

Kansas Association of Biology Teachers

K. A. B. T. Newsletter

September 1992 Volume 33, No. 3

John Wachholz, Editor

Calendar - Looking Ahead

1992 Event

September 19	Konza Prairie Visitors Day: Open House to the Public-Numerous activities scheduled.
October 2-4 Newsletter.	Great Plains Limnology Conference - Lake of the Ozarks - Check
October 2-4	Kansas Ornithological Society Meeting. Contact Dr. Elmer Finck at ESU for details. (316) 341-5623.
October 3	KABT Fall Meeting - KSU - Details in newsletter.
October 4	Fall Visitors' Day - The Land Institute - Salina, Kansas - 1-5:30 p.m.
October 9-10	Kansas Mammalogist Society - Emporia State University - Registration - \$5. Contact Dwight Moore in the ESU Biology Department: (316) 341-5611.
October 15-17	NSTA Regional Convention - Fort Worth, Texas
November 7-8	Kansas Herpetological Society - Bethel College - Newton
November 11-15	NABT National Convention - Denver
December 5	Workshop - "Caring for Creatures in the Classroom" - Museum of Natural History

1993 Event

April 1-4	NSTA National Convention - Kansas City
May 29-30	KABT Spring Field Trip - Cimarron National Grasslands

Please mail or phone meeting dates and other items of interest to biology teachers to John Wachholz, 2311 Applewood Lane, Salina, Kansas 67401, (913) 825-7742.

Your membership **expiration date** can be found on your mailing label. All dues are now payable on **September 1st** of each year.

KABT Notes - From President to KABT Members

Fall Meeting:	Genetics and Evolution Conference
Where:	Kansas State University
When:	Saturday, October 3, 1992
Cost - Members:	\$5
Cost: - Non-Members:	\$15 (\$10 KABT Membership + \$5)

In an effort to provide useful and up-to-date information, KABT is sponsoring a fall conference on Genetics and Evolution. Saturday morning will start off with some favorite labs and simulations used

by fellow KABT high school teachers. Also in the morning we will have Dr. Larry Scharman speaking on Evolution and Creationism and Debra Collins, a genetic's counselor, speaking on human genetics. Later in the afternoon Dr. Tom Manney will present some new hands-on labs using radiation sensitive yeast to monitor solar radiation. The last presentation will be by Dr. Rollin Sears. He will explain and demonstrate the new technique of chromosome painting.

I sincerely believe that if you attend this conference, you will walk away with both valuable information and some exciting labs that you can use in your classroom. We have kept the costs low so as not to prohibit anyone from attending. Mark October 3 on your calendar. Bring your colleagues, and come to Kansas State University's Akert Hall for the KABT fall Genetics and Evolution Conference. Because of the hands-on labs and written materials to be used by the participants, we are asking (if at all possible) to preregister. All that needs to be done is call: John Wachholz - (913)-825-7742 or Pat Lamb - (913)-776-1438

Cimarron National Grasslands Field Trip: Bob Rose is in charge and Stan Roth will lead this spring field trip. Bob is putting together a field trip booklet for participants. He will mail them to the first 15 or so that pre-register. Each booklet will have natural history checklists, maps, historical notes, and other tidbits pertinent to a field trip. Watch for pre-registration details in future newsletters.

PUBLISHING DATES FOR THE KABT NEWSLETTER are the first week of September, November, February and April. Manuscripts must reach the editor by the 15th day of the previous month. The KABT Newsletter includes abbreviated minutes of the official meetings, announcements of future activities, brief news notes, and other brief items of interest to biology teachers. Send your contributions to John Wachholz, Editor, 2311 Applewood Lane, Salina, KS 67401 (913) 825-7742.

Newsletter & Journal Information Needed: Articles are needed for the newsletter. Please forward them to John Wachholz, 2311 Applewood Lane, Salina, Kansas 67401, (913) 825-7742. Please help with the newsletter. The most helpful occurrence would be for all individuals sending information to the newsletter to send it via PSINet-KEMNET or on a disk. If you send it on a disk, any format is acceptable. ASCII text is easy for me to work with. Your help is appreciated. (MSDos, Mac, Apple - just send it!) Articles for the **Kansas Biology Teacher** should be sent to John Richard Schrock, editor KBT, Division of Biology, Box 50, Emporia State University, Emporia, KS 66801-5087.

