A Woman's Curse?

Why do cultures the world over treat menstruating women as taboo? An anthropologist offers a new answer—and a challenge to Western ideas about contraception

By Meredith F. Small

THE PASSAGE FROM GIRLHOOD TO womanhood is marked by a flow of blood from the uterus. Without elaborate ceremony, often without discussion, girls know that when they begin to menstruate, their world is changed forever. For the next thirty years or so, they will spend much energy having babies, or trying not to, reminded at each menstruation that either way, the biology of reproduction has a major impact on their lives.

Anthropologists have underscored the universal importance of menstruation by documenting how the event is interwoven into the ideology as well as the daily activities of cultures around the world. The customs attached to menstruation take peculiarly negative forms: the so-called menstrual taboos. Those taboos may prohibit a woman from having sex with her husband or from cooking for him. They may bar her from visiting sacred places or taking part in sacred activities. They may forbid her to touch certain items used by men, such as hunting gear or weapons, or to eat certain foods or to wash at certain times. They may also require that a woman paint her face red or wear a red hip cord, or that she segregate herself in a special hut while she is menstruating. In short, the taboos set menstruating women apart from the rest of their society, marking them as impure and polluting.

Anthropologists have studied menstrual taboos for decades, focusing on the negative symbolism of the rituals as a cultural phenomenon. Perhaps, suggested one investigator, taking a Freudian perspective, such taboos reflect the anxiety that men feel about castration, an anxiety that would be prompted by women's genital bleeding. Others have suggested that the taboos serve to prevent menstrual odor from interfering with hunting, or that they protect men from microorganisms that might otherwise be transferred during sexual intercourse with a menstruating woman. Until recently, few investigators had considered the possibility that the taboos—and the very fact of menstruation—might instead exist because they conferred an evolutionary advantage.

In the mid-1980s the anthropologist Beverly I. Strassmann of the University of Michigan in Ann Arbor began to study the ways men and women have evolved to accomplish (and regulate) reproduction. Unlike traditional anthropologists, who focus on how culture affects human behavior, Strassmann was convinced that the important role played by biology was being neglected. Menstruation, she suspected, would be a key for observing and understanding the interplay of biology and culture in human reproductive behavior.

To address the issue, Strassmann decided to seek a culture in which making babies was an ongoing part of adult life. For that she had to get away from industrialized countries, with their bias toward contraception and low birthrates. In a "natural-fertility population," she reasoned, she could more clearly see the connection between the physiology of women and the strategies men and women use to exploit that physiology for their own reproductive ends.

Strassmann ended up in a remote corner of West Africa, living in close quarters with the Dogon, a traditional society whose indigenous religion of ancestor worship requires that menstruating women spend their nights at a small hut. For more than two years Strassmann kept track of the women staying at the hut, and she confirmed the menstruations by testing urine samples for the appropriate hormonal changes. In so doing, she amassed the first long-term data describing how a traditional society appropriates a physiological event—menstruation—and refracts that event through a prism of behaviors and beliefs.

What she found explicitly challenges the conclusions of earlier investigators about the cultural function of menstrual taboos. For the Dogon men, she discovered, enforcing visits to the menstrual hut serves to channel parental resources into the upbringing of their own children. But more, Strassmann, who also had training as a reproductive physiologist, proposed a new theory of why menstruation itself evolved as it did—and again, the answer is essentially a story of conserving resources. Finally, her observations pose provocative questions about women's health in industrialized societies, raising serious doubts about the tac-

tics favored by Western medicine for developing contraceptive technology.

MENSTRUATION IS THE VISIBLE stage of the ovarian cycle, orchestrated primarily by hormones secreted by the ovaries: progesterone and a family of hormones called estrogens. At the beginning of each cycle (by convention, the first day of a woman's period) the levels of the estrogens begin to rise. After about five days, as their concentrations increase, they cause the blood- and nutrient-rich inner lining of the uterus, called the endometrium, to thicken and acquire a densely branching network of blood vessels. At about the middle of the cycle, ovulation takes place, and an egg makes its way from one of the two ovaries down one of the paired fallopian tubes to the uterus. The follicle from which the egg was released in the ovary now begins to secrete progesterone as well as estrogens, and the progesterone causes the endometrium to swell and become even richer with blood vessels—in short, fully ready for a pregnancy, should conception take place and the fertilized egg become implanted.

