characteristics of toxicity it does not appear to be recommended in the literature for treatment of acute infectious diarrhea.

The widespread use of metronidazol found in our study probably corresponds to the frequency of infantile giardia infections. However, metronidazol has been defined as a potentially dangerous drug, capable of producing neutropenia and CPM; moreover, it has been found to have carcinogenic effects in animals and mutagenic effects in bacteria. Therefore, it should only be used when the etiology of giardia has been confirmed by a parasitological examination.

Of the 200 children with ADD treated with antibiotics, 17% were treated with two or three different drugs. In general, the combination of two antibiotics is only justified in special cases treated in hospitals, such as endocarditis (principally those due to streptococcus), severe infections in immunosuppressed patients, and infections by combinations of anaerobic and gram-negative aerobic bacteria. The combined use of ampicillin and metronidazol, the most common combination, apparently based on the idea that in our setting most cases of infantile diarrhea are caused by entero-invasive bacteria or by giardia, reflects nothing more than an empirical use of antibiotics.

In comparing the number of times antimicrobials were prescribed with the source of the prescription, we found that self-medication accounted for 51.3% of the cases. This is a consequence of the free availability of antibiotics, as well as cultural pressure for the consumption of antibiotics. Physicians with the national health service accounted for 25.7% of prescriptions, a very high figure, as is that corresponding to private physicians (18.2%).

Among the reasons for which the mother does not take the child to the ORU, the most common were lack of confidence and lack of orientation. In most cases, lack of confidence is probably due to the anxiety and parents' lack of knowledge of the child's state. Cultural attitudes are another important factor. In this connection, Elabari points out that people, especially in developing countries, believe that no treatment will be effective if it doesn't include the administration of medicine, and "the more, the better."

Parents are used to buying drugs without consulting a physician. For these reasons, in spite of the fact that oral rehydration therapy is at present the keystone of the national programs for control of ADD, this resource is not used to maximum advantage. One of the main reasons has been accessibility, which has been limited for various reasons, including distance, difficulties with transportation, and economic limitations. This suggests the need to extend ORUs to the rural setting. Also, the time the mother needed to spend in the OKU during administration of oral rehydration therapy was a frequent reason for its rejection.

## RECOMMENDATIONS

1. Restrict the free sale of antibiotics.
2. Implement and supervise the fulfillment of the norms for use of antimicrobials in treatment of acute childhood diarrhea.

3. Broaden the educational campaign for the use of oral rehydration as a basic means of treatment of diarrhea.

4. Establish ORUs in rural areas.

5. Create controlled mobile oral rehydration for home visits.

## NEXO: The First Two Issues

As we anticipated in our article introducing NEXO, Nicaragua's first scientific journal, to our readers (Vol I, No. 6), NEXO has developed quickly into an irreplaceable source of information on current scientific activities in Nicaragua, and a fascinating window into the vital debate over Nicaragua's priorities for scientific and technical development. We wish we had the resources to translate and publish the journal as a whole, offering the same service to scientists that the *Annual Review of Nicaraguan Sociology* provides to social scientists. At some point SfN hopes to publish a book on science and development in Nicaragua, which will include extensive selections from NEXO. In the meantime, here is a partial table of contents of the October-December and January-March issues, the first two "official" issues of the journal:

### October-December 1987 (Year I, No. 1):

"Around the sea in eighty days," by Rómulo Ballesterro: a critical account of Brooklyn's hapless garbage barge.

"Photochemical study of *Dorstenia Drakena*," by Dylia Saavedra: an analysis of the chemical composition of a medicinal plant used in Central America and Mexico as a remedy for diarrhea.

"Computer science in Nicaragua": a discussion of present uses of computers in Nicaragua, and of its possible role in the country's development.

"High temperature superconductivity," by Donato Capozzi: a survey for Nicaraguan readers of recent developments in the field.

"The politics of scientific and technological development in Nicaragua, Part I": NEXO offers a forum for the national debate.

"Physics in Nicaragua: The national solid state physics laboratory": The proposed laboratory (cf. *SfN Newsletter*, Vol. II, No.2) and how it might contribute to the development of education in the basic sciences.

