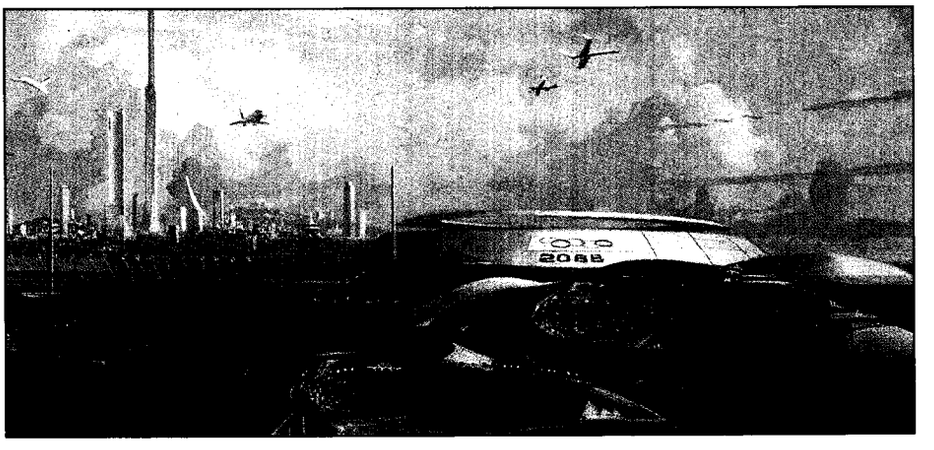
ARTICLE

In 2088 Olympians and weekend athletes alike will excel with the help of electronic sensors, brain wave supplements, and bionic joints and limbs

BODY AND SEOUL

BY PAMELA WEINTRAUB AND MARK TEICH

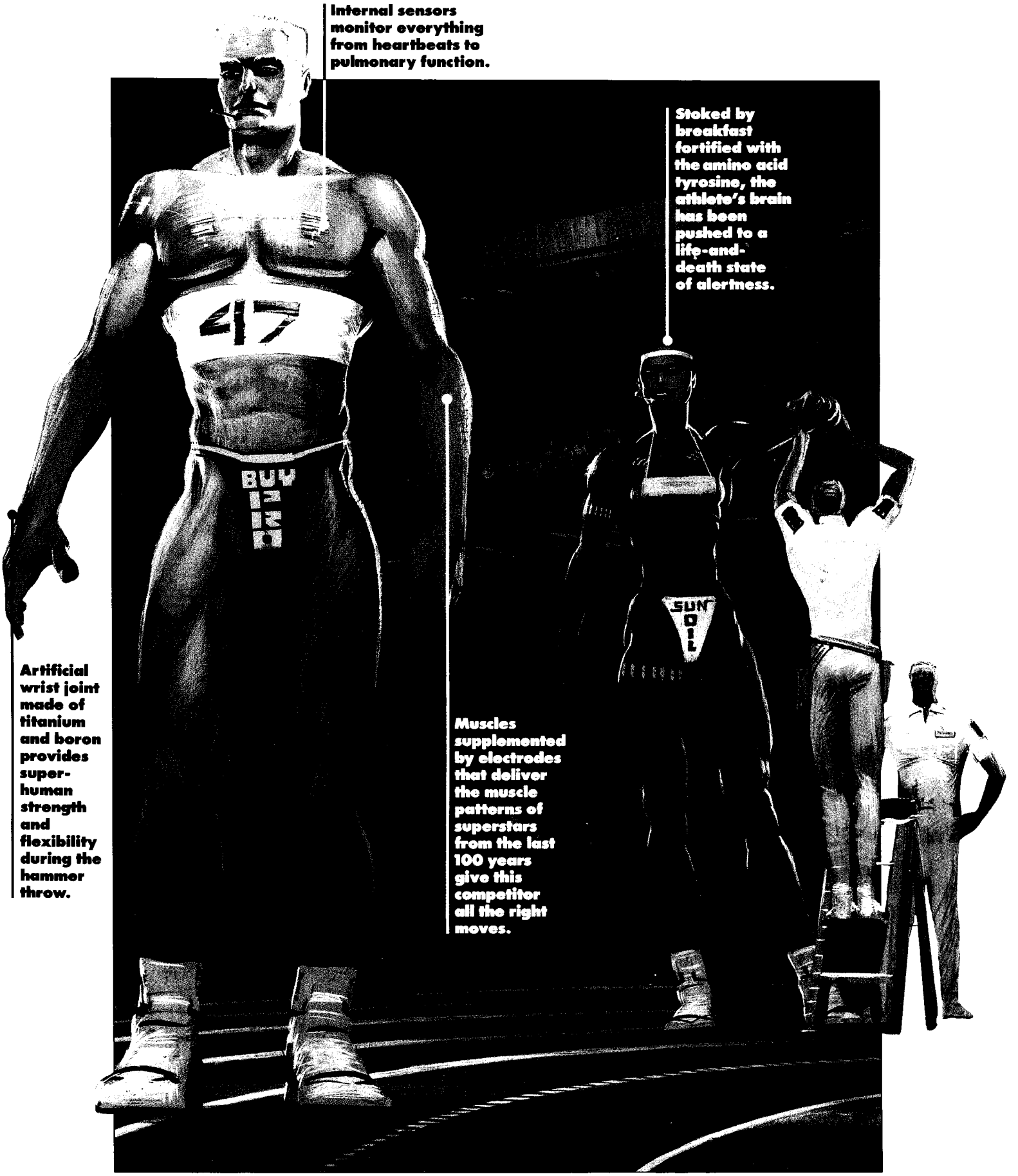


