

GORILLAS AS TEACHERS

I read with shock and sadness the news of Dian Fossey's death early this year. Born and reared in San Francisco, she had spent most of her last 18 years in central Africa, studying the little-known mountain gorillas that inhabit the volcanic Virunga range shared by the nations of Uganda, Zaire and Rwanda. She was killed at age 53 by unknown assailants, possibly poachers, whose attacks on the decimated gorilla population she had opposed vigorously for many years. Through her scrupulous daily field observations, she had become a world authority on the elusive gorillas of the high rain-forests, chronicling the mating, parenting and social behavior of specific families through three generations. Fossey's book (*Gorillas in the Mist*, Boston, Houghton Mifflin Co., 1983) is a serious work, but its sagas of life among our closest primate cousins often are startling in their poignancy. She describes her first encounter with Group 8, a small family group led by a majestic male.

Lastly, the old silverback came forward. In all my years of research I never met a silverback so dignified and commanding of respect. His silvery extended from the sides of his cheekbones, along neck and shoulders, enveloped his back and barrel, and continued down the sides of both thighs. . . . I estimated his age as approximately fifty years, possibly more. The nobility of his character compelled me to seek a name for him immediately. In Swahili, rafiki means "friend." Because friendship implies mutual respect and trust, the regal silverback became known as Rafiki . . .

Old Rafiki had sired the group's four young adult males — two by a female now deceased, and two by "Coco," the remaining female. Coco, who was elderly and doddering, with a deeply wrinkled face, and flabby, hairless upper arms, was treated very solicitously by the family:

Coco and Rafiki often shared the same nest [gorillas build new nests each night of fresh vegetation], resembling



a gracefully aging old married couple who needed no words to strengthen their respect of one another . . . One day I was able to hide myself from the group feeding on a wide open slope 130 feet away from me. They were widely spread out with Rafiki at the top, moving uphill, and Coco far at the bottom, wandering erratically on a feeding course that led away from the rest of the group. Rafiki suddenly stopped eating, paused as if listening for something, and gave a sharp questioning type of vocalization. Coco obviously heard it, for she paused in her wanderings and turned in the general direction of the sound. Rafiki, out of sight from her, sat and gazed downhill. The other group members followed his example as though they were waiting for her to catch up. Coco began climbing slowly, stopping occasionally to determine their whereabouts before again meandering in the general direction of the patient males. Once within sight of Rafiki, the elderly female moved directly to him, exchanged a greeting series of soft belch vocalizations until reaching his side. They looked directly into each other's face and embraced. She placed her arm over his back and he did likewise over hers. Both walked uphill in this fashion, murmuring together like contented conspirators.

Browsing on Greens

The book's photographs show the gorillas to be magnificent bundles of long, lush fur compared with the short-haired lowland species we are familiar with in zoos. (No mountain gorilla has yet survived in one.) Inquisitive eyes peer from under hoods of thick, fluffy fur — important protection from icy rains, hail, and fog at the 10,000-13,000 ft. altitude of their habitat. Fossey describes how the families seize every chance to bask in the sun blissfully during warm interludes, like frozen New Yorkers thawing out on a Miami beach.

The gorillas concentrate their browsing on approximately sixty plant species, ambling up and down the slopes seeking thistles, nettles, bamboo shoots, bracket fungus, blackberries, assorted fruits, leaves, roots, and wild celery (up to 8 ft. tall!). They also hunt for larvae and grubs in hollow dead stalks and under the bark of trees. Fossey depicts their amiable snacking on a favorite fern that's found suspended from thick moss pads on the lower limbs of the abundant *Hagenia* trees: "Gorillas frequently settle themselves comfortably on a soft cushion of moss, disengage a big wedge of moss, and sit with it on their laps, idly picking out the fern, leaf by leaf."

Our Cancer-free Cousins

These predominantly gentle, predominantly vegetarian creatures don't suffer from the major diseases plaguing western man today such as cancer, heart disease, or diabetes. Detailed autopsies in the book show that other than deaths caused by old age, the animals usually died from pneumonia, pleurisy, and massive parasitic infestations, which developed after they were too badly wounded or crippled — either by poachers' traps or in fierce engagements with gorillas outside the family group — to seek shelter from the raw elements, or to feed normally.

Though the area teems with roundworms and many other parasites, researchers found only minor infestations in healthy animals. They also noted an animal's ability to survive severe wounds without succumbing to infection, so long as it was able to seek shelter and to con-

tinue feeding. In other words, empowered by the nutrients derived from the foodstuffs natural to its habitat, the gorilla's immune system was well equipped to ward off bacterial, viral, fungal, and parasitic invasions, as well as to resist cancerous growths and other manifestations of a breakdown in immune defenses.