Outstanding Biology Student Certificates Are Available

Send your name and address to KABT Student Certificates, 2311 Applewood Lane, Salina, KS 67401

The Kansas Biology Teacher Is Off The Ground

The third issue of KABT's journal, The Kansas Biology Teacher is being prepared. We hope you find its contents helpful and stimulating, just as the first two issues. While you examine its contents, think about what you can do to make the next issue even better. I'd suggest you plan to write your own contribution to the journal. Its purpose is to share ideas regarding the teaching of biology. We know you have many ideas the rest of us would like to know about.

Send your article(s) to John Richard Schrock, editor KBT, Division of Biology, Box 50, Emporia State University, Emporia, KS 66801-5087.

Minutes From Spring 1992 KABT Meeting

The KABT annual spring meeting was convened at the Timber Creek campground of Milford Reservoir at 10:00 a.m., June 6th, 1992. Executive Council members* and other organization members were present.

President Pat Lamb opened the meeting by passing out an agenda and called first for a treasurer's report.

Treasurer's report. While reviewing the financial status of the organization John Wachholz passed around a copy of the ledger for Executive Council members to peruse. It was revealed that the publication and mailing of the second volume of the Kansas Biology Teacher cost a total \$837. The KABT currently has a positive balance.

KACEE REPORT. Pat Wakeman reported that since there had not been a KACEE meeting, he had no report.

Editor's Report. Paul Jantzen delivered a brief report and thanked John Wachholz for his tremendous support.

Administrative Secretary Report. Bob Rose reported that we are, indeed, eligible to receive a \$1.00 rebate from the NABT for enrolling members in the national affiliate. However, we must file a list of joint members with the national office at the first of every year. Bob also reported that the NABT awards committee (of which he is a member) is going to initiate an award for recruiting new NABT members.

Awards President Pat Lamb acknowledged Paul Jantzen for his outstanding service to the KABT as editor from 1977-1992. Paul was presented a plaque of appreciation with instructions to display it where it could be seen. John Wachholz expressed his admiration for Paul's work and reported that KABT has made a \$50.00 gift to The Land Institute in Paul's name.

Appointments. With great humility, John Wachholz graciously accepted the appointment to the office of newsletter editor. John Richard Schrock accepted the appointment to direct the publication of the Kansas Biology Teacher, until that position is more clearly defined in the organization bylaws.

Old Business

1. Bob Rose suggested that, since a quorum of the membership was present, a vote on the two published constitutional amendments be called for. Pat Wakeman moved to accept the amendments. Terry Calendar seconded. There was no new discussion. The motion was passed. Bob Rose will insert the amendments into the constitution.
2. Discussion of the KBT journal publication was postponed until later in the meeting.
3. Discussion of creating a new membership form resulted in John Wachholz volunteering to create a new one. Bob Rose agreed to mail John copies of past forms.

New Business

1. **Corporate Sponsorship.** Pat Lamb initiated a discussion of seeking financial sponsorship for the organization. Suggestions included Ward's, CABISCO, Sargent Welch, Nebraska Scientific, and the Kansas Beef Council. Some objections to sponsorship were raised. No decision to pursue any particular one source of sponsorship was reached. The selling of advertising in the KBT journal was not opposed. Pat Lamb will pursue that issue. KBT editor, John Richard Schrock, will pursue financial support sources for that publication.

2. Fall Genetics Conference. The date has been set for 3 OCT 92. Deb Collins is working to coordinate the conference with Pat Lamb. Discussion of a site resulted in Salina and Lawrence and the two possible locations.
3. 1993 Spring KABT Field Trip. Bob Rose reported that he and Stan Roth were still planning the trip to the Cimarron National Grasslands. The date was set for the first weekend in May, 1993.
4. 1992 NABT National Convention. The meeting will be in Denver, 11-14 NOV 92. Bob Rose is still planning on organizing a car pool of vehicles. Bob Rose, Stan Roth, and John Richard Schrock will likely drive vehicles and a schedule for picking up passengers will be in the September newsletter, along with options for hotel accommodations.

