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Reader

# TOM, IT'S TIME FOR YOUR SHOT

## HOW TESTOSTERONE DRIVES US

by Steven L. Shepherd

I first heard about Tom Blamey from a woman I had once worked with. She had a friend, she said, who had lost both testicles to cancer. Now he took supplemental testosterone shots. He did so once a month, and the result was that his moods and energy levels rose and fell like those of a woman. Sometimes he would stretch out the periods between shots, and towards the end of his cycle he would get low and lethargic. And then she'd have to remind him, only half-jokingly, that, "Tom, it's time for your shot."

*Tom Blamey breaking boards at tae kwon do tournament*

*Photograph by Sandy Huffaker , Jr.*

This, I thought, is someone I would like to meet.

Testosterone is terribly trendy right now. It's been in *GQ* and on the cover of *Newsweek* and *Scientific American*. It's voguish and it's faddish; it'll make you young, make you sexy, make you rage. If you're a drug company, it might make you rich. But what does it do when you're not looking for a miracle or the body of Conan? If you're just an ordinary guy minding your own business?

I wanted to know.

Not that I was completely ignorant. It's hard to be totally naive about testosterone—or at least its mythology. I knew, for instance, a little about it from having watched my son. He is now 13 years old. Less than a year ago he was a soft and cuddly child, amenable of spirit and still clad partially in baby fat. But now, almost over night, his voice has dropped, he is moody and irascible, he has grown taller than my wife, and his shoes are now bigger than my own. His form has become muscular and defined, his legs hairy, his shoulders broad. Riding a bicycle behind him now is like riding behind a truck.

All this is due to a roughly 30-fold increase in the testosterone levels of a boy entering puberty. But this is not the first time my son has been exposed to such a high level of testosterone. While still in his mother's womb he was temporarily subjected to levels almost as high as those of a man. This early surge is responsible for triggering the developmental chain of events that leads to the formation of male genitals; without it a person will become female in every respect but chromosomes. Contrary to Genesis, it is the female body that is the universal template and it is from the female that the male is crafted; it is testosterone that does the shaping. The same prenatal testosterone surge "organizes" the developing brain so as to make it male. Men and women do indeed think in differing ways, and there are detectable physical differences in their brains as well. Moreover, a mounting body of evidence suggests that the relative levels of testosterone to which a fetus—male or female—is exposed can influence a person's behaviors and sexual preferences later in life: more prenatal testosterone exposure helps lay a foundation for more male-typical behaviors and a greater sexual preference for women, lower levels for more female-typical behaviors and a greater preference for men.

Another thing I knew about testosterone was that women have a rather good understanding of its effects on men.

I learned this when I was still a teenager. The messenger was a bumper sticker pasted on the back of a car driven by a young woman who had pulled up next to me at a stop light. She was pretty and attracted my gaze, but it was her bumper sticker that answered exactly the socially inappropriate thought I was having at exactly that moment.

*I do*, it said, *but not with you.*

"My God," I had thought. "They know."

What the sticker told me, what I realized in that brief moment of adolescent clarity, was that women knew what was in the minds of men—that we are driven and poisoned by testosterone, always under its sway—and that knowing this they would always know their moves in advance. In the battle of the sexes they would always be a step ahead. For they knew the incessant urge in the male mind, that we all, as President Carter had dared say, have lust in our hearts, and that because of it we are constantly looking, wondering, and wanting. Aching. They knew the inner male mantra and they knew their answer:

I do, but not with you.

Now, many years later, I still admire an attractive woman, but the mantra is a little less insistent. Not because I've attained any Zenlike ability to quell my inner thoughts, but for the same reason I now have an erection less frequently when I wake up in the morning: as I age, my body is beginning to produce less testosterone.

It is human nature that as a thing becomes less abundant it is accorded greater value. And so it is perhaps that I have been led now to learn more about testosterone. And perhaps it is for the same reason that women, who produce their own testosterone but have in their bloodstreams only a small fraction of the amount carried by men, seem intuitively to know more about it than we.

* * *

I first met Tom early last year. He is 30 years old, a little bigger than me—5 feet 10 inches, 190 pounds—and he looks like Garth Brooks. The first day we met he invited me to his Ocean Beach house, and he was remarkably forthcoming. "I'll tell you," he said, "whatever you want to know."

He grew up in a small town just north of Seattle. In high school, according to his own admission and the observations of friends, he was wild: a partyer and a hellion, indifferent to school, always stretching the rules. He drove before he was licensed—and he drove fast. Once he nearly killed himself and others. Another time he "borrowed" his father's motorcycle and crashed it on the freeway. Always he had a girlfriend.

Most of these behaviors seem to have persisted into his freshman year at Central Washington University. It was then, when he was 19 years old, that he had his first episode of cancer. "It was diagnosed on a Friday," says Tom, "and my testicle was removed on a Monday." It's a fast-growing cancer, and once it's been found doctors don't like to dally.

Following this surgery, Tom had neither radiation nor chemotherapy. There was no evidence the cancer had spread, and he and his doctor decided instead upon a course of aggressive surveillance: frequent blood tests and x-rays to check for signs of recurrence. There were none, and five years later his doctor pronounced him cured. In the meantime he graduated from college, spent time in Hawaii, came to San Diego, and found his first professional job—started a grown-up life. It's not difficult to imagine then the mixture of dread, anger, and devastation he felt upon discovering a lump on his remaining testicle just six months after his anointment as cancer-free.

Tom's second testicle was left in place a week after it was found to be cancerous. This allowed time for sperm banking, but there wasn't any question

about removing it. "Because otherwise I was going to die." He was 24.

I once knew a guy whose father had built a business making sheep castrators. These devices were green rubber doughnuts about the size of a Cheerio; they were expanded and slipped over a sheep's testicles, then released. This stopped the blood supply and in a few days the dead and withered organs would drop off. Clearly one would hope for a better technique on people, but even so I had imagined simplistically that the surgical approach to the removal of a man's testicle would be the most direct: through the scrotum.

But that is not how it's done. To avoid disrupting the surrounding tissues and risking the cancer's spread, Tom's testicles were both taken out through abdominal incisions. The technique, he says, was better the second time. "The incision on the right is only about an inch long—a bikini cut—whereas the one on the left…" and with his hand he shows me that it's about three inches long.

Testicular prostheses are available. His first surgeon asked if he wanted one, but Tom said no. "You can't tell," he says, "unless you're one of these guys with big gonads"—which he quantifies by holding his hands out in front of him, cupped to the sides and about the distance apart of two basketballs. "The second doctor didn't even ask. I guess he'd seen the decision I'd made the first time."

It was immediately after his second surgery that Tom received his first shot of testosterone. He was still sedated, and when he came to, the pain in his hip was intense. Injectable testosterone comes mixed in a heavy oil; it is administered through an industrial-size needle into deep muscle tissue, and ideally the muscle should be vigorously exercised afterward. But in the case of Tom's first injection, "It just sat there. It hurt like hell," he says. "And I thought, 'If this is what it's going to be like, I'll just skip it.'"

Testosterone is a hormone with an extraordinary variety of effects. For instance, it not only helps trigger the adolescent growth spurt my son has just experienced, but it also brings that growth to an end. It does this by causing the shafts and growth plates of the long bones in the arms and legs to fuse; in ancient Rome, where male slaves were often castrated as infants, a eunuch could be readily identified not only by the feminine contours of his body fat but also by his unnaturally long limbs. In adults, testosterone plays a role in keeping a man's red blood cell counts at proper levels, in maintaining skin pigmentation (Roman eunuchs were also noticeable for their "sallow" complexions), and in preserving bone density and muscle mass. The latter are testosterone's well-known "anabolic" effects, and though we tend now to think of them most commonly in the context of steroid-abusing athletes, they are vitally important to ordinary good health.

None of this was explained to Tom. And given the pain of the injection, the immediacy of other concerns—"like, they wanted to take out all my lymph nodes"—and the fact that he wasn't then involved with a woman, he decided to forego any more injections. It just didn't seem necessary, and for one and a half years he went without testosterone.

In hindsight, this was not a good decision. But a decision is only as good as the information on which it is based, and this was not the only time Tom was left mis- or uninformed. He was told, for instance, that his first and second cancers were unrelated and that he'd just had the bad luck to be the one-in-a-million case. But according to the medical literature, a man's lifetime risk of contracting testicular cancer is 1 in 500. That same literature shows that a man who has had one episode of testicular cancer is at increased risk of a second, and that the odds of a recurrence are on the order of 1 in 20. This means that a man's lifetime risk of having two episodes of testicular cancer are more in the neighborhood of one in ten thousand—not high, but a hundred times greater than the doctor's glib one-in-a-million. (Given a U.S. population of about 90 million adult men, these same numbers suggest that some 9000 men in the U.S. are, as Tom refers to himself, "double testicular cancer patients.")