"Agriculture and the environment in Nicaragua," by John Vandermeer (member of New World Agriculture Group, and of the editorial advisory board of *Science for the People Magazine*): a transcript of his presentation at the first Central American Conference on Environmental Action, May 1987.

### January-March 1988 (Year II, No. 2):

"A seminar on computing in Nicaragua": report on a seminar organized by the *Colegio de Ingenieros de Nicaragua* in 1987.

"Solar energy in the drying of grains," by Paolo Santagostino: an analysis of current solar energy projects organized in collaboration between DINOT (the Department of Research and Technological Orientation of the UNI) on the one hand, and ENABAS (the National Basic Grain Agency) and an agricultural cooperative, on the other.

"Geological research in Nicaragua," by Rómulo Ballesterro: a description of an ongoing research project, in collaboration with Sweden and other countries, investigating the geological history of Nicaragua.

"The politics of scientific and technological development in Nicaragua, Part II": the debate continues.

"An interview with Milton Almeida dos Santos": discussions with the visiting U.N. expert on urban planning.

The next issue should contain an article by former SfN instructor William Gills on technology transfer, as well as articles on technological innovation in Nicaragua and "scientific" architecture. You can get NEXO in the United States! All you have to do is send an international money order for \$25, payable to NEXO-REVISTA CIENTIFICA, to Nexo-Apartado Postal SV-30, Managua, Nicaragua. It may take a while getting to you, but it will arrive.

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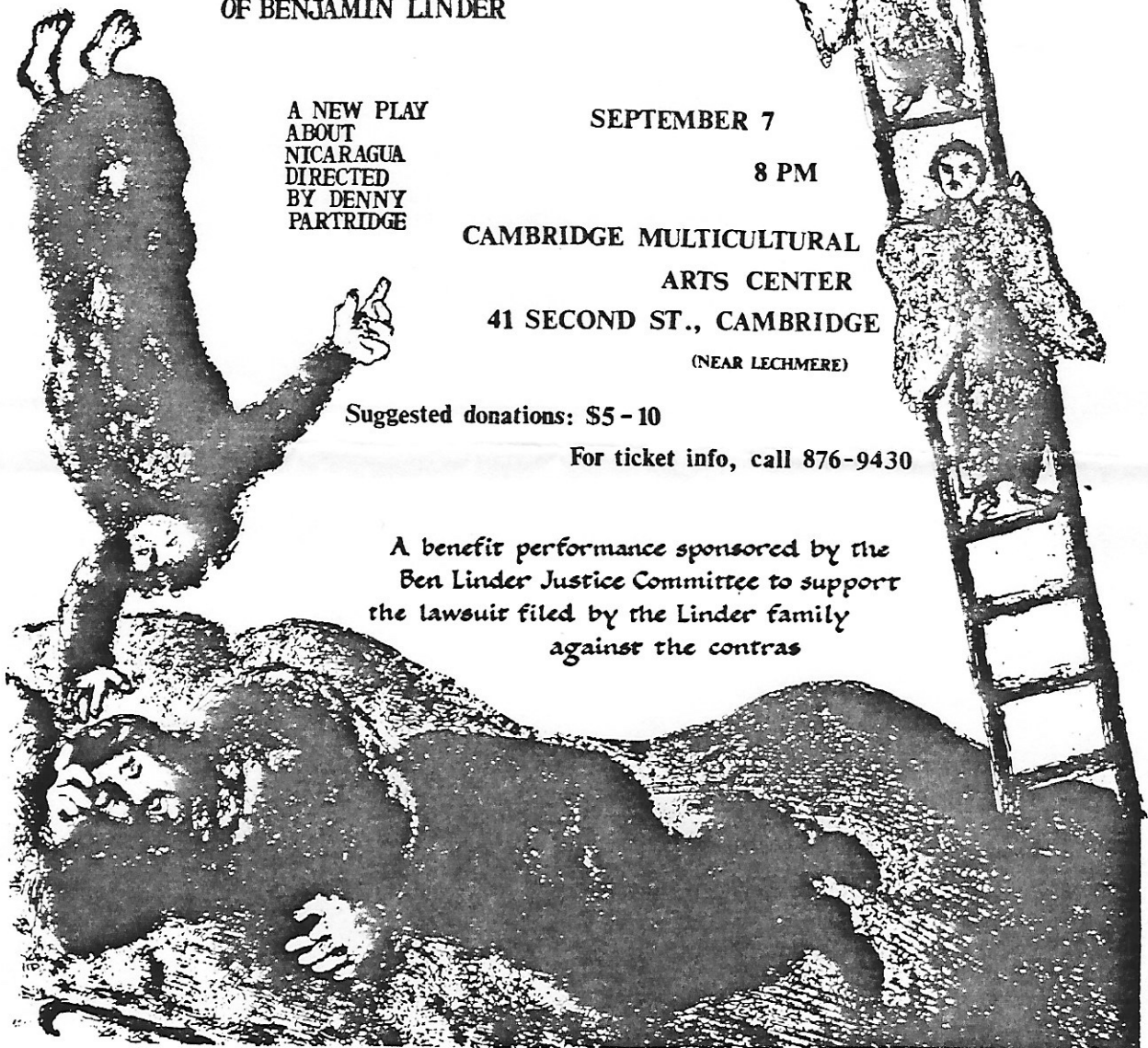
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**STRICKLER**, *continued from p. 1.*