Notes From Around the STATE

Don Frenzen will teach biology, chemistry, environmental studies, and human anatomy/physiology at Hillsboro high School. He taught at St. Vrain Valley School in Longmont, Colorado since 1977.

Frank Nelson has retired as biology teacher and chairperson of the Emporia High School science department. **Connie Ferree** is the new EHS biology teacher.

Frank True returned from a brief trip to Africa this summer. Look for his description of Rift Valley, Lake Victoria, malaria, etc. in the KBT.

Rob Miller is a new biology teacher at Leavenworth High School; he will be teaching biology and basic biology.

Misty Brannan teaches both life science and physical education at Tescott this fall. Trego Community High School biology teacher (and KABT regional representative) **Ernie Brown** received one of the Master Teacher Awards.

Elizabeth James began teaching biology, botany and zoology at Rose Hill High School this fall.

Paul Jantzen, who has served KABT as editor of both newsletter and the new journal, retired from biology teaching at Hillsboro High School this year; thankfully, Paul will continue to serve as associate editor. Paul is currently filling in for an instructor from Barton County Community College who had a stroke. He is teaching biology two nights a week at Marion.

Alex Specht is the new biology teacher at Hoisington High School. He is teaching four regular and two advanced biology classes.

Bob Spencer, who previously taught 10 years at Rose Hill High School, recently returned from a season of supervising inner city kids on a VisionQuest schooner; he is teaching general science, physical science, biology, chemistry and physics at Axtell, Kansas.

Stephen Smith taught the upward bound course at Emporia State University this past summer.

Frank True, spent two weeks in Africa this summer.

The new biology teacher at Topeka West High School is **Lisa Volland**, who previously taught in Hays, Kansas.

Tonganoxie High School teacher **Pat Wakeman** attended the BSCS Blue Version Summer Teacher Education Institute at Colorado College, July 5-11.

Tyson Yager will be teaching biology and physical science at Wichita East High School.

(From The Minnesota Exchange)

RANDOMNESS AND SELECTION

Here's a surprising and convincing activity to demonstrate the effect of selection on random events. The evolution of complex species by means of strictly random variation may seem as improbable as tossing 100 pennies and having them all land heads up. If we tossed a hundred pennies repeatedly, performing a trial every second, it would probably take 2^{100} seconds = 3×10^{22} years (longer than the estimated age of the universe) before we would reasonably expect all 100 coins to come up heads.

Variation in nature, as in tossing coins, is indeed random, but selection is not random at all. By allowing selection to work on the random events, it is possible to get each of the pennies to come up heads in as few as nine trials, instead of the 2^{100} trials suggested by strictly random chance.

Try this class activity:

1. Count out 100 pennies.
2. Shake them thoroughly in a box and dump the coins onto the floor.
3. Select all the pennies that came up heads and set them aside.
4. Collect the remaining pennies and repeat from step number 2.
5. Count the number of tosses necessary for all the pennies to become heads. Your results will be much less than 2^{100} . Brian Peterman and Gordon Olson - Minnehaha Academy

RUBBER BALL ENERGY STORAGE SYSTEM

(Illustrates principles of internal potential energy and elasticity)

Apparatus: Rubber ball (like an old tennis ball) sharp knife, scissors.

Procedure: If a rubber ball is cut in half and then trimmed down, it can be made to eventually reach the point where it will store energy for a few moments. If you use your forefingers and thumbs to turn the ball section "inside-out", then place it on a hard surface, after a few seconds it will flip up in the air as it turns itself "right-side-out". Try the experiment with different types of rubber balls. Physics Teachers Resource Agents - Submitted by Camille Wainwright - Mounds Park Academy

RED LIGHT, GREEN LIGHT

Each student has three cards on his/her desk. One red, one green, and one yellow. As I review a unit or conduct a general discussion, all students MUST indicate a response by selecting and displaying a card in his/her hand. A green card means, "I know that answer. It is mine; ask me anything." A yellow card indicates, "I am not sure but I am willing to take a risk. Try me." A red card means, "Do not call on me." If you begin to notice that some students are always showing red cards, you may need to schedule a conference with them. This is a good quick way to check the level of understanding with the entire class.