During the year and a half Tom went without testosterone, he experienced a variety of symptoms. He lost his facial hair, his complexion improved (his skin, he says, was "the smoothest it has ever been"), he developed cellulite on the back of his thighs, he lost muscle tone and mass, and his temperament "went way down." The latter he illustrates by holding his hands before him, palms down, and lowering them in unison to his knees. No doubt this is true. But it is probably also true that it was more than a shortage of testosterone that made for this period of lowered temperament.

One person to have known Tom for many years is Cindy Frye. Cindy was a high school classmate of Tom's, and for the last two years they have roomed together. "Tom," she says, "is a completely different person today from who he was in high school." In high school "he was real social, but not too serious and always getting in trouble." Now, she says, he is very serious, very oriented. "He has very much evolved."

Another person to have seen this evolution is Bill Penny. Tom and Bill first met in seventh grade. Bill was their high school class valedictorian, and later Tom was best man at Bill's wedding. Even today the two talk by phone several times a month. Penny speaks of Tom with great love and insight, and he says that following the loss of Tom's second testicle—the beginning of the time when he was free of testosterone and his temperament went down—Tom "was severely depressed."

Part of the reason for the understanding Bill Penny brings to his observations is that throughout the period of Tom's surgeries and treatments, Bill's mother was battling her own cancer. She and Tom, says Penny, were quite close, and the two of them talked about it quite a bit. She talked to Tom about his need to "be more aggressive about his own health care, but also about changing his behavior and avoiding situations that could lead to more problems—everything from alcohol use to whatever." More importantly, she talked to him about the need to examine and evaluate his life. "She had already started on the same kind of life

transition that Tom eventually ended up with," says Penny.

Of that transition, Penny says that Tom today is "more contemplative, more introspective," than he was in high school. "Those characteristics may have been latent—most adolescents are not introspective." But following Tom's first diagnosis and the loss of his first testicle, "he definitely became somebody who was trying to build himself for tomorrow. He became very much more forward thinking. He started doing better in school, and he started thinking about where he needed to be going."

This process of personal deepening was well under way when Tom's second cancer occurred. But it was also shortly after this that Bill Penny's mother died. And that, says Penny, "depressed Tom significantly." A lack of testosterone, he suggests, was probably only one in "a mixture of issues" that could have contributed to Tom's more tempered mood at the time.

But there was one psychological change that can be attributed solely to his new shortage of testosterone. He lost his interest in sex. It wasn't discreet or dramatic, says Tom. Rather, he simply grew sexually indifferent to women. "I could take them or I could leave them." When you have testosterone, he explains, "you *need* them. But without testosterone, that animalistic attraction is not there. You don't have that dying rage." Physically, he could get an erection, but it didn't last long. The male animal was tamed. The mantra had stilled.

Unwanted attentions, by definition, are unwanted. But as I had realized in my moment of bumper sticker insight, women do expect at least to be able to summon forth upon their initiative a certain chorus of thoughts among men, and when they fail at this it can be disquieting. "Tom is very physically attractive," says Bill Penny, "and women are definitely attracted to him." More than once during the time he was without testosterone, Tom found himself in the company of a woman who showed a physical interest in him, and when he failed to reciprocate, says Tom, "there was a confusion and feeling of rejection on her part—and then *I* would feel less of a person."

The choreography of courting is complex. It is, perhaps, more deeply ingrained than ever we can know, the basic steps having evolved long before humans walked the earth. Fundamentally, courtship for a male involves attracting the attention of a receptive female while simultaneously fending off rivals until winning the opportunity to mate. Testosterone has been found in all vertebrate species in which it has been sought, from fishes to salamanders to roosters to dogs. The first of these animals appeared in the early Paleozoic era—which means that testosterone has been around for at least 500 million years. Throughout this time, testosterone has had one consistent principal function: to foster those things that constitute maleness. Whether it be the growth and display of a male lizard's dewlap, the comb, wattle, and crow of a rooster, or the rack, bellow, and rut of a stag, the physical features that make a male male and the behavioral traits it takes to exercise and advertise them depend on testosterone. Testosterone is of crucial importance in facilitating the sexual ballet, and it is difficult to surmount its absence. "It is easier," says Tom, "to fake no interest when you have testosterone than it is to fake an interest when you don't have testosterone."

Paradoxically, though, his lack of testosterone actually facilitated some relationships during the time he was without it. "When I was not taking testosterone," he says, "it was a lot easier relating with women. Sex wasn't always a hidden agenda. You're not having to always try to control yourself. My relationships with women were closer then, because they were *safer*.... Those sexual thoughts aren't always there." He tells, for instance, of a married couple who are longtime friends of his. The woman, he says, is very attractive. "But you'd never want to do that"—make an advance, or have sex with her—"because of what it would do to the friendship. But still, it's always a thought. When you're not on testosterone, though, that thought isn't there." As a result, he found himself able to cultivate and enjoy friendships with women that might not have blossomed otherwise. "Women," he says, "can *feel* when you're interested in them for reasons other than sex."

We are, though, creatures not only of hormones, but also of experience and memory, and there came a day when Tom found himself involved with a woman with whom he wanted to share not only friendship, but physical closeness as well. And that's when he wanted to begin taking testosterone.

* * *

The first man ever to receive an effective dose of medically administered testosterone was a 26-year-old Chicagoan known in the literature only by his initials. N.T. had underdeveloped testicles, a condition known as hypogonadism, and had physically never gone through puberty. He was slight of build and youngish of appearance; his voice was high, his pubic hair scant, and he shaved only a little fuzz every few weeks. Erections, wrote the author of the report in which the case was first described, occurred occasionally. Ejaculations never.

On November 6, 1934, N.T. began receiving daily injections of a concentrated extract made from 1100 pounds of bull testicles, collected from the Chicago stockyards. The shots, wrote Allan Kenyon, of the University of Chicago, had no effect on the man's beard or general health. But, "Erections became greatly increased in frequency and several ejaculations occurred for the first time in his life." Two weeks into the experiment Kenyon decreased the dosage and the man's frequency of erections decreased; later, he increased the dose and the erections increased. Then, on the 53rd day, Kenyon stopped the treatment. He had given his subject the world's entire supply of testosterone-containing extract. Shortly thereafter, "no further ejaculations occurred."

Fortunately, N.T. got a second chance. In 1935, and within weeks of each other, two separate research teams in Europe published papers describing their creation of pure testosterone from cholesterol —a discovery for which the

papers' main authors later shared a Nobel prize. This development meant that pure testosterone, once almost impossibly difficult to obtain, could now be manufactured and administered in abundance.

It did, though, take some time to work out the proper dosages. One of the first men to receive the new synthetic testosterone was an English veteran of the First World War who had lost his testicles to shrapnel at the age of 19. In 1937 he began receiving daily injections of 20 milligrams of testosterone—about three times a man's daily production. Following his wounding the man had never had an erection and had lost all libido. And although he had gotten married and had been so for 13 years at the time of his treatment, he and his wife had never had sex.

On the night of his very first injection, the couple consummated their marriage. For each and every night thereafter the man had both erections and sex (his wife being reported as now "satisfied completely"). But after nine days the patient went to his doctor and "implored" him to postpone the day's scheduled injection: his erections had progressed from "rapid and prolonged" to constant, and even after sex "detumescence did not occur." The patient's libido, added the doctor, "was almost excessive."

Similar reports can be found in most of the early literature. Kenyon, in 1937, began treating several hypogonadal men (including N.T.) with near-daily injections. One 36-year-old began having erections within 16 hours of his first injection and they soon progressed to near constancy; married, he began having sex every other day, and "would have preferred it daily." Another man also soon reached a state of constant erection, and though he was kept awake by his condition, the entire process, wrote Kenyon, "excited the patient greatly."

Writing many decades after these first experiments, Dr. Julian Davidson, of Stanford University, notes that no one who has ever observed a man discover or recover his "sexuality at the touch of a needle containing testosterone can fail to experience considerable wonder over how the hormone works." But every bit as dramatic is the change in demeanor that accompanies the administration of testosterone to a man with none of his own. Time after time the early literature speaks of hypogonadal men who were initially anxious, sullen or fragile of mood, and easily prone to distraction and physical tiring. After treatment, these same men are described as energetic and self-assured, less fragile, and more assertive. One such patient, who happened also to be a doctor trained in endocrinology, wrote that after beginning testosterone therapy he began to surprise himself by "talking back to taxi drivers." It was quite remarkable, he said, that a simple medication "could so change the behavior and outlook of an individual."