Nature's Pharmacopoeia

Herbalists and naturalists insist that for each ailment known to man, there is an appropriate natural remedy in the plant world — even though we have yet to uncover them all. Fossey's gorillas, browsing placidly on misty mountainsides — undistracted by television commercials for Chicken McNuggets and Sara Lee chocolate cake! — may have instinctively chosen just those plants or insects which their systems required. Out of Tanzania's Gombe National Park, where Jane Goodall's pioneering research on wild chimpanzees still goes on actively, reports are emerging that chimps at Gombe have their own wilderness pharmacy. Apparently, they seek out on a regular basis the aspilina bush, a shrub 6-10 ft. tall. Each chimp, making its periodic pilgrimage to the area where the aspilina grows, will carefully select as many as 30 small leaves, roll one leaf at a time around in its mouth for about 15 seconds, then swallow it whole. Observers had speculated on whether the leaves might be hallucinogens or intoxicants, but recently, two North American scientists isolated a previously unknown substance from aspilina leaves — a red oil subsequently named thiarubrine-A, which turns out to be an exceptionally powerful antibiotic. They discovered it can kill common, disease-causing bacteria even when it is diluted to less than one part per million! The topper came during visits to East African research centers, where the scientists learned that the native people traditionally *also* use aspilina leaves, specifically to treat wounds and stomachaches.

My Type of Folks

Gorillas and chimps are not people and speculations about their diet are only marginally applicable to man. Still, we know that all primates, including ourselves, need to derive exactly the same kinds of nutrients from the diet — the so-called "essential" amino acids, fatty acids, minerals and vitamins. While practically

all creatures except guinea pigs are able to make their own vitamin C, we primates are linked by our inability to do so, which makes us dependant entirely on dietary sources. (I felt another strong tug of kinship, not just in reading Fossey's accounts of maternal devotion and fiercely protective loyalties within gorilla families, but in learning that, where tested, the autopsied apes had Type O, Rh-negative blood — the same type as mine!)



In the early days of zoo-keeping, apes did poorly on low-quality human fare. Conversely, the closer we humans get to adopting for ourselves some of the food habits of apes in the wild, the better are the health results. The biggest turnaround in the medical hierarchy is its current policy of embracing the concept — albeit begrudgingly — that nutrients may be useful in preventing cancer and heart disease. True, this consists of barely dabbling its toes, figuratively speaking, in nutritional waters, such as tossing a few kind words in the direction of fiber, vitamin C, vitamin A, and unsaturated fats. But it's a beginning!

Meanwhile, rank and file workers in medicine go on producing invaluable studies. In one, they found that smokers with *low blood levels of vitamins A and C* had a much greater risk of developing lung cancer than smokers with normal to high levels. Now, Louisiana State University Medical School reports that a *low blood level of vitamin E* may be even more

significant in predicting lung cancer. All three vitamins are "antioxidants": they protect delicate lung tissues from oxidative damage. The same vitamins, of course, do an equally good job protecting the rest of our tissues. Low blood levels of any one of the three mean serious loss of this protection. As noted in *FELIX LETTER #26*, a British study of 5000 women showed that those with the *lowest blood levels of vitamin E developed breast cancer five times more often* than women with normal to high vitamin E levels. Although Dian Fossey didn't include a nutrient analysis of the foods her gorilla subjects consumed, it's logical to assume that coming from rich volcanic soils, they would be loaded with every nutrient required, including vitamins A, C, and E.

Benefits from Folic Acid

Folic acid would also be abundant in them. The body needs it for synthesizing the cell's genetic materials; DNA and RNA. A deficiency affects formation of new cells, particularly noted in areas of rapid growth and turnover, as in bone marrow where red blood cells are produced, in the intestinal tract, and in pregnancy where both maternal and fetal tissues are growing. Folic acid supplements given to a large group of pregnant women in Great Britain greatly decreased the incidence of infants born with serious brain or spinal column abnormalities known as "*neural tube defects*." Because the women in this experiment previously had borne one or more babies with these defects, doctors had pronounced it most likely a genetic disorder. The good results with folic acid supplementation surprised the heck out of everybody! Perhaps the genetic aspect lay in the fact that these pregnant women 'inherited' a need for much more folic acid than their substandard diets could ever provide! Deficiencies of even the modest amounts recommended by the generally conservative nutrition establishment appear to be commonplace, not just in England but, according to a number of surveys, in the United States as well.

Folic acid supplements (5 milligrams/day equal 5000 micrograms. 1mg=1000 mcg) also have shown very promising results in reversing *cervical dysplasia* in women. In this condition, cells of the uterine cervix grow abnormally and if untreated, may become cancerous. "The Pill" is known to raise folic acid requirements. *It makes sense to me that a modified "gorilla" regimen — lots and lots of good greens and fruits and other*

folacin-rich foods described in the following table — would be a preventive measure for all women on the pill, plus all women 40-55 years of age, who appear to be most vulnerable to cervical dysplasia.