David Arlander - Rochester John Adams

Kansas Association of Biology Teachers, 1992-93 Officers

President: **Pat Lamb**, Manhattan High Schools, 2100 Poyntz, Manhattan, KS 66502. School: (913) 587-2100; Home: (913) 776-1438.

Vice President: **Terry Callendar**, Wamego High School, North Lincoln, Wamego, KS 66547. School: (913) 456-2214; Home: (913) 456-7924.

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Kansas Association of Biology Teachers Regional Directors, 1992

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This article is in the newsletter as a tribute to Paul Jantzen for his years of service and dedication to teaching, KABT newsletter editor, published articles, etc. To the best of my knowledge Paul would never allow his name to be entered for a reward of any type. Somehow this article made me think of Paul and all his work and dedication. I have used it in my classroom for over seven years now. Thanks Paul for all of your contributions to education. Your appreciation for life and nature will continue in the lives of your fellow teachers, friends, and former students that you have impacted throughout your career.

"A handful of mud "

by Paul Brand

Soil is life. Can we preserve it for future generations?

Christianity Today - April 19, 1985

I grew up in the mountains of South India. My parents were missionaries to the tribal people of the hills, and our lives were about as simple as they could be---and as happy.

There were no roads. (We never saw a wheeled vehicle except on our annual visit to the plains.) There were no stores, no electricity, no plumbing. My sister and I ran barefoot, and we made our own games from the trees, sticks, and stones around us. Our playmates were the Indian boys and girls, and our lives were much the same as theirs.

Rice was an important food for all of us. And since there was no level ground for wet cultivation, it was grown all along the streams that ran down the land's gentle slopes. These slopes had been patiently terraced hundreds of years before; and now every one was perfectly level, and bordered at its lower margin by an earthen dam covered by grass. Each narrow dam served as a footpath across the line of terraces, with a level field of mud and water six inches below its upped edge and another level terrace two feet below. There were no steep or high drop-offs, so there was little danger of collapse.

Those rice patties were a rich soup of life. When there was plenty of water there would be a lot of frogs and little fish. Egrets would stalk through the paddy fields on their long legs and enjoy the feast. Kingfishers would swoop down with a flash of color and carry off a fish from under the beak of a heron. And it was here I learned my first lesson on conservation.

I was playing in the mud of a rice field with a half-dozen other little boys. We were racing to see who would be the first to catch three frogs. It was a wonderful way to get dirty from head to foot in the shortest possible time. Suddenly, we were all scrambling to get out of the paddy. One of the boys had spotted an old man walking across the path toward us. We all knew him as "Tata," or "Grandpa." He was the keeper of the dams. He walked slowly, and was stooped over a bit as though he were always looking at the ground. Old age is very much respected in India, and we boys shuffled our feet and waited in silence for what we knew would be a rebuke.

He came over to us and asked us what we were doing. "Catching frogs," we answered. He stared down at the churned-up mud and flattened young rice plants in the corner where we had been playing. I was expecting him to talk about the rice seedlings we had just spoiled. Instead, the elder stooped down and scooped up a handful of mud. "What is this?" he asked. The biggest boy took the responsibility of answering for us all.

"It's mud, Tata," he replied.

"Whose mud is it?" the old man asked.

"It's your mud, Tata, this is your field."

Then the old man turned and looked at the nearest of the little channels across the dam. "What do you see there, in that channel?"

"That is water, running over into the lower field."

For the first time Tata looked angry. "Come with me and I will show you water." A few steps along the dam he pointed to the next channel, where clear water was running, "That is what water looks like," he said. Then we came back to our nearest channel, and he said again "Is that water?"

We hung our heads. "No, Tata, that is mud." The older boy had heard all this before and did not want to prolong the question-and-answer session, so he hurried on. "And the mud from your field is being carried away to the field below, and it will never come back, because mud always runs downhill, never up again. We are sorry, Tata, and we will never do this again."