* * *

It has now been almost five years since Tom began routinely taking supplemental testosterone. He takes a single 400-milligram shot every four weeks. Some years ago, this regimen was studied in a group of hypogonadal men by Stanford's Julian Davidson, and based on blood tests he determined that the men's testosterone levels were higher than normal for about the first ten days of the month, and lower than normal for the last week. These changing levels have a multitude of effects, and Tom is keenly aware of many of them. "It's very interesting," he says. "I really get a feel for myself. I can watch my emotions change." He describes himself as more aggressive early in the month, and more relaxed later. If he waits too long between shots and his hormone level dips too low, he gets hot flashs—like those of a woman in menopause.

Tom's roommate, Cindy Frye, is also keenly aware of the effects of his shots. They affect, she says, his energy levels, his diet, his aggressiveness, and his moods. Especially his moods. They swing, she says, "so much."

This gives him an insight into the lives of women that few men will ever know. He can relate, says Cindy, when she says that "it depends on where I'm at in my cycle as to what I want to eat, and if I have energy or I don't have energy, or if I'm feeling aggressive or I'm not feeling aggressive." But this similarity of experience has its drawbacks as well.

When she is having her period and he has just taken a shot, then, she says, "we fight. We don't get along, because we're both feeling very aggressive." She has lived with other women and there have been clashes when their periods coincided. "And it was kind of rough. But let me tell you, when Tom takes his shot and I have my period it is, sometimes, war. I mean, it can be really intense."

These were the ups and downs I wanted to know about. In them are lessons for the vast majority of men whose testosterone is from sources more natural—but who are no less subject to the hormone's effects. Following our first meeting, Tom and I met again more than a dozen times over the next seven months. We talked, rode bicycles, played chess, went to the beach, and shared meals, all while he was under the varying influences of testosterone.

As was I.

* * *

One of the first times we got together was at a Saturday morning Tae Kwon Do class in early March. Tom began studying Tae Kwon Do the summer after he lost his second testicle; he took it up, he says, because he was having joint pain from too much running. "Plus, there's a lot of attributes to it that I like. Tae Kwon Do is about balance and control, and that's what life's about—-balance and control."

No doubt there were other reasons as well. Tae Kwon Do, suggests Bill Penny, may have helped give Tom an "alternative way of expressing his masculinity." Along with such other activities as scuba and sky diving, it affords him, says Penny, a chance to redefine and "to combine the spiritual as well as the physical elements of what it might mean to be a man."

Like everyone, Tom began as a novice, a white belt. But on the day I sit and watch from the wooden benches of

the gymnasium at the Ocean Beach Community Recreation Center, he wears a black belt at the waist of his cotton ghee. There are in San Diego untold commercial Tae Kwon Do and martial arts studios, but Tom prefers the setting here, where there are participants of all ages and abilities. "It's good for me," he says. "I'm single, and this is my chance to come and play with the kids. It gives me a sense of community."

Besides Tom, there are in the class two other men, two women, three children, and the instructor—Rocky Burks, a third-degree black belt who has been Tom's teacher since he first started lessons. Tom and Rocky have become close friends over the years; clearly, others in the room have so as well, for there is a good deal of friendly banter as the class assembles and its members stretch. Most of these people, says Tom, know of his "situation." Not because he is quick to bring it up, but because he doesn't avoid it when it's relevant. And, "It's often relevant, because people talk about sex so much."

It has today been nearly a month since Tom took his last injection of testosterone, and he describes himself now as "really mellow. Very low-key. Very relaxed." About us, the world feels equally at peace: the skies are blue and the weather is shirt-sleeve-and-shorts perfect. The doors to the gym are opened wide, and through them come beams of light and the sounds of the day: screeching seagulls, laughing children, the strains of an acoustic guitar. On the floor of the gym, the class finishes its stretching, then rises to take positions. Tom, the senior member, assumes the most privileged position: front row, righthand corner, facing the instructor. The students and the instructor bow. The class begins.

"Double arm block," calls Rocky. And in unison clenched fists swing sideways and up, elbows bent, arms articulating from the shoulder.

"Rise and block—front punch." Forward they step across the floor. Step, swing, step, swing. A legion in training.

"Knife hand block. One, two, three, four,… Quickly now. One, two, three, turn. Every move strong, every move focused."

One man in the class is an ex-Navy pilot, tall, well-built, and young. Normally, he might be called "athletic looking." But he is new to this. He wears a white belt and moves like the giant Imperial walkers from *Star Wars*. Tom, in contrast, is smooth, his moves graceful and accomplished. His kicks are high, and as they cut the air they leave behind a swooshing sound, like the slicing of a sword. Occasionally, he wipes sweat from his forehead, fingertip touching brow.

After a time, the class breaks for a rest. Tom joins me on the bench, but soon he is approached by two of the class's children—boys of seven or eight. They have been hitting the leather punching bag that hangs from a chain near the wall and they show Tom their knuckles. He examines them gently, then tells one of the boys there is too much red on his pinkie and ring fingers: the point of contact needs to be more central. Someday, he tells me, he would like to be a teacher.

When the break ends, the class arranges itself into pairs for sparring. Tom's first partner is a vivacious and attractive young woman recently graduated from UCSD. She has been attending class for two years and wears a yellow belt; earlier, Tom had pointed her out and confessed that he once had a bit of a crush on her. Now they face off and, at Rocky's signal, begin. Tom is bigger, stronger, more experienced, and clearly has the advantage. But rather than combative, their sparring is gentle and play-like, their moves fluid and in harmony. Back and forth they step, arms swinging and blocking. At times their faces come close, and as they do I am reminded of Ella Fitzgerald and Louis Armstrong singing Irving Berlin's "Cheek to Cheek."

After several minutes, the pairs reform and this time Tom is matched with the fighter pilot. The pilot is a head taller than Tom and equipped even now with a short, military haircut. But despite the Hollywood contrast—the warrior and his hormonal opposite—and the sometime-sound of contact as they begin, there is no suggestion of threat or hostility in their moves and countermoves. Instead, Tom mostly teaches. They laugh as they retreat and advance, and at times the pilot simply throws up his hands in defense and surrender. Hormones be what they may, the black belt dominates the white; and when their time is up they bow and shake hands.

Finally, Tom spars with his instructor. More contact now and the pace is faster; a flurry of high kicks, fast turns, and rapid chops. But they, too, end in laughter and a bow.

What if I had come early in Tom's cycle? If, instead of mellowness, he was feeling what he calls the "killing rage?" Would he have disemboweled the pilot and made off with the girl? Would the kids have had to cover their eyes?

Not likely, says Burks. He says there are days when Tom has told him he feels "juiced" on testosterone and others when he doesn't feel like sparring—days he feels more defensive than offensive. But Rocky says the same is true of himself, and that overall he notices little variation in Tom's performance.

The reason is control. At their core, says Burks, martial arts are about self-protection, and hence, "raw, unbridled aggression. The idea is to focus all your energy, all your strength, into a strike that is going to do physical damage to someone. So obviously if you have that ability, and you're in a class where people are learning, you have to have control. The bottom line is control, control, control—learning who you are, what's inside you, and learning to control that." Lose that control and there's a risk of injury. Burks says he's seen cracked ribs and jammed fingers and has himself suffered a broken nose. Lose that control and you'll be asked to leave.

It works the other way as well. More than once Burks has seen Tom stir himself from lethargy—times when his testosterone levels may have been low—through sheer force of will. "When he is challenged, whether he feels like it or not, he will force himself to rise up and defend, to accept the challenge and meet it head on. He has the mental discipline to make himself do things."

James Dabbs is a psychologist at

Georgia State University who has been studying testosterone and its relationship to behavior for more than a decade. Some of his earliest work was conducted with male criminals, and it showed that compared to men with the lowest levels, men with the highest testosterone levels were more likely to have committed violent crimes. This result seemed to support the work of other researchers and is certainly consistent with the popular belief that testosterone is related to aggression. But Dabbs, who speaks with a rich Southern accent, now says that, "If you look at the literature closely, and even at my own work, you will find that there is a greater association between dominance behavior and testosterone than between aggression and testosterone." The relationship between testosterone and aggression is, he believes, probably overrated.

Psychologists define aggression as behavior that is intended to physically injure another. Dominance, on the other hand, refers to the achievement or maintenance of status over someone else; with it comes the prerogative to control resources. Aggression is fairly easy to identify in animals, but the problem with most of the human research is that rather than studying deliberately injurious behavior, the work relies instead on such things as people's ratings of how prone they are to anger or irritability. Moreover, most of the studies can be interpreted to show that the relationships found are with dominance rather than with aggression. Even the prison work has found that while violent criminals tend to have higher testosterone levels than nonviolent, nonassertive criminals, so too do men who are not violent but hold prestigious, socially dominant positions within the prison hierarchy.