If conception does take place, the levels of estrogens and progesterone continue to rise throughout the pregnancy. That keeps the endometrium thick enough to support the quickening life inside the uterus. When the baby is born and the new mother begins nursing, the estrogens and progesterone fall to their initial levels, and lactation hormones keep them suppressed. The uterus thus lies quiescent until frequent lactation ends, which triggers the return to ovulation.

If conception does not take place after ovulation, all the ovarian hormones also drop to their initial levels, and menstruation—the shedding of part of the uterine lining—begins. The lining is divided into three layers: a basal layer that is constantly maintained, and two superficial layers, which shed and regrow with each menstrual cycle. All mammals undergo cyclical changes in the state of the endometrium. In most mammals the sloughed-off layers are resorbed into the body if fertilization does not take place. But in some higher primates, including humans, some of the shed endometrium is not resorbed. The shed lining, along with some blood, flows from the body through the vaginal opening, a process that in humans typically lasts from three to five days.

OF COURSE, PHYSIOLOGICAL FACTS alone do not explain why so many human groups have infused a bodily function with symbolic meaning. And so in 1986 Strassmann found herself driving through the Sahel region of West Africa at the peak of the hot season, heading for a sandstone cliff called the Bandiagara Escarpment, in Mali. There, permanent Dogon villages of mud or stone houses dotted the rocky plateau. The menstrual huts were obvious: round, low-roofed buildings set apart from the rectangular dwellings of the rest of the village.

The Dogon are a society of millet and onion farmers who endorse polygyny, and they maintain their traditional culture despite the occasional visits of outsiders. In a few Dogon villages, in fact, tourists are fairly common, and ethnographers had frequently studied the Dogon language, religion and social structure before Strassmann's arrival. But her visit was the first time someone from the outside wanted to delve into an intimate issue in such detail.

It took Strassmann a series of hikes among villages, and long talks with male elders under the thatched-roof shelters where they typically gather, to find the appropriate sites for her research. She gained permission for her study in fourteen villages, eventually choosing two. That exceptional welcome, she thinks, emphasized the universality of her interests. "I'm working on all the things that really matter to [the Dogon]—fertility, economics—so they never questioned my motives or wondered why I would be interested in these things," she says. "It seemed obvious to them." She set up shop for the next two and a half years in a stone house in the village, with no running water or electricity. Eating the daily fare of the Dogon, millet porridge, she and a research assistant began to integrate themselves into village life, learning the language, getting to know people and tracking visits to the menstrual huts.

Following the movements of menstruating women was surprisingly easy. The menstrual huts are situated outside the walled compounds of the village, but in full view of the men's thatched-roof shelters. As the men relax under their shelters, they can readily see who leaves the huts in the morning and returns to them in the evening. And as nonmenstruating women pass the huts on their way to and from the fields or to other compounds, they too can see who is spending the night there. Strassmann found that when she left her house in the evening to take data, any of the villagers could accurately predict whom she would find in the menstrual huts.

THE HUTS THEMSELVES ARE CRAMPED, dark buildings—hardly places where a woman might go to escape the drudgery of work or to avoid an argument with her husband or a co-wife. The huts sometimes become so crowded that some occupants are forced outside—making the women even more conspicuous. Although babies and toddlers can go with their mothers to the huts, the women consigned there are not allowed to spend time with the rest of their families. They must cook with special pots, not their usual household possessions. Yet they are still expected to do their usual jobs, such as working in the fields.

Why, Strassmann wondered, would anyone put up with such conditions?

The answer, for the Dogon, is that a menstruating woman is a threat to the sanctity of religious altars, where men pray and make sacrifices for the protection of their fields, their families and their village. If menstruating women come near the altars, which are situated both indoors and outdoors, the Dogon believe that their aura of pollution will ruin the altars and bring calamities upon the village. The belief is so ingrained that the women themselves have internalized it, feeling its burden of responsibility and potential guilt. Thus violations of the taboo are rare, because a menstruating woman who breaks the rules knows that she is personally responsible if calamities occur.

NEVERTHELESS, STRASSMANN STILL thought a more functional explanation for menstrual taboos might also exist, one closely related to reproduction. As she was well aware, even before her studies among the Dogon, people around the world have a fairly sophisticated view of how reproduction works. In general, people everywhere know full well that menstruation signals the absence of a pregnancy and the possibility of another one. More precisely, Strassmann could frame her hypothesis by reasoning as follows: Across cultures, men and women recognize that a lack of menstrual cycling in a woman implies she is either pregnant, lactating or menopausal. Moreover, at least among natural-fertility cultures that do not practice birth control, continual cycles during peak reproductive years imply to people in those cultures that a woman is sterile. Thus, even though people might not be able to pinpoint ovulation, they can easily identify whether a woman will soon be ready to conceive on the basis of whether she is menstruating. And that leads straight to Strassmann's insightful hypothesis about the role of menstrual taboos: information about menstruation can be a means of tracking paternity.