The folic acid (or folacin) content of leafy vegetables takes a nosedive in normal cooking, let alone in commercial food processing. Freshly picked raw greens — like the ones Fossey's gorillas munched on all day long — are our best bet for retaining full folacin content. Fortunately, many wonderful, tasty foods noted below are still good sources, even when cooked. Many are also rich in protective minerals, vitamins A, C, E, and fiber. A few (walnuts, wheat germ, and beans) also contain vital Omega-3 (as well as Omega-6) essential fatty acids.

Four hundred micrograms (mcg) for adults and 800 mcg for pregnant women are the 'official' RDA. Much, much more can be consumed with great benefit. Here are a few of the best sources: (Please note: folacin, a water-soluble vitamin, is not stored to any extent in the body.)



BREAST-FEEDING UPDATE

Arriving after a gestation period of 8-9 months, the newborn mountain gorilla is tinier than a human infant (a typically 200 lb. female gives birth to a 3-4 lb. infant), and is just as helpless. The

early months are spent sleeping and nursing in its mother's arms or clinging to her long fur. Between four and six months of age, it begins to wobble around to explore the world — all within arms' reach of the mother. By that time, exuberant vistas of play have opened up, since the whole gorilla troupe, including even the dignified silverback patriarch, clearly enjoys hugging the baby and romping with it, under the mother's watchful eyes. A typical group may consist of the silverback leader (weighing around 375 pounds), three sexually mature females who are usually mated to him for life, a not yet mature male, and perhaps four or five youngsters. Sexual maturity comes between 9-13 years of age. Unfortunately for the decimated gorilla population of the Virunga mountains, their natural birth spacing system remains all too effective, a mother's average interval between births being well over three years. Most youngsters are just starting to wean themselves at the end of their second year, and Fossey suggests that the long period of nursing may delay return of the mother's monthly estrus cycles signifying fertility.

VEGETABLES	Weight	Portion	Folacin
Spinach, raw	56 grams	1 cup	109 mcg
cooked, fresh	180	1 cup	262
cooked, frozen	205	1 cup	204
Turnip greens, cooked	144	1 cup	170
Brussel sprouts, cooked	156	1 cup	125
Broccoli, cooked	156	1 cup	107
Asparagus, cooked	90	½ cup	99
Romaine lettuce	56	1 cup	76
Mung bean sprouts, stirfried	124	1 cup	72
Collard greens, cooked	190	1 cup	69
Swiss chard, cooked	175	1 cup	57
Parsley, chopped, fresh	30	½ cup	55
Artichoke, cooked	120	1 whole	53
Seaweed, raw - Kelp	28	1 oz.	51
Tomato juice, canned	243	1 cup	48
Beet greens, cooked	144	1 cup	47
Beets, cooked	85	½ cup	45
Sweet potatoes, cooked	255	1 cup	46
Winter squash & pumpkin, different types, cooked	245	1 cup	40

NUTS, SEEDS	Weight	Portion	Folacin
Sunflower seeds, dried	72 grams	½ cup	169 mcg
oil roasted	67	½ cup	158
Soybeans, roasted	54	½ cup	122
Cashews, roasted	67	½ cup	91
Peanuts, oil roasted	73	½ cup	77
Pumpkin seeds, dried	32	½ cup	64
Almonds, dried	71	½ cup	42
Walnuts, chopped	61	½ cup	40

LEGUMES	Weight	Portion	Folacin
Green peas, cooked	160 grams	1 cup	100 mcg
Green beans, cooked	125	1 cup	42
Dried Beans, cooked:			
Pinto beans	190	1 cup	145
Black-eyed peas	250	1 cup	142
Kidney beans	185	1 cup	115
Garbanzo beans	170	1 cup	113
Navy beans	190	1 cup	108
Soybeans	180	1 cup	76
Lima beans	180	1 cup	78
Great Northern beans	180	1 cup	74
Lentils	190	1 cup	61
Tofu (Soybean curd)	125	½ cup	58

FRUITS	Weight	Portion	Folacin
Avocado, mashed	115 grams	½ cup	60-75 mcg
Boysenberries, frozen	132	1 cup	84
Blackberries, fresh	144	1 cup	52
Orange juice, fresh	248	1 cup	109
Oranges	140	1 whole	45
Melons (cantaloupe, casaba, honeydew)	170	1 cup	45

GRAINS	Weight	Portion	Folacin
Wheat germ, raw	19 grams	¼ cup	62 mcg
toasted	28	¼ cup	118
Buckwheat flour	48	½ cup	60