To appreciate why it makes sense for testosterone to be more closely related to dominance than to aggression, it is useful to recall the evolutionary purpose of testosterone: to help males successfully reproduce. All the things testosterone does—increase muscle mass, increase concentration, increase libido—are, says Dabbs, "in the service of the same motive, which is to increase male reproductive efficiency. Men are the way they are, good hunters, with good spatial abilities, etc., because that's what it takes to be sexually successful. Testosterone, and the things it does, increases their sexual chances. It promotes all the things that might help a man do what men do."

Aggression might conceivably help a man win the mating game under some circumstances, but it is dominance and the power to control resources (with the ultimate resource being uncontested sexual access) that is the real plum. Most males of most species don't find mates, and the principal means for any one male to overcome this problem—and to keep his genes from disappearing forever—is by achieving dominance. This fact has been demonstrated in countless animal studies. In one classic study of elephant seals, for instance, the top 5 males in a dominance hierarchy of 115 males were responsible for 85 percent of all matings. But the same dynamic can just as easily been seen in a recent photograph from *National Geographic*. The picture, taken in 1903, shows a rather satisfied looking Polynesian chief. The chief is wearing a garment made from the hair of his vanquished foes, presumably all male, and around him are three beautiful, smiling women—all naked.

Paul Bernhardt is a colleague of Jim Dabbs who now works at the University of Utah. Elaborating on the distinction Dabbs draws between testosterone's relationships with aggression and dominance, Bernhardt says it appears that "testosterone really drives dominance. One way of gaining dominance is aggression. But there are a lot of situations now where aggression is not going to work. There are some situations where violence works, but there are many more where it doesn't.

"If you think of the O. J. Simpson trial, trial lawyers have been shown to have high testosterone levels, but they weren't out there hitting each other in the face. To obtain dominance you use the method that works in the situation at hand. Testosterone is related to your willingness to take the step that no one else is willing to take."

That willingness is part of some elemental psychological force that has yet to be named or fully defined. Dabbs has said previously that it contains something of strength, impulsiveness, and adventurousness. Others have called it the inclination to prevail.

Whatever it is, the extent to which it does include aggressiveness probably helps explain some of Dabbs' more recent and seemingly paradoxical findings. One such study examined the testosterone levels and job achievement of nearly 5000 military veterans in their late 30s. In most respects these men were representative of their same-age counterparts in the U.S. population as a whole. Contrary to what might be expected, Dabb's results showed that as testosterone levels went up, occupational status tended to go down. The group with the highest testosterone levels were jobless, while the group with the lowest levels were professionals and managers. Men at the extreme high end had a 60 percent greater chance of being unemployed than of being a doctor.

In other studies with this same population, Dabbs and his colleagues have looked at testosterone levels and such factors as alcohol and drug abuse, legal and money troubles, and poor educational attainment: all were more common among men high in testosterone. They have also examined the hormone's relationship to marital success, finding that the higher a man's testosterone level, the less likely he was to be a good husband—or a husband at all. "A man with a high level of testosterone," note Dabbs and his coworker, "is less likely to marry and is more likely to have experienced a divorce some time in his life. Moreover, he is more likely to have spent time apart from his wife because they were not getting along, to report having extramarital sex with at least three people, and to have hit or thrown things at his spouse.… In short, testosterone has a consistently negative relationship with getting married and staying married, and with multiple indicators of marital success." Overall, says Dabbs, the general picture is one of an association between higher testosterone

and a greater "tendency toward excessive behavior."

Testosterone, in other words, is associated with a lot of what we have come to consider antisocial. In the complex societies humans have evolved, it takes more than strength, aggressiveness, or impulsive acquisivity to succeed—to obtain dominance. Rather, it takes competence, cooperation, and social intelligence. Nor is this simply a description of the politically correct New Age male. It's a sure bet the enemies of National Geographic's happy chief didn't give up their hair without a fight, but it's equally sure the chief had allies, whom he had to muster, cajole, inspire, and organize—and later reward.

Biology is not fate. Every day men with high testosterone levels enter into and stay in happy marriages, enter into and practice socially prestigious professions, and enter into and function as esteemed and reliable members of society. But they do so by exercising the same qualities Tom calls on in Tae Kwon Do: discipline and self-control. "As creatures of culture," says Jim Dabbs, "successful members of society control their impulses. Testosterone-related impulses are no exception."

Generally these impulse controls are instilled early in life; they act almost invisibly and almost continuously. We call their transfer and acceptance socialization. It is perhaps no accident that the one human group in which there does exist evidence of a relationship between testosterone and aggression independent of dominance is teenage males. This is a group in which testosterone levels are high and impulse controls are low. But it is also a group in which the experience of high testosterone levels is new.

When Tom first began Tae Kwon Do, it was about nine months after he had lost his second testicle. Rocky remembers him then as capable and athletic and no more timid then other beginners. But Tom remembers it otherwise: "I got beat up a lot. I just wanted to be everybody's friend. I couldn't defend myself—I didn't have it in me." It was another nine months before he started taking testosterone, and by then it had been a year and a half that he'd been without it. In a sense he was at that point virtually new to the stuff. And in ways it was rather like being a teenager again.

"After I started taking testosterone," says Tom, "I got more competitive. I was willing to be more aggressive. My reaction was like, 'Oh, you hit me. I'm gonna kill you.'"

Rocky doesn't recall seeing this newfound aggression in his class, but he does remember that about that time Tom took some supplemental classes with another instructor in town. "And he immediately got a reputation. The students there were all afraid of him, because he was being aggressive. He was in on top of these people and shoving them around, and the other instructor came to me and said, 'What's with this new guy you got here? He's beating up all my students. He's kicking their asses.' So, yeah, he got a reputation. He was a bit of a bad boy for a while."

It would take some getting used to.

* * *

It was a few weeks after our visit to his Tae Kwon Do class that Tom came to my house for dinner one night. My wife was out of town, and my son and I were left alone to do the entertaining. Tom arrived wearing sandals, large, baggy corduroys, and a loose button-up shirt, and together with his wire-rim glasses the effect was "stylishly casual." Much of his dinner conversation was directed to my son, and they spoke with enthusiasm about music, guitars, and racing bicycles. Clearly, he put my son at ease. After dinner we moved to the living room and began a game of chess.

Rank, privilege, and the prerogative to control resources are parceled out in human societies in many ways. Within large groups, the principal means is through the assigning of different values to different traits or skills, which is why doctors generally hold positions of higher social status than ditch diggers. In smaller groups, however, rank tends more often to be based on the results of one-on-one dominance contests. It is the belief of psychologist Allan Mazur, of Syracuse University, that testosterone plays a key role in the outcome of such contests, and to explain that role fully he has developed what he calls a biosocial theory of social stratification.

In essence, Mazur says that people—and particularly men—win and lose rank in small groups through repeated face-to-face competitions. The winners of such contests experience a rise in testosterone levels, and this then prompts them to seek out more such competitions. At the same time—by fostering more confident, assertive action—testosterone better equips winners to win again. In short, winning produces testosterone which produces more winning which produces more testosterone. Losing, in contrast, leads to a fall in testosterone, which encourages more depressed, submissive behavior and the avoidance of further competition. In this way, testosterone helps ensure that the cream rises, the unfit cease to engage in losing battles, and relative peace prevails.

Mazur's theory is based partly on a large body of animal studies. Among the most compelling of these are a series of experiments conducted with rhesus monkeys in the early 1970s. These experiments began when researchers put a large group of males together in an enclosure and allowed them to form a dominance hierarchy; after they'd sorted themselves out, blood tests showed that the most dominant monkeys had the highest testosterone levels. New, lone males were then introduced to the group one at a time. Within minutes, each of these animals was decisively attacked and defeated, and when later tested each was found to have experienced a dramatic drop in testosterone, with levels falling an average of 80 percent from their original values.

Later, these defeated males were allowed to form their own separate group. Inevitably, one monkey became the dominant (or alpha) male of this new group, and along with his new rise in status the animal's testosterone level showed a fourfold increase. This small group was then reintroduced to the larger group; the small group was soundly defeated, each member of the

defeated group experienced a decrease in testosterone levels—and with his dominance freshly demonstrated, the alpha male of the larger, victorious group experienced his own fourfold increase in testosterone. (These high and low testosterone levels, it should be pointed out, are not permanent. Once an animal "learns its place" in the social order, its testosterone level returns to whatever is physiologically normal for that particular animal, which is why an alpha male can have levels well below many of his subordinates during times of social peace. Nor must an alpha's dominance be achieved only at the expense of other males. In one of the experimenters' most striking manipulations, defeated, testosterone-depressed males were given their own private four-female harems. Each male immediately became master of the house, and the combination of newly acquired alpha status and unchallenged sexual access proved potent medicine, with some of the animals experiencing testosterone increases of as much as 1000 percent.) Hundreds of versions of these experiments were performed, and the results were always the same: defeat and loss in social rank led to a loss in testosterone, victory and a gain in rank led to a gain in testosterone.