Tata was not ready to stop his lesson as quickly as that, however. He went on to tell us that just one handful of mud would grow enough rice for one meal for one person, and it would do it twice every year for years and years into the future. "That mud flowing over the dam has given my family food since before I was born, and before my grandfather was born. It would have given my grandchildren and their grandchildren food forever. Now it will never feed us again. Then you see mud in the channels of water, you know that life is flowing away from the mountains."

The old man walked slowly back across the path, pausing a moment to adjust with his foot the grass clod in our muddy channel so that no more water flowed through it. We were silent and uncomfortable as we went off to find some other place to play. I had experienced a dose of traditional Indian folk education that would remain with me as long as I lived. Soil is life, and every generation is responsible for all generations to come.

The Hand Of Man

I have been back to my childhood home several times. There have been changes. A road now links the hill people with the plains folk, but traditional ways still go on. The terraced paddy fields still hold back the mud. Rice still grows. And the old man the boys call "Tata" is now one of the boys I used to play with 65 years ago. I am sure he lays down the law when he catches someone churning up the mud, and I hope the system holds for years to come. I have seen what happens when it doesn't.

The Nilgiri hills, or Blue Mountains, were a favorite resort in the hot season for missionaries from the plains. They were steep and thickly forested, with few areas level enough for cultivation, even with terraces. The forestry service allowed no clearing of the trees except where tea, coffee, or fruit trees were to be planted. These bushes and trees, in turn, held the soil---and all was well.

Thirty years after my encounter with "Tata" I was back in India, a doctor and a missionary myself, with a wife and growing family. We began going to the Nilgiris for every summer holiday, and our children reveled in the cool air and lush forests. But something was different, or soon became so.

A new breed of land owners had begun to take possession of the land. These new "farmers"---former political prisoners who, following India's independence, were given tracts of land---had not farmed before. They had never been exposed to a Tata teaching them the value of mud. They wanted to make money, and make it fast. They knew the climate was ideal for potatoes, and that there was a market for such a crop. Forests were thus cleared on sloping land, and potatoes planted. Two and even three crops could be harvested per year, and money flowed freely into their purse.

But harvesting potatoes involves turning over the soil, and monsoon rains often came before a new crop could hold that soil. Not surprisingly then, as my family and I returned to those mountains of boyhood memory, the water now looked like chocolate syrup. It oozed rather than flowed. We were seeing rivers of mud. I felt sick.

I went over to ask old Mr. Fritschi and his wife, a dear Swiss couple living in Coonoor on the Nilgiri hills, about the havoc that was being wrought and to find out if there was anything we could do. They had been missionaries of the Basel Mission but were long retired and now owned a nursery of young plants and trees. They loved to help and advise farmers and gardeners about ways to improve their crops. It seemed to me that these devoted people would know if there was some way to advise the landowners about ways to save their soil.

Mr. Fritschi's eyes were moist as he told me, "I have tried, but it is no use. They have no love of the land, only of money. They are making a lot of money, and they do not worry about the loss of soil, because they think it is away in the future, and they will have money to buy more." Besides, he continued, they can deduct the loss of land from their income tax as business depreciation.

Thirty more years have passed and we have left India. But every year I go back to visit Vellore Christian Medical College and take part in the leprosy work there. I do not, however, enjoy going back to the Nilgiri hills. I look up to those slopes and see large areas of bare rock of no use to anybody. Those deforested areas that still have some soil look like gravel. And the clear streams and springs that ran off from these areas 60 years earlier are dry today. When the rains come they rush in torrents and flood, then they go dry.

Oh Tata! Where have you gone? You have been replaced by businessmen and accountants who have degrees in commerce and who know how to manipulate tax laws. You have been replaced by farmers who know about pesticides and chemical fertilizers, but who care nothing about leaving soil for their great-grandchildren.

A Worldwide Drama

Outside of India I have seen another drama involving trees, soil, water, and human starvation working its tragic sequence. The place is Ethiopia.