replaced, except by the Dutch man I mentioned above. Thus, everyone is incredibly overworked.

B. Lack of resources, especially textbooks and a photocopier. This affects quality of classes, research, administration, etc.

C. To give you an idea of how bad things are, we have been approved for a \$100,000 grant from the Canadian government, but the department has been unable to do the bare minimum of prioritizing its needs to get the project started. Because of that, we are in danger of losing the grant. This is an example of the point that Bob Sutcliffe made in his interview (Vol II, No. 2): this country barely survives day to day, let alone planning for even one year ahead.

6. **My contribution as a cooperant.** I haven't been as well-utilized as I would have liked. Ideally, I would have spent this year training a faculty member to teach statistics and giving a full length 128-hour class on social research to at least half of my faculty. As is now obvious, objective material conditions (lack of time and background on the part of the faculty) made this goal impossible.

I definitely have "filled a gap" in the words of Bob Sutcliffe. I don't think the monographs would have been finished by now if I weren't advising the students, and the quality would be even lower than it is. The *prácticas de producción* this year for first year students would certainly have gone down the tubes if I weren't here. My statistics class would otherwise be taught by a mathematician who knows nothing about social research, so the students wouldn't be learning the applications of statistics. The books I brought down make a slight difference to the Center of Documentation.

But in terms of long term difference, I don't think any one cooperant or any one program of cooperation is capable of making a long-term difference. But we are part of a system of international solidarity which **does** make a big difference. Leaving aside material aid, every academic department that I know has a faculty that is at least one half foreign.

I would say that we are contributing to the survival of the country, but in these times it's impossible to talk about development.

June 2, 1988

The methodology class that I was teaching at UNAN with Gil has been assumed by him since I got sick and I probably will not return, since it is a long, hard bike ride. Gil also took over my statistics class at the UCA for two weeks while I was in bed, so

no material was lost. The class is going well—no one flunked the first exam (which probably means that it was too easy), and the students seem satisfied. I alternate between trying, on one hand, to teach them logic and concepts as well as formulas, and on the other hand getting frustrated by their difficulty with abstract thought. It's an interesting contradiction that students here are quite capably of dealing with concepts in political economy, imperialism, third world dependency, etc., but they are baffled by quantitative research and just want formulas to stick numbers into. Considering how difficult the class is for them, I really appreciate the effort my students put into it. So far, I have covered probability (very basic), sampling, Student's T, and chi-square, and I have yet to teach correlation, regression, and research design.

After my very pessimistic report two months ago on the *Prácticas de Producción*, I'm glad to report that all of our first year students began their practicums in factories as scheduled on April 27. They work for the most part in textile factories on the production line. As supervisor, my role is to meet with each group (5-10 students) weekly, encouraging them to reflect on the social and structural roots of the problems and successes of the factories, which are all state-owned. I think the program is excellent. The students are mostly middle-class, and this contact with manual labor and laborers is an important experience. In spite of the revolution, much of the middle class here resembles and identifies more with the middle class of the U.S. than with the poor of Nicaragua, and for that reason the practicums expose students to an aspect of the country that is completely new and foreign to them.