But Mazur's theory rests on human data as well, much of it his own. Mazur has found, for instance, that after vigorously contested but clearly decisive tennis matches, winners show a rise in testosterone levels and losers a fall. Over the course of a college season, he has found that winning tennis players tend to have a rise in testosterone not only after their victories but also just *before* their next matches—especially if they thought they had played well. (Indeed, if a man is sufficiently invested in a contest, he needn't even be in it for it to affect his testosterone. Paul Bernhardt has shown that the testosterone levels of committed sports fans rise and fall with the fortunes of their team.) And, most importantly, Mazur has shown that a contest needn't even be physical for it to affect a man's testosterone.

Sports are only play. And few of us are involved with any frequency in truly aggressive, violent encounters. Rather, the most common dominance contests for most of us are mental. These are the day-to-day, sometimes petty, often vicious, struggles and squabbles on mahogany rows, on construction sites, among law office "partners"—virtually anywhere there are more than two post-pubertal males—over "Who has the say." And to mimic them Mazur has turned to that quintessential game of mental combat, chess.

In an experiment also worked on by James Dabbs, Mazur first studied participants in an all-day tournament. Among men who eventually won more than half their matches, Mazur found that testosterone levels rose in anticipation of the tournament and were higher still when the event was over. Losers showed falling anticipatory levels, and wound up at the end of play with levels well below winners. Mazur and Dabbs also looked at players in an extended, nine-week tournament, and found in this case that after just two weeks of play winners maintained consistently higher testosterone levels than losers. They found, too, that the winners' biggest testosterone surges took place after those games that were the most intensely fought. Competitors, says Mazur, "must take their competition seriously" if it is to affect their testosterone levels.

As Tom and I sit down to play chess, he is incapable of producing an anticipatory rise in testosterone. (Nor is he capable of reproducing any of the other fluctuations experienced by men with testicles: our levels pulse high and low in 15-minute cycles; among men with partners, they're higher after their mates ovulate; they're twice as high in the morning as later in the day; they're higher in summer and fall; and they go up after sex.) All the same, his testosterone is plenty high. It has been just over a week since his last shot, and of his physical, intellectual, emotional, and sexual selves he says, "I'm about at my peak right now." According to Julian Davidson's work, he is still way above normal.

As we set up the pieces, we engage in the customary self-effacement of our skills. It has been years since we've played, we both say. We're rusty. And we never were particularly good. But still, neither of us wants to lose—not against someone we've just met and wish to impress. My son pulls up a chair to watch, and as the game unfolds, he and Tom resume their dinnertime conversation. Tom is full of philosophical pronouncements, and at one point he tells my son that in life you must, "Be bold. You only live once."

Boldness is also a characteristic of testosterone-influenced behavior, and as he speaks Tom executes an across-the-board queen trade I am not expecting. But restraint is sometimes wiser than boldness, and by practicing fundamentals—control the center, develop your pieces—I begin steadily to erode his position. It isn't elegant, but eventually the checkmate is mine. We have found ourselves well matched, however, and when the game is over, we laugh and congratulate each other. I may even have felt a slight testosterone surge.

* * *

The woman on whose account Tom began taking supplemental testosterone has long since passed from his life. He has, however, maintained his interest in romance, and on the night he comes to play chess (and after my son has gone to bed) Tom tells me of a new woman with whom he has become involved. "I find her," he says, "very physically attractive—we're dating now."

He tells me this with a mixture of pride, disbelief, and lasciviousness, and as he speaks I am moved to recall that he is now "peaking" on testosterone. "I find her emotionally attractive, too," he says, "but physically, especially." There is in his voice an unmistakable urgency as he says this, and for emphasis he clenches his fists at his side—as a thirsty man in the desert might strive to squeeze water from the air. Three days ago, he tells me, he slept with her for the first time.

What is it, I wonder, that would cause him to be so sexually successful at this very height of his testosterone cycle? Can a woman tell when a man's levels are high? Can they sense testosterone?—or tell a man who is high from

a man who is low? Do they know?

I asked this of Dr. Allan Mazur, and he told me there are no scientific studies showing that women have the ability to accurately assess men's testosterone levels. He also added that he himself had once tried informally—"And I stress informally"—to gauge men's testosterone levels, and he found that he couldn't. "My expectation was that men who were more muscular, hairy, menacing looking than those who were iffy had more testosterone. But this was not the case." So what might a woman be responding to when she sleeps with a man for the very first time on the same night his testosterone level is approaching its absolute maximum?

Cindy Frye, Tom's roommate, has seen him interact with many women and through many testosterone ups and downs, and she suggests that what women are responding to is the way that he feels about himself. When his levels are high, she says, "I think maybe he feels more competent, or more manly—more attractive. I think he just feels really good. I can visualize him, it's kind of like he's strutting around—not in a cocky way, but.… like a male bird. He's more puffed up."

He also emanates a greater quantity of behavior with a chance of inducing a woman to respond. "He's more likely," she says, "to put his arm around someone then—in a friendly way; because he's usually a very friendly person. He likes to give you the hugs goodbye and hello. But he's more likely to do that after a shot."

And then there's the matter of his interests. "When he's low, when it's near the time that he needs a shot, women are not his focus. But after a shot his body is telling him like, 'Whoa, what's going on here?'"

Tom himself summarizes all of this simply by noting that, "Women react in kind to my interest level." But the trio of factors mentioned by Cindy Frye—increased physical awareness, mental focus, and engaging behavior—all point to the surprising complexity of testosterone's role in a man's sexuality.

In popular mythology, the relationship between testosterone and sex is clear-cut: testosterone gives men both the urge and the capacity. Take it away and they have neither, give it back and they have both, give them more and they have more. But are these things true? And what does testosterone do physiologically? Where does it turn the chemical key? And how does it give rise to those ever-intruding male thoughts?

Most men have far more testosterone than they need for normal sexual functioning—however one cares to define normal. Much as we're inclined to believe otherwise, studies have shown repeatedly that within normal ranges, greater or lesser amounts of testosterone have no effect on a man's capacity or desire for sex. At extremely high, supranatural levels, testosterone does affect some aspects of sexual function—as demonstrated by the unceasing erections of Allan Kenyon's early subjects. But by definition these are levels far higher than are ever found in normal men.

At the other end of the scale, it takes a certain minimum amount of testosterone for a man to be able to achieve normal sexual functioning. Less than this and a man will have little or no desire, few or no spontaneous nighttime erections, a lowered intensity of sensation, and little or no sexual activity overall.

Together, these characteristics describe what is called a threshold effect: some critical minimum is needed to make a thing happen, but more than that makes no difference. A car, for instance, needs enough gasoline to run, but more than enough makes it run no better. This raises the obvious question of what all that extra testosterone is doing in our bloodstreams—Why do we have more than we need for sexual functioning? And to this the best answer seems to be that we have it to aid in our pursuit of dominance; men have an excess of testosterone not so that they might perform better sexually, but rather so that they might better win the opportunity to perform at all.

But an even more fascinating question is suggested by the many aspects of a man's sexual functioning that are *not* on the list of those dependent upon testosterone. For instance, a man with no testosterone can still have an erection. Alfred Kinsey, the researcher whose famous studies on Americans' sexual habits were published in the 1950s, reviewed all available studies on men who for one reason or another had lost their testicles, and he concluded that a surprising proportion of castrated men retain some ability to respond to sexual stimuli, to have erections, and to experience orgasm. One study found that a quarter of the men examined still had the ability to have sex 15 years after their castrations, and another told of a man who had been castrated at the age of 23 but was still having sex once a week with his wife 30 years later. So the question is, If it's not critical to the plumbing, what exactly does testosterone do? Why do men who lose their testicles retain the ability to respond to an erotic movie or a woman's touch, but lose the ability to initiate or respond to their own fantasies?

One clue is suggested in an early study testing the use of synthetic testosterone. Among the participants were a pair of married men who had both been castrated. Each could perform the mechanics of sex, but each lacked sensitivity in the penis, lacked enthusiasm, and described sex as "mere arduous work." Testosterone, it seems, makes sex fun. Without it, sex might be pursued for the benefit of another, but not for oneself.

The link between physical sensitivity and the interpretation of a sensation as pleasurable is at the core of a theory developed by Julian Davidson to explain the physiological role played by testosterone in sexuality—which he calls the most consistent, "biologically important known action of a hormone on behavior." Davidson's theory is that genital sensations and sexual thoughts feed and amplify each other in a self-reinforcing, circular fashion. Just as that first quickening in the loins can lead to a flurry of images and impulses, so too the reverse. Testosterone's biochemical role, suggests Davidson, is to increase the sensitivity of the sexual nervous system—to increase its capacity to carry and recognize pleasurable signals. Because of the tight, circular linkage between sexual thoughts and physical

sensations, an increased capability anywhere in the system increases the capability of the whole. Add a little testosterone where none existed before and you get more tinglings and twinges, more fantasies, more erections, better orgasms. And because we're inclined to do more in the future of what has made us feel good in the past, the testosterone-enhanced link between thoughts and sensations readily accounts for the relationship between testosterone and sexual behavior.