I first came to Ethiopia in the early 1960s when I went to Addis Ababa on behalf of the International Society for the Rehabilitation of the Disabled. My task was to negotiate the establishment of an all-Africa training center for leprosy workers, with an emphasis on rehabilitation. I met Emperor Haile Selassie and his minister of health, as well the ministers of agriculture and commerce, the dean of the then-new University Medical College, and representatives of American Aid and the Rockefeller foundation. Later I went to work in the new training center as a surgeon, teaching reconstruction of the hand and foot. But, as had happened so often in my life, it was the land that caught my attention. Most of our leprosy patients were farmers, and their future had to be in farming if they were not to be dislocated from their families and villages.

The emperor was very gracious as we talked about the problem. He gave us the use of tracts of the royal lands to farm. The Swedish churches had sent farmers into Ethiopia to teach the patients how to farm more efficiently; and it was a joy to see acres of tef, the local food grain, growing to harvest. Patients with leprosy were learning how to work without doing damage to their insensitive hands. We were grateful to the benevolent old emperor, and all seemed to be going well. Gradually, however, we began to see the real problems of the tragic country.

Camping out in the countryside, while visiting distant treatment centers, we were impressed with the way the countryside was fissured with deep canyons where streams had eroded the soil on their way to join the Blue Nile. Farms on the edges of these canyons were having to retreat year by year as their soil slipped away into the rivers. There had once been trees

and forests on this land, but the trees had been felled for timber and firewood, and also to make way for grazing and cultivation.

What impressed me most, however, were the poor crops and stony fields that were cultivated by the peasant farmers. Every field seemed to be covered with great stones and boulders. Many of these stones were of a size that could have easily been levered up and rolled away to the edges of the fields where they would have made useful walls to hold the soil in and keep marauders out. As it was, it must have been a constant irritation to have to till and harvest between these rocks.

It did not take much inquiry to find out why such simple improvements had never been made. The peasants knew, and were frank to tell us, that if ever they made their fields look good they would lose them. The ruling race of Amharas, based in the capital city, contained all the lawyers and leaders of the country. Any good piece of land could be claimed by one of the city-dwelling Amharas simply by stating that it had belonged to his ancestors. Supporting documents were easy to obtain. In court the peasant had no chance. His only hope of being allowed to continue farming his land was to make it appear worthless.

Both the Ford foundation and the Rockefeller foundation had considered sending help to teach good farming methods and to halt erosion, but both insisted to the emperor that land reform had to come first. Only if the land were owned by the people who farmed it would it be taken care of in a way that would preserve it for generations to come. The peasants had to have confidence that their handful of mud would still be there for their children. If not, why not let it go down the river?

I believe the emperor wanted to introduce land reform; but if he tried, he failed. The Amharas were too strong for him. The established church, the old Ethiopian Orthodox church of which the emperor was head, had vested interest in the status quo, and was on the wrong side of real justice. This has happened so often in the past, when churches got comfortable and wealthy. We need to be watchful and aware today.

On a state visit to Egypt, Emperor Haile Selassie walked down to the river Nile and knelt to scoop up two handfuls of the rich fertile mud on its bank. Raising his hands, he said, "My country." The Blue Nile had carried Ethiopia to Egypt, and the old emperor knew it. He could not send the mud upstream again and he did not have the courage to make the changes that would have arrested further loss.

Today the emperor is dead. Every cabinet minister with whom I negotiated for our training center is dead---they were killed by the firing squads of the revolution. There might not have been a famine today if the trees had not all been cut, if the land had not eroded away, if the absentee landlords of Ethiopia had not been so greedy, and if the church had insisted that justice should prevail.

I did not like the revolution or the foreign invaders who brought it about, but they would never have succeeded if the people had not been laboring under a sense of injustice. The new Marxist government has not succeeded in bringing back the trees or the land, and it has spent its energy in war. But the roots of Ethiopia's problems stem from generations ago---even before the leaders who have now died for their collective sins.

Kindred sins

Today I live in Louisiana. I have no soil or water problems. In fact, my topsoil is so deep and so rich that I would not even try to plumb its depth. And the land is so flat that even when it floods my soil stays where it is.