LIVER	Weight	Portion	Folacin
Chicken & turkey livers	85 grams	3 oz.	600 mcg
Beef, pork, lamb livers	85	3 oz.	150

BREWER'S YEAST	Weight	Portion	Folacin
	8 grams	1 tbsp	313 mcg

Miracles in Mom's Milk

Maybe we can pick up some clues not only from the gorilla's diet that protects it against 'civilized' ailments, but also from its infant feeding practices. When prepared formulas replaced breast-feeding in the western world as the new, "enlightened" way to go, they were touted as equally nutritious and certainly more dependable than mother's milk. After all, how could a plain, ordinary human *breast* expect to compete with the technologic wizardry of modern science! Today, sadder and wiser, we know that the 'formula' for commercial infant milk consisted of 1 part science and 99 parts profit-motive. From more experienced and humbler scientists, we are beginning to learn that mother's milk is a thousand times more complex than any formula conceived; moreover it continually adapts to the growing infant's changing requirements. With newer technology, they are discovering that not only does a mother deliver factors to boost the baby's immune system, but her milk also contains substances which are skimpy or totally absent in formulas but are turning out to be significant to the infant's optimum development. *Taurine*, a sulfur-containing amino acid, is one example. In her comprehensive *Joy of Breastfeeding* (Techkits, P.O. Box 105, Demarest NJ 07627), Margaret Salmon tells us that in amounts which breast-milk but not formula provides, taurine may be a requirement in the newborn, "since the infant may not be able to synthesize enough taurine for the growth and development of brain, muscle and retina of the eye."



Where Formulas Fail

The essential fatty acids — the ones I've covered from soup to nuts in previous *Felix Letters* — are another case in point. Linoleic acid (Omega-6) and alpha-linolenic acid (Omega-3) are the two "starter" molecules that humans, gorillas, and other primates must get in the diet. From them our body can manufacture longer-chain, highly unsaturated fatty acids that it uses to regulate cholesterol, and to make normal cell membranes and the powerful, hormonelike prostaglandins which control innumerable functions. *Very new infants may not yet be able to convert the "starter" fatty acids into the long-chain polyunsaturates.* In the womb, the mother's system and the placenta did the converting for them. Afterwards, that's where mother's milk comes in — it continues the process, by supplying the newborn with pre-formed long-chain Omega-3 and Omega-6 polyunsaturates. The amounts needed are small, but *infant formulas have little or none.*

Premature infants may need these fatty acids for a longer period than full-term infants while their immature 'converting system' tries to catch up. It should be noted that especially large amounts are laid down *in the baby's rapidly growing brain and the retina of the eyes.* The scientists who have done the studies in this area universally recommend breast-feeding. They say it's particularly crucial for "preemies." Thirty-some years ago, when my second child was born, tiny and premature, no one suggested that I nurse him or secure breast-milk for him. (At home, I pumped my breasts faithfully, anyway; and three weeks later, when he got to be five pounds and we were allowed to take him home, I finally was able to nurse him!) I'm terribly glad that pediatricians are encouraging mothers to come in and nurse their preemies, or to bring in their pumped milk for tube-feeding if the infant is too weak to nurse.

Don't ask me how nature manages such a thing, but milk from mothers of pre-term infants actually have *higher levels of Immunoglobulin A* than the milk of mothers of full-term infants, which means that the premature babies will be getting much-needed protection while their own immune system is still fragile. While science and medicine's achievements can be plenty impressive, I find nature's downright awesome!

Let's Find a Way to Make it Work

A great resurgency of breast-feeding in the U.S. showed up around 1970 and has continued till now. The big rate of increase between 1970-1980 is dropping off, however, and the slowdown clearly is tied to economic factors. Families in the west with incomes over \$25,000 have the highest percentage (78%) of nursing mothers. Women who work but still make very little are the least apt to nurse infants. It's not hard to see why! A majority of mothers of young children now work outside the home. Unfortunately, nothing has changed to accommodate this new reality. The chairman of the committee on nutrition of the American Academy of Pediatrics says that changes in employer attitudes that would make it possible to realize greater gains in breast-feeding in the workplace have been especially slow.

A masterpiece of understatement!

A number of countries that need women in the work force, just as we do, are way ahead of us. Nurseries for babies, and after-school sports and recreational facilities for older children, are connected to the factories or office buildings where parents work. Just a handful of far-seeing industrialists might turn the tide, by pioneering this approach in the U.S. and discovering how "cost effective," in the long run, it would be. Within a decade, child care facilities in the workplace could be as much a part of American working life as computers. I remember when they were considered impractical, too.

In the immortal, slightly altered words of a former captain of industry: "Anything that's good for breast-feeding is bound to be good for the country!" ■



Illustrations are by Clay Geerdes and other artists as noted.

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