All this remains to be tested. But it's not bad as theory.

* * *

In May, several months after Tom first expressed to me his feelings for the woman he has become attracted to, we went to La Jolla early one evening. The purpose of our trip was twofold: Tom was going for a swim in the Cove, and then, after dinner, we were going to Warwick's to hear Theresa Crenshaw —physician, researcher, sex therapist, and sometime media "personality"—talk about her new book on love, lust, and hormones.

On our drive to the Cove, Tom briefs me on the state of his love life. He has grown increasingly close to the woman he spoke of over our game of chess. They date regularly and are together often. But now she has developed a reservation about the physical side of their relationship.

The nature of her unease is religious. But the issue is complicated by her enjoyment of the intimacy she shares with Tom. She is growing conflicted. But Tom has proposed a solution, one few men could offer: He has suggested that he quit taking testosterone. His physical desire for her will wane; she will be faced with less temptation; restraint will come easier.

Momentarily I am taken aback by his suggestion. The audacity of what he is proposing is almost incomprehensible to me. It is as if he were willing to view his physical longings as the mere product of a switch that could be turned off and on at will; it's a view that treats the loss of his testicles as an advantage—and one that could constitute the ultimate lemons to lemonade maneuver.

As I digest this proposal, my first thoughts are of its possible health ramifications. Stopping testosterone would re-expose Tom to the same health effects he risked or encountered in the year and a half following the loss of his second testicle—bone loss, muscle loss, and anemia. In addition, the possible further effects of stopping and starting a man's flow of testosterone willy-nilly are largely unknown. Tom, too, has his own doubts about the idea. Unlike that first time he went testosterone-free, this time, he says, "I would know what I'm missing." And he cites as but two examples a lack of energy and a reduced competitiveness at work.

But the more I think about it, the more a different question comes to mind: Would he even achieve his goal? If he stopped testosterone, dampening his inclinations and her temptations, would her newly chaste behavior qualify as meritorious?

My understanding of Christian theology is slim. But this much I believe is correct: Without temptation there is no "good." Adam, before he was offered the apple, had never done wrong, never been evil. But neither had he been good, for never had he been challenged. This is what it means to be innocent. Were Tom to remove temptation from his girlfriend, he would equally remove her chance to be virtuous. Like it or not, testosterone supports a cornerstone of human behavior, and to thwart or deny its effects is to thwart or deny a part of who we are.

At the Cove, Tom strips quickly to a pair of black Speedos, dons yellow goggles, and sets off towards a buoy a quarter-mile distant. The air is clear and warm, the water temperature in the high sixties; there are in the water several dozen other swimmers. "I consider this," says Tom, "one of the great perks of living in San Diego." But perk or no, he has as well a specific purpose in his swim: he is training for a triathlon—a half-mile swim, fifteen-mile bike ride, and three-mile run. The event is scheduled for later this summer, but already it would seem he is in shape, for his strokes are easy and confident and he is in and out of the water within half a hour.

After he showers, Tom and I head to a nearby delicatessen for dinner and a rendezvous with his girlfriend, who will join us for the talk at Warwick's. There, the crowd is large and excited. Dr. Crenshaw stands near an island at the center of the store, and from her, people radiate out into every available aisle and cranny; everyone, it seems, is interested in sex, love, and hormones.

Crenshaw, I gather, has spent considerable time on talk radio. From it she has picked up a manner that is slightly licentious and I suspect maddening to her academic colleagues. She's got an answer for everything, is smooth, polished, and unctuous, and can segue from anywhere to anywhere. Many of her comments are self-serving (as when she tells her listeners how to evaluate "any sex book, and not just mine: If it doesn't make sense to you, if it doesn't seem to have common sense, then it's no good, no matter how many degrees its author has—although I have my share"). But behind the stagecraft and gloss there is depth and value in much of what she says.

She emphasizes, for instance, that our sexuality (men's and women's) is affected by a complex web of interacting hormones, no one of which works alone. Even such a powerful hormone as testosterone is under the governance of other hormones, and testosterone in its turn affects the supply and action of still other hormones, among them estrogen, serotonin, and adrenaline. Moreover, like testosterone, many of these other hormones affect our relations with the outside world through behaviorally mediated feedback loops.

Oxytocin, for example, is released during orgasm. It is probably responsible for the syrupy warmth of afterglow —and it's influenced by touch. Touching produces a rise in oxytocin, and after a while the mere thought or anticipation of touch can do the same; oxytocin therefore encourages touching, which leads to more oxytocin…and more touching. This, says Crenshaw, is how you can "get addicted to your partner." And so it is that a hormone

helps undergird the process of human bonding.

Tom's web of hormones is no doubt knocked akilter each month by the artificiality of his testosterone highs and lows. But it is equally certain that other parts of it work just fine. For as the doctor speaks, I glance at him and his girlfriend. The two are completely absorbed and, sitting atop a table, may not even be aware of the closeness with which they have drawn together—their legs and hips touching and their hands clasped; each flooding themselves with oxytocin.

As we are driving home, and after we have said goodnight to his girlfriend, I ask Tom if he has thought of juggling his testosterone injections in anticipation of the triathlon for which he is training. If he started early enough he could time it so he took a shot and was "peaking" just before the event, and this theoretically could give him quite a competitive edge.

He laughs at my suggestion, and says, "No, I'm not that competitive. Maybe I'd consider it if I had a chance of winning. But I don't."

Once before, I'd asked him another version of this question—Would he ever consider manipulating his shots for business or social reasons? In anticipation, say, of a potentially contentious meeting, where the assertiveness of a testosterone charge might prove an advantage, would he consider taking a shot? "No," he had said. No to that as well. "It's not that smart to be that aggressive. You're really not in control, and I don't like that side of me. I don't like being that reactive."

But as we drive home there hangs in the air the very real possibility that what he won't do for sports or business or male-on-male dominance, he will consider for a woman.

* * *

Fortunately, Tom's girlfriend has had the good sense to say she does not want him to stop taking his testosterone. The health effects would be undesirable, but her main reason, says Tom, is that, "She likes me for what I am—for being a man. And she doesn't want that to go away."

He tells me this on a warm day in late June as we are riding bicycles around San Diego Bay. Tom is still in training for next month's triathlon, and already today he has swum a half mile and run four. But despite the erstwhile purpose of the ride, our pace is easy and relaxed; sometimes Tom takes the lead, sometimes I do, often we ride parallel, talking and laughing. There no pressing to the fore, no jockeying for position, no competition.

It has today been three weeks since Tom's last injection, and he is nearing the "low" part of his cycle. To what extent this accounts for the pleasantness of our ride, I cannot say. But I do know that such peaceful male excursions are not to be taken for granted.

I have another friend with whom I also used occasionally to go bicycling, although he has since moved away. My friend is kind-hearted and always eager to help, but he is also a physician and was then a navy captain. Testosterone-wise, this is a bad combination. One of Allan Mazur's earliest studies looked at the effect of rising social status on a man's testosterone. To study this he measured the testosterone levels of a group of male students before and after graduation from medical school, and he found that immediately after becoming full-blown doctors every one of the students experienced a large testosterone uptick. Similarly, another group of researchers followed male candidates at the Army's Officer Candidate School, and they found a steady increase in the men's testosterone levels as the date of their commissioning approached. Most likely these were temporary increases only, but nobody has yet had the nerve to study men who are both officers and doctors.

My friend didn't do a lot of biking and he rode an inexpensive and heavy machine. At the time I was doing a fair amount of bicycling, owned a high-end aluminum frame bike, and was intimately familiar with the routes we were taking. So it wasn't surprising that I was often in front when we set out. Yet at every opportunity my friend shot past me to assume the lead. If I then passed him, he would strain to his utmost to recapture the lead. This went on continually—and without explicit acknowledgment from either of us—and our rides frequently turned into nothing but an unending series of reckless races. Once he was so bent on being in front that he nearly killed himself, slingshoting past me to make a left turn in the face of oncoming traffic.

Nor was this behavior limited to bicycling. Once we went to Washington, D.C., on official business. For three days we scurried from office to office, meeting to meeting, mostly walking and taking the subway, he in his gold-striped uniform, I in my suit. Washington is the most rank-conscious of towns, and everywhere we went my friend had to be in front. Determined to keep pace with him—and refusing to accede to a pecking order dictated by the amount of gold on one's sleeves, of which I had none—I walked faster. My walking faster only made him walk faster, and the entire trip was conducted as if we were in training for the Olympic race-walk.