"There are two important pieces of information for assessing paternity," Strassmann notes: timing of intercourse and timing of menstruation. "By forcing women to signal menstruation, men are trying to gain equal access to one part of that critical information." Such information, she explains, is crucial to Dogon men, because they invest so many resources in their own offspring. Descent is marked through the male line; land and the food that comes from the land is passed down from fathers to sons. Information about paternity is thus crucial to a man's entire lineage. And because each man has as many as four wives, he cannot possibly track them all. So forcing women to signal their menstrual periods, or lack thereof, helps men avoid cuckoldry.

TO TEST HER HYPOTHESIS, STRASSMANN tracked residence in the menstrual huts for 736 consecutive days, collecting data on 477 complete cycles. She noted who was at each hut and how long each woman stayed. She also collected urine from ninety-three women over a ten-week period, to check the correlation between residence in the menstrual hut and the fact of menstruation.

The combination of ethnographic records and urinalyses showed that the Dogon women mostly play by the rules. In 86 percent of the hormonally detected menstruations, women went to the hut. Moreover, none of the tested women went to the hut when they were not menstruating. In the remaining 14 percent of the tested menstruations, women stayed home from the hut, in violation of the taboo, but some were near menopause and so not at high risk for pregnancy. More important, none of the women who violated the taboo did it twice in a row. Even they were largely willing to comply.

Thus, Strassmann concluded, the huts do indeed convey a fairly reliable signal, to men and to everyone else, about the status of a woman's fertility. When she leaves the hut, she is considered ready to conceive. When she stops going to the hut, she is evidently pregnant or menopausal. And women of prime reproductive age who visit the hut on a regular basis are clearly infertile.

It also became clear to Strassmann that the Dogon do indeed use that information to make paternity decisions. In several cases a man was forced to marry a pregnant woman, simply because everyone knew that the man had been the woman's first sexual partner after her last visit to the menstrual hut. Strassmann followed one case in which a child was being brought up by a man because he was the mother's first sexual partner after a hut visit, even though the woman soon married a different man. (The woman already knew she was pregnant by the first man at the time of her marriage, and she did not visit the menstrual hut before she married. Thus the truth was obvious to everyone, and the real father took the child.)

In general, women are cooperative players in the game because without a man, a woman has no way to support herself or her children. But women follow the taboo reluctantly. They complain about going to the hut. And if their husbands convert from the traditional religion of the Dogon to a religion that does not impose menstrual taboos, such as Islam or Christianity, the women quickly cease visiting the hut. Not that such a religious conversion quells a man's interest in his wife's fidelity: far from it. But the rules change. Perhaps the sanctions of the new religion against infidelity help keep women faithful, so the men can relax their guard. Or perhaps the men are willing to trade the reproductive advantages of the menstrual taboo for the economic benefits gained by converting to the new religion. Whatever the case, Strassmann found an almost perfect correlation between a husband's religion and his wives' attendance at the hut. In sum, the taboo is established by men, backed by supernatural forces, and internalized and accepted by women until the men release them from the belief.

BUT BEYOND THE CULTURAL MACHINATIONS of men and women that Strassmann expected to find, her data show something even more fundamental—and surprising—about female biology. On average, she calculates, a woman in a natural-fertility population such as the Dogon has only about 110 menstrual periods in her lifetime. The rest of the time she will be prepubescent, pregnant, lactating or menopausal. Women in industrialized cultures, by contrast, have more than three times as many cycles: 350 to 400, on average, in a lifetime. They reach menarche (their first menstruation) earlier—at age twelve and a half, compared with the onset age of sixteen in natural-fertility cultures. They have fewer babies, and they lactate hardly at all. All those factors lead women in the industrialized world to a lifetime of nearly continuous menstrual cycling.

The big contrast in cycling profiles during the reproductive years can be traced specifically to lactation. Women in more traditional societies spend most of their reproductive years in lactation amenorrhea, the state in which the hormonal changes required for nursing suppress ovulation and inhibit menstruation. And it is not just that the Dogon bear more children (eight to nine on average); they also nurse each child on demand rather than in scheduled bouts, all through the night as well as the day, and intensely enough that ovulation simply stops for

about twenty months per child. Women in industrialized societies typically do not breast-feed as intensely (or at all), and rarely breast-feed each child for as long as the Dogon women do. (The average for American women is four months.)