But I cannot be at peace. My home is right beside the Mississippi River. I could probably throw a stone into the water from my roof. My house is an old one and built up on piles. At the time it was built, the occupants would expect to sit on their porch and watch the muddy waters of the Mississippi swirl under the house for a few days each year. If I were to analyze my garden soil, I would find that most of it came from Kansas and Ohio and Iowa and other states upriver. A farmer from Iowa could come to my garden, as the emperor of Ethiopia did in Egypt, scoop up a handful of mud, and say, "My farm!"

But no mud comes from Iowa to my garden now. The corps of engineers has built a dam, or levee, all along the bank of the river, so the mud runs straight out to sea. During the spring floods, I walk along the levee and look at that mud. They tell me that many whole farms flow past my house every hour. I know that Iowa has lost more than half its topsoil just in the hundred or so years since Americans started farming that land.

Because I am haunted by the mountains of India and by the erosion of Ethiopia, I have to ask why American farmers still lose soil. They tell me they know all about contour plowing, but say modern farming machinery is so big that it is impossible or uneconomic to plow around contours. So they just go straight up and down. They get it done faster---and lose the soil faster. This all gives better returned to the shareholders, and improves all the market indicators. Shareholders and members of the board are today's absentee landlords of the farm. They are not farmers. They tell me that only small family farms still do contour plowing, but they are going out of business. Big companies are buying them up, so they can use "efficient" methods.

They tell me that the American forests are replanted when they are cut, and I think that is probably true. But I also understand that wide clear-cutting is practiced even on steep slopes. It is a matter of pride that every part of every tree is used for timber or pulp or chipboard when it is cut. But then, nothing goes back into the land. There is no building of the soil, just depletion. Kindred Sins

My Mississippi River is also the site now of scores of petrochemical plants and herbicide factories. I have chemical plants to my right and industrial plants to my left. (The proximity of the river is convenient for getting water to cooling towers and receiving effluents.) All the trees downwind have turned white and died. They tell me it was fluorides, but it

could have been any one of the effluents that have given parts of Louisiana the highest incidence of cancer in the country. Ten years ago all the cattle in this area were declared unfit to sell for beef because of unacceptable levels of tetrachlormethane in their fat. I wonder what the levels are in me and my family.

I look at the great Mississippi and think back to the days of Huckleberry Finn and his raft, when the river was largely water and fish. I look down now at the swirling mud and see it as no better than the Blue Nile, or the Cauvery River in India that carries mud from the Nilgiri Hills. Is there a common thread? It is not ignorance in all cases. Nor is it dire poverty (although that sometimes leads to the cutting of the trees for fuel). No, there would be enough for all if it were not for greed. More profit. Faster return on investment. A bigger share for me of what is available now, but may not be available tomorrow.

God has something to say to us about this. And he said it repeatedly by his prophets. Moses described in detail the care of the land in Leviticus 25. It was to be nurtured and given a regular sabbath year of rest. It was never to be sold on a permanent basis but regarded as a trust from the Lord. "The earth is (the Lord's), and you are sojourners". Later Isaiah pronounces God's judgment; "The earth dries up and withers, the whole earth grows sick; the earth itself is desecrated by the feet of those who live in it, because they have broken the laws, and violated the eternal covenant: "Because of this the land mourns, and all who live in it waste away; the beasts of the field and the birds of the air and the fish of the sea are dying." God is concerned about his creation and looks to us whom he put in charge of it. We are to share in its redemption, not to be agents of its destruction.

My Legacy

I would gladly give up medicine tomorrow if by so doing I could have some influence on policy with regard to mud and soil. The world will die from lack of pure water and soil long before it will die from a lack of antibiotics or surgical skill and knowledge. But what can be done if the destroyers of our earth know what they are doing and do it still? What can be done if people really believe that free enterprise has to mean absolute lack of restraint on those who have no care for the future?