It was exhausting and unpleasant and we never spoke of it, but it may have been that neither of us had much choice in the matter. The notion that he should take the lead may have been so deeply instilled in my friend that he could not have tried to do otherwise—in the military, rank *does* dictate who walks in front. And as for me, I had been tossed a gauntlet before which few men could fail to stoop. Moreover, we had both set reason aside. Unwittingly we had gotten ourselves into a contest—not over how fast we would walk, but over whose will would prevail—and of all the impulses to which testosterone gives rise, it is the impulse always to prevail that most men seem least able to control.

* * *

"You've seen those bumper stickers that say, 'The guy with the most toys at the end wins'?

"Well, I believe it's the person who best understands himself at the end who wins." So said Tom one day shortly after we met.

Certainly a big part of that understanding is deciphering one's rela-

tionship to one's work, and for a long time this year Tom has been struggling with his place at his job. He is an actuary, and loves the essentials of his profession—untangling the statistical relationships between insurance losses and the monetary reserves needed to cover those losses. And the firm he was with allowed him the vision of opportunity. "I could see it," he says. "In five years I could have been head of my own department, making $100,000 a year, with a company BMW—all the bells and whistles." But he wasn't happy.

He worked in a wasteland of Scott Adams cubicles. He had a personality conflict with a co-worker (on whom he says he was tempted more than once to let loose with a testosterone rage). And he was being pressured to make decisions with which he didn't agree. The net effect, he says, was that, "I was depressed, and I was very busy being depressed."

One of the things Tom learned from having cancer is that none of us has enough of life to waste in situations that make us miserable. "There are," he says, "two kinds of people in this world: those who do something about the things that make them unhappy and those who don't." And having no patience with the latter, he resolved to find himself a new job. Early in June his efforts paid off, and he was offered a position with a young and growing company, with a dynamic boss and a new building, a view of the ocean from his window, and a corporate gym—in which are offered Tae Kwon Do classes that he has been asked to help teach. "It's like a dream," he says. "How often in your life does this happen?"

Part of the dream is the arrangement he has made to give himself a month between jobs—a month he will spend in Hawaii. The triathlon for which Tom has been training was to be held in Carlsbad, but he has found a similar event for the same day in Hawaii. In addition, he plans to run in a separate ten-mile race around the rim of Kilauea, to go backpacking and camping, to scuba dive, and to read. It is, as he says, a dream.

Just before he goes he takes his regular shot of testosterone. And just after he gets back he takes another. The interlude was almost too long, and at the end, he says, he was plummeting. "I was hot flashing and getting kind of complacent."

He tells me this over dinner a few days after his return. He tells me too of his adventures. On Oahu he did the triathlon and scuba-dived—after which he suffered a ruptured eardrum that bled for days. At 4000 feet on Hawaii he raced around the volcano's rim. On Kauai he backpacked. It was there, on the cliffs of the Na Pali Coast's Kalalau Trail, a thousand feet above the ocean below, that he met a young woman immobilized from fear and led her to safety. And it was there, on Kauai, that he met the nudists.

All day he had been hiking, along the cliffs and through the tropical forest, and when he arrived at his campsite there was a waterfall. He took off his pack and his shoes and he stood in his shorts and his shirt in the cooling spray, and as he did a naked woman emerged from the trees to greet him. Nor was she alone. Throughout the week he met her companions, and they were, says Tom, very sociable. "But also nice. I mean, a couple of times during the week I was sitting there having conversations with these absolutely gorgeous women, right in front of me, naked, and I was…I, I,… I mean,… it's not like there was a rude one." They were from the Maui family, said one, and every July they gathered here for a reunion.

I am, as Tom tells me this, nearly swooning with envy. What he is describing is a literal incarnation of the fantasy behind every beer commercial ever made, and for a while I can only marvel at the irony of its having been visited upon a man with no testicles.

Finally, though, I recover, and when I do, I ask if he had trouble controlling himself. When he first stumbled into the nudists it had been fourteen days since his last shot, and I ask too if it would have been more difficult to control himself had it been earlier in his cycle—had he been peaking?

Certainly, he says, it was uncomfortable. "A little bit. I was a little uncomfortable." And certainly it was easier controlling himself later in the month rather than earlier. "That's definitely true. If I was in a hormonal rage it would have been a little more difficult to control myself."

But as I reflect on it later, the question I posed is a little silly—the product, perhaps, of too many beer commercials. "It's all a matter of control," says Tom. "I mean, we don't run wild, and kill, maim, rape, pillage. We control ourselves. I have conditioned myself to be in control all my life. And so once you're in that event—in with the nudists—I put myself in control. And I don't lose control very often."

Testosterone or no, temptation or no, he had simply comported himself, as James Dabbs would have said, as "a successful member of society."

* * *

Not long after his return from Hawaii, Tom and I went out one evening. It had been seven days since his last shot, and there was little doubting its effect.

Our first stop is Tae Kwon Do practice. The fighter pilot is not in class today and perhaps it's a good thing; Tom collides with one person during warm-up laps and says in joking response, "Oh, I can't wait to hit you." During the combination sequences his movements are intense and forceful, concentration is on his face, and at each swing and pivot he emits a menacing hiss. He spars, as before, with the woman on whom he once had a crush; there is far less of the dancelike quality to their engagement than when first I saw them, though still they laugh and embrace when finished. The gym is warm and humid, and when the session is over Tom is covered in sweat and his clothes are dripping.

When he has cooled off, Tom and I are joined by his roommate, Cindy, and by the young woman with whom he has just sparred. Together the four of us walk to a nearby Chinese fastfood restaurant for dinner. Over styrofoam trays of food, Tom and Cindy resume what is obviously an ongoing conversation. The subject is children and the question is why someone would ever

have children—because, says Tom, the world's in trouble now and it's only getting worse. And under these circumstances, it's selfish to have kids.

"I don't believe that," says Cindy. "That things have to be worse in the future than they are today."

"I don't care what you believe," says Tom. "Where are your facts? Where's your data? Back up what you say. Because otherwise it's just an opinion, and what good's an opinion? Give me some facts."

"This," says Cindy to me, "is Tom on his soapbox." Previously she has told me that he likes to pontificate, and especially so early in his cycle, when he'll get pushy or confrontational. Or, as he says, "righteous."

Addressing Tom, she says, "I don't like the color of your soapbox." And about kids and the world, "You're wrong, you're making a mistake."

"No," says Tom. "I've never made a mistake. Oh, little stuff. But nothing major, not since I've been an adult. I've never been dishonest. I've never killed or raped or hurt someone. I have no regrets. I've never stayed in a situation I didn't want to be in, or gotten out of a situation I should have stayed in. I can't think of anything important I've done that was a mistake or that I would have done differently."

There is to this speech an almost inhuman certitude. Whether or not he has ever made a mistake, he clearly tonight has no doubts about not having done so. Nor is there any use in Cindy's arguing the point further.

Allan Mazur, in his biosocial theory of social stratification, maintains that most human dominance is won and lost not through violence, but through talk. No less clearly than does the peacock when he shows his feathers, we display our relative standings through the words, tone, and gestures we use when we talk. Conversation, says Mazur, constitutes the basic human status display.

Mazur has identified nine rules that describe how we use this form of display. Most govern noncompetitive, "polite" conversation; only when a rule is broken can it be seen that a challenge is underway. For instance, one rule is, "Look at the speaker's face, particularly if the speaker is looking at you." We do this if we accept the speaker's dominance or right to speak, or if the conversation is not meant to be competitive. When a listener breaks this rule and looks away from the speaker, he is indicating his disregard for the speaker or what the speaker has to say—which is why a defiant child will make a show of looking away from a parent engaged in reprimand, and why the parent in turn will command the child to, "Look at me when I am speaking to you!"

Several of Mazur's rules do, however, describe the prerogatives of the dominant person in a conversation. One is that, "The high-status person sets the pace and the mood of the conversation." Among the tools for doing this are volume and rapidity of speech. Another is exclamation—such as, "I have never made a mistake." Clearly Tom is directing the conversation in progress over our Chinese food, and just as clearly he is being aided in this by the huge levels of testosterone now coursing through his system.

Later, Tom and I return to my house for an evening-ending game of chess, and here he gives me his thoughts on the way testosterone influences his conversational mannerisms. "It affects my argument. Like today: It would be difficult for someone to argue with me today. Because I'm on a peak. I'm very aggressive. I'll go to lengths. If my testosterone was low, I'd say, 'Oh yeah, whatever, sure. It's no big deal.' But right now I'm fairly competitive, if you will, on my opinion. And I'm willing to go to lengths, competitive lengths, to deal with that."

This pushiness, I suggest, would be a great asset in a sales environment.