The Dogon experience with menstruation may be far more typical of the human condition over most of evolutionary history than is the standard menstrual experience in industrialized nations. If so, Strassmann's findings alter some of the most closely held beliefs about female biology. Contrary to what the Western medical establishment might think, it is not particularly "normal" to menstruate each month. The female body, according to Strassmann, is biologically designed to spend much more time in lactation amenorrhea than in menstrual cycling. That in itself suggests that oral contraceptives, which alter hormone levels to suppress ovulation and produce a bleeding, could be forcing a continual state of cycling for which the body is ill-prepared. Women might be better protected against reproductive cancers if their contraceptives mimicked lactation amenorrhea and depressed the female reproductive hormones, rather than forcing the continual ebb and flow of menstrual cycles.

Strassmann's data also call into question a recently popularized idea about menstruation: that regular menstrual cycles might be immunologically beneficial for women. In 1993 the controversial writer Margie Profet, whose ideas about evolutionary and reproductive biology have received vast media attention, proposed in *The Quarterly Review of Biology* that menstruation could have such an adaptive value. She noted that viruses and bacteria regularly enter the female body on the backs of sperm, and she hypothesized that the best way to get them out is to flush them out. Here, then, was a positive, adaptive role for something unpleasant, an evolutionary reason for suffering cramps each month. Menstruation, according to Profet, had evolved to rid the body of pathogens. The "anti-pathogen" theory was an exciting hypothesis, and it helped win Profet a MacArthur Foundation award. But Strassmann's work soon showed that Profet's ideas could not be supported because of one simple fact: under less-industrialized conditions, women menstruate relatively rarely.

Instead, Strassmann notes, if there is an adaptive value to menstruation, it is ultimately a strategy to conserve the body's resources. She estimates that maintaining the endometrial lining during the second half of the ovarian cycle takes substantial metabolic energy. Once the endometrium is built up and ready to receive a fertilized egg, the tissue requires a sevenfold metabolic increase to remain rich in blood and ready to support a pregnancy. Hence, if no pregnancy is forthcoming, it makes a lot of sense for the body to let part of the endometrium slough off and then regenerate itself, instead of maintaining that rather costly but unneeded tissue. Such energy conservation is common among vertebrates: male rhesus monkeys have shrunken testes during their nonbreeding season, Burmese pythons shrink their guts when they are not digesting, and hibernating animals put their metabolisms on hold.

Strassmann also suggests that periodically ridding oneself of the endometrium could make a difference to a woman's long-term survival. Because female reproductive hormones affect the brain and other tissues, the metabolism of the entire body is involved during cycling. Strassmann estimates that by keeping hormonal low through half the cycle, a woman can save about six days' worth of energy for every four nonconceptive cycles. Such caloric conservation might have proved useful to early hominids who lived by hunting and gathering, and even today it might be helpful for women living in less affluent circumstances than the ones common in the industrialized West.

But perhaps the most provocative implications of Strassmann's work have to do with women's health. In 1994 a group of physicians and anthropologists published a paper, also in *The Quarterly Review of Biology*, suggesting that the reproductive histories and lifestyles of women in industrialized cultures are at odds with women's naturally evolved biology, and that the differences lead to greater risks of reproductive cancers. For example, the investigators estimated that women in affluent cultures may have a hundredfold greater risk of breast cancer than do women who subsist by hunting and gathering. The increased risk is probably caused not only by low levels of exercise and a high-fat diet, but also by a relatively high number of menstrual cycles over a lifetime. Repeated exposure to the hormones of the ovarian cycle—because of early menarche, late menopause, lack of pregnancy and little or no breast-feeding—is implicated in other reproductive cancers as well.

Those of us in industrialized cultures have been running an experiment on ourselves. The body evolved over millions of years to move across the landscape looking for food, to live in small kin-based groups, to make babies at intervals of four years or so and to invest heavily in each child by nursing intensely for years. How many women now follow those traditional patterns? We move little, we rely on others to get our food, and we rarely reproduce or lactate. Those culturally initiated shifts in lifestyles may pose biological risks.

Our task is not to overcome that biology, but to work with it. Now that we have a better idea of how the female body was designed, it may be time to rework our lifestyles and change some of our expectations. It may be time to borrow from our distant past or from our contemporaries in distant cultures, and treat our bodies more as nature intended.

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