I cannot, however, conclude without a small balance of joy and an indication that God still has a church that produces people who care. In the final analysis it is not knowledge or lack of it that makes a difference, but concerned people. The sense of concern for the earth is still transmitted by person-to-person communication and by personal example better than by any other method. Old Tata still lives on. He lives in the boys who played in the mud, and they will pass on his concern for the soil and his sense of its importance to future generations.

Old Mr. Fritschi still lives on through his son. The love of trees he tried to promote in the Nilgiri hills is now being promoted by his son on the plains of Karigiri. A single dedicated person giving a good example is better than a lot of ringing of hands and prophecies of doom.

Ernest Fritschi was born in India and lived there long enough to love it, take Indian nationality, and marry a lovely Indian wife. He studied in Madras University, became a doctor, and then an orthopedic surgeon. Working with leprosy patients, he joined the leprosy Mission and worked in many countries, including Ethiopia, and then became director of the Schieffel in Research and training center at Karigiri near Vellore.

The land for the center had been barren gravel with not a tree any where, and water had been hard to locate. I remember walking over the large acreage before we started to build and thinking that it was no surprise the government had donated it so freely. It was good for nothing else.

Ernest, however, had faith in the land and was determined to prove that it could be productive of more than buildings and a hospital. Other directors had made a good start, but Ernest made a rule for himself that every year he would plant trees. He collected seeds and seedlings from everywhere and nourished them in his own garden until they were strong. Then he would plant them out just before the rains, and have them watered by staff and patients until they had root systems deep enough to survive. The hill that formed one border of the Karigiri land was bare and rocky, and the rains would send a rushing flood of water over the gravel of the hospital grounds. So Ernest built contour ridges of gravel and soil to hold the water long enough for it to soak in.

I remember the hospital and its surrounding staff houses and chapel as they grew. They were gray and white and stood out on the skyline. They could be seen for miles as the only structures breaking the monotony of the gravel slopes. Today, as I approach that hospital, it is hidden in a forest with trees higher than the tallest buildings. The place has been declared a sanctuary by the environmental department of the state government in recognition of what already exists. The whole area is full of birds; we counted and identified over 40 species in one afternoon. The water table, falling in most places, was rising last year under the gravel at Karigiri. Soil is building, not being lost.

What is a few acres among the millions where the reverse is true? It is important to me because it sounds a message. One man can make a difference. Dedication is what is needed. And faith. It is important, too, because the man who made this little revolution is not a professional farmer or a government official. He is a doctor who loves trees, soil, and water. He was sometimes criticized by his board of governors who said his goals and objectives should be to treat and rehabilitate leprosy patients. Money, they argued, should not be diverted to other goals, like farming and reforestation. But he proved that concern for soil and trees benefits patients too. Buildings do not need air conditioning when they are shaded by trees. Patients who see and participate in good practices on the land learn to reproduce the same when they go home.

Not far from there is the Christian Medical College, founded by the beloved American doctor Ida Scudder. She insisted on building the college on an extensive piece of land where there would be room for gardens and trees. She was followed by others who had the same view, including the first Indian director, Dr. Hilda Lazarus, who doubtless had claims to fame in her own medical specialty but whom I remember for her love for trees.

Dr. Lazarus is long gone, but her trees and philosophy remain. In my day we used to get excited and concerned about new drugs and new diagnostic equipment, but today when I visit the Christian Medical College, I find the director more likely to be excited about preserving the water table, and growing the still life in the land, and God still blesses those who recognize "the earth is the Lord's."

I am a grandfather now. My grandchildren do not call me Tata, but I rather wish they would. It would not mean much to them, but it would remind me that, in addition to the immortality of our spirit, we all have a sort of immortality of our flesh. If the kids called me Tata, it would remind me that, down the centuries, there may be many generations of people who will bear my humanity, who will enjoy life or who will suffer in proportion to the care that I now take to preserve the good gifts that God has given us. Part of that care is in teaching and in example.

My grandson is called Daniel, and the next time he comes to visit me I shall take him out into my garden and scoop up a handful of mud. I shall ask him, "Daniel, what is this?"

Sense of Wonder

"If a child is to keep alive his inborn sense of wonder . . . he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement, and mystery of the world we live in." Rachel Carson