"Oh," he says, "wouldn't it though? Or in any environment. It's incredible. I mean, who's going to break down, who's going to just dissipate, first? Just through sheer argument—'I give up.' As you do with children, when you're raising children; you know, when the child just buries you down, just bores you down, and you just finally give in. 'Okay, I just give, you win.' Or whatever. They just have more energy." Testosterone, as he sees it, gives him not just the will to prevail, but also the energy. Not to mention the syntax of George Bush.

The tenor of the game is markedly different from that of our earlier match. A quick learner, Tom refrains tonight from the bold move. Instead, he is dogged, keeping his head in the game and fighting the whole way, never relenting. I again adhere to fundamentals: trading evenly for pieces but for small gains in position.

The contest is slow and grinding, but eventually a break comes my way. Quickly I gain the dominant position on the board, and with it I ask if he would like to concede.

"No," he says without hesitation, "never concede."

And so we slog on. The struggle lasts a long and wearying while. I win, but unlike before, I feel at the game's conclusion not a surge in testosterone, but simply tired. Were we to play again tonight, I would doubt the outcome.

* * *

A month later Tom and I find ourselves again locked in a game of chess. Because of the timing, Tom is again early in his cycle and again "peaking." But the venue today is different: we are at the beach.

It is late summer, midafternoon on a warm and cloudless Saturday and the beach is well populated. We have come here not principally to play chess, but to play volleyball. Tom has brought his net and invited a group of friends, and it is while we are waiting for the others that we get out the board.

As has been the case every time we have played, I win the first game. Tom, however, immediately suggests a second. Walking past us in a constant stream is a seemingly infinite number of beautiful young women, barely dressed. Particularly attractive is a woman playing volleyball on an adjacent court. She has chestnut hair pulled back in a ponytail, and over her tan she wears an iridescent pomegranate-red bikini of the most minimal dimensions. Each bra-cup is held in place by a trio of thin cords

that intersect in a clasp over her shoulder blades, and her bikini bottom flares up in a V from her crotch, arching high on her hips and defining what Judith Moore once memorably called "preternaturally long legs."

I find this more than a little distracting. As we begin our opening moves my attention is split, shifting from board to woman, to woman, to woman, to board. Tom, in contrast, seems exclusively focused on the game—totally zoned in. Testosterone has been shown to affect men's brain waves. It has been shown to improve their performance on such tasks as repetitive subtraction problems, and to minimize the typical morning-to-afternoon deterioration in some thinking skills—a deterioration that corresponds to a rhythmic daily fall in most men's testosterone levels. Because of such findings, it has been hypothesized that one means by which testosterone works is through improving concentration. In general, this improved concentration would be on things sexual (which is thought to be why men without testosterone have an impaired ability to fantasize about sex—they can't stay focused on the stimulus). But if testosterone can improve a man's facility with numbers, no doubt it can help in other areas as well.

The woman on the court nextdoor is tall and lithe, her play fluid and graceful. Not long into our game I contemplate a move that allows me an attack. It also leaves my queen unguarded and in jeopardy. But as I contemplate the move, I see the woman nextdoor rising for a spike. I see the attack, the woman, the attack, the woman, and I forget completely that my queen is even more exposed than the woman. All of its own, my hand greedily moves the piece—and the moment I let go Tom snatches my queen. From then on he is on the offensive, attacking, attacking, attacking. Mercilessly attacking. And for the first time, he wins.

The woman I am watching is playing two-on-two. Both her teammate and her opponents are male, and briefly I wonder if they are as debilitated by her in their play as am I. Nor is that all I wonder, but to the rest of it I know already the answer.

*I do, but not with you.*

Heady with conquest, Tom seeks a third game. The distractions of the beach are sweet, and again my concentration on the wooden pieces is abysmal. Again Tom thrashes me. But he is charitable in victory, and we both enjoy ourselves immensely—testosterone piloting us each through our own separate universes.

* * *

There are some things of which one person may speak and another ought not. Once this summer, for instance, Tom was over to dinner. A third guest had joined us, and during the dinner conversation she told us of the trouble she was having with her cat. The animal is a male and an inveterate hunter. Frequently, said our guest, the cat brings mice, rats, and birds into her house—the presence of the latter often betrayed by little more than scant piles of feathers and a beak. Moreover, she said, "He likes to torture his prey. He'll bring the animals inside and keep them alive for hours, while they scream and howl. It's a real nuisance."

"Well," said Tom, "you ought to deball that cat. That would mellow him out."

It was, I believe, a sound piece of advice. But under the circumstances, one much better given by Tom than by me.

Still, our language is rife with associations between testicles and things deemed manly or desirable, and such landmines can be difficult to avoid. Even such a straight-laced word as *testify*—the bearing of solemn witness—carries a hint of testicular suggestion, for such oaths were once made by the laying of hands upon another man's testicles, as when the biblical Joseph swore upon his father's testicles that he would not allow the dying man to be buried in Egypt.

And so it was that not long after Tom suggested deballing the cat we found ourselves discussing workplace ethics and a man we discovered is a mutual acquaintance. He's pleasant, I said. But he got himself into a compromised position professionally: he knew firsthand of improprieties and when the time came to speak up, to speak the truth, he was silent.

"He's got no balls," I said.

It's a common enough expression, and one I'm sure has come up before in conversations to which Tom has been a party. But as soon as I said it, I was chagrined. I felt as though I had stuck not only my foot in my mouth, but my shoes, legs, arms, and torso as well. The phrase captured exactly the sentiment I wanted to convey, but it was an unfortunate choice of words, and as soon as they were out, I wished that I could reel them back.

Tom, however, did not flinch. Rather, he pointed out that the person we are speaking of is nice enough and that people are rarely willing to put their careers on the line.

Yes, I said, but the issue we are speaking of is courage and integrity, not amiability. And then we moved on to other subjects—I grateful to the core to be dealing with a man of such grace.

* * *

Well into the twentieth century, the emperors of China maintained a vast corps of eunuchs. They were used as bureaucrats, servants, and keepers of the harem—a striking example of the results of one man's total dominance. The emperor himself kept thousands of eunuchs, and to members of the Imperial family a formal system of allocation applied: thirty eunuchs to each prince, twenty each to the nephews, ten to the grandsons.…

Outside the palace, the eunuchs were widely despised. In part this was because they formed themselves into exclusive societies, were involved in endless court intrigues, and wielded their own corrupt forms of power. In appearance, the eunuchs were readily identifiable: they had no beards, developed what one source called a "cringing, hang-dog demeanor," and walked bent over, with toes turned outward and mincing, little steps. They also smelled.

When they made their eunuchs, the Chinese removed a man's penis as well as his scrotum and testicles. A silver

plug was inserted into the exposed end of the urethra. This was a less-than-perfect arrangement and when combined with frequent trauma-inspired poor bladder control, often resulted in incontinence. So arose the expression that someone stank like a eunuch.

But perhaps the greater reason the eunuchs were despised is that many of the men who became so were volunteers. Acceptance into the eunuch corps meant a lifetime job as a civil servant, and for a small fee a man could have himself altered so as to become eligible. It is likely that many of the peasants who made such a decision perceived themselves as having few other options, but I would guess that the Chinese found the character of a man who would choose such a path to advancement nearly as abhorrent as the physical results of the procedure itself.

In a sense, Tom faced a similar choice when his second testicle was diagnosed as cancerous. For him the choice lay not between his testicles and material gain but between his testicles and his life. Phrased that way, there wasn't much choice to it, but still in its wake he was left to deal with depression, discomfort, hormonal imbalance, and a lifetime of smirks. Characteristically, though, he has found the positive side of his experience. "I'm glad I got cancer," he says. "Well, not twice. But I've grown from it. I've learned things from it, and I'm a stronger, better person for it."

Rocky Burks, Tom's Tae Kwon Do instructor, would no doubt agree. He didn't know him previously, but even so, he says that Tom today "is probably more of a man than most guys who have their testicles. And I mean that not only physically, but mentally and emotionally as well."

A few years after Tom and Rocky met, Rocky's wife of many years died unexpectedly. Engulfed by grief and looking for a way to begin healing, he began running. Tom would go with him. "And he would set a pace for me," says Rocky. "He was capable of going a lot faster. But being a friend, he would set a pace that I could keep up with, a pace that was just fast enough to where I could keep up with him, just enough to where he realized I was pushing myself a little bit to keep up with him. And then maybe the last half mile he might go ahead and sprint off and burn himself out. Which was fine.

"The way I saw it was, 'Here's somebody helping somebody else along.' And that attitude is precisely what makes him good with the women in the class, with the children in the class, with other people in general. He doesn't try to dominate somebody, so much as help them along. He would be happy to see everybody rise to the level he's at—or even above that level.

"I have a lot of respect for the guy." ■

NOTE: Wantonly mangled when edited and published by the *Reader*, the preceding is the original submitted text.