I mentioned in an earlier report that I was giving a three-week course on social statistics—covering basic statistics for the social sciences—during the winter vacation. The course was taught to the entire faculty of the UCA School of Social Work, who have B.A.'s in social work, sociology, or anthropology, but little or no experience with quantitative methods. It was important because our first group of students are now writing monographs and need technical advice about data analysis. While the professors are still not capable of conducting or advising quantitative research, I think they now recognize the need for technical advice for their own research as well as student monographs. Although I felt frustrated that I didn't have time to teach more, it was rewarding to see these professors overcome their fear and suspicion of numbers (rooted, I believe, in a Marxist rejection of positivism) and I almost saw lightbulbs light up in a few people. It's a small step, but that's about all one can expect right now.

In solidarity,  
Jennifer

**••EMERGENCY APPEAL••**

SfN is now supporting the work of 10 instructors and engineers in Nicaragua. This support is only possible thanks to your contributions. Like other organizations working in Nicaragua, the recent currency reform has hit us hard. We don't want to be forced to cut back any of our essential work. Your generosity at this time is crucial.

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## Student Internships in Central America

The Institute for Central American Development Studies (ICADS) offers undergraduates and graduate students opportunities for study and research in Nicaragua and Costa Rica. Students spend one or two semesters in the host country, of which half the time is spent in the classroom and half in field internships in conjunction with scholars and professionals working in the country. ICADS concentrates on women's issues, economic development and multinational corporations, agricultural sciences, and the environment. The curriculum is already accredited at several universities in the U.S., and should be recognized by other universities as exchange credit.

Several SfN instructors are expected to offer internships during the coming year. Interns working with university professors will assist in curriculum and laboratory development and research projects. Other internships proposed include agricultural research, helping to set up a women's center and family planning clinic, a survey on the status of peasant women, the solar oven project mentioned in the last issue of the newsletter, and work in the areas of health, journalism, banking, special education, and environmental education.

Cost of participation in the program is equivalent to one semester's tuition at the student's home college, plus about \$950 for room, board, and expenses, as well as round-trip transportation to San José. Applications for the spring semester are due November 15, 1988. For application materials and further information write ICADS, P.O. Box 145450, Coral Gables, FL 33114, or ICADS, Apartado 3 Sabanilla, 2070 San José, Costa Rica.

## Hydrology Positions Available

As Tom Jackson reported last month, INAA (the Nicaraguan water and sewer authority) needs specialists in the following areas:

- Geohydrologists** to work on Managua's water supply, and the extent to which it is endangered by potential hydraulic connection with highly polluted Lake Managua.
- Computer modeling** of the water supply system. Long-term experience with municipal water supply highly recommended.
- Staff engineers:** Knowledge of Spanish required.
- Pump mechanics** for inventory and maintenance of the 400 pumps in the Nicaraguan water supply system.

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Cooperation in Scientific Education  
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## Announcements

**Second C.A. Conference on Women in Science.** A sequel to the First Central American Conference on Women in Science, Technology, and Medicine, which took place under the auspices of the Kovalevskiaia Fund in August 1987 (*SfN Newsletter*, Vol. 1, No. 6 and Vol. 2, No. 1), will be held in San José, Costa Rica, from December 5-7, 1988. The Kovalevskiaia Fund will provide transportation costs for five Nicaraguan women and one Salvadoran. The international meeting will have a Central American focus, and the official language of all activities will be Spanish, but there is space on the program for five talks by participants and observers from outside Central America. For further information, please contact Dr. Ann Hibner Koblitz, Director, Kovalevskiaia Fund, 6547 17th Ave. N.E., Seattle, WA 98115.

**Linder Family to Seek Damages.** On April 20, just before the first anniversary of the death of U.S. engineer Benjamin Linder at the hands of the contras, his family filed a \$50 million lawsuit in Miami against the leaders of the contra organization which killed Ben. For more information on the lawsuit, contact the Ben Linder Justice Committee, Center for Constitutional Rights, 666 Broadway, 7th Floor, New York, NY 10012, (212)-614-6465.

**VI Annual North America-Nicaragua Colloquium on Health.** In Managua, November 3-12, 1988. To date, over 800 North American and 3500 Nicaraguan health personnel have attended this annual event. For information, contact CHRICA, 347 Dolores #210, San Francisco, CA 94110, (415)-431-7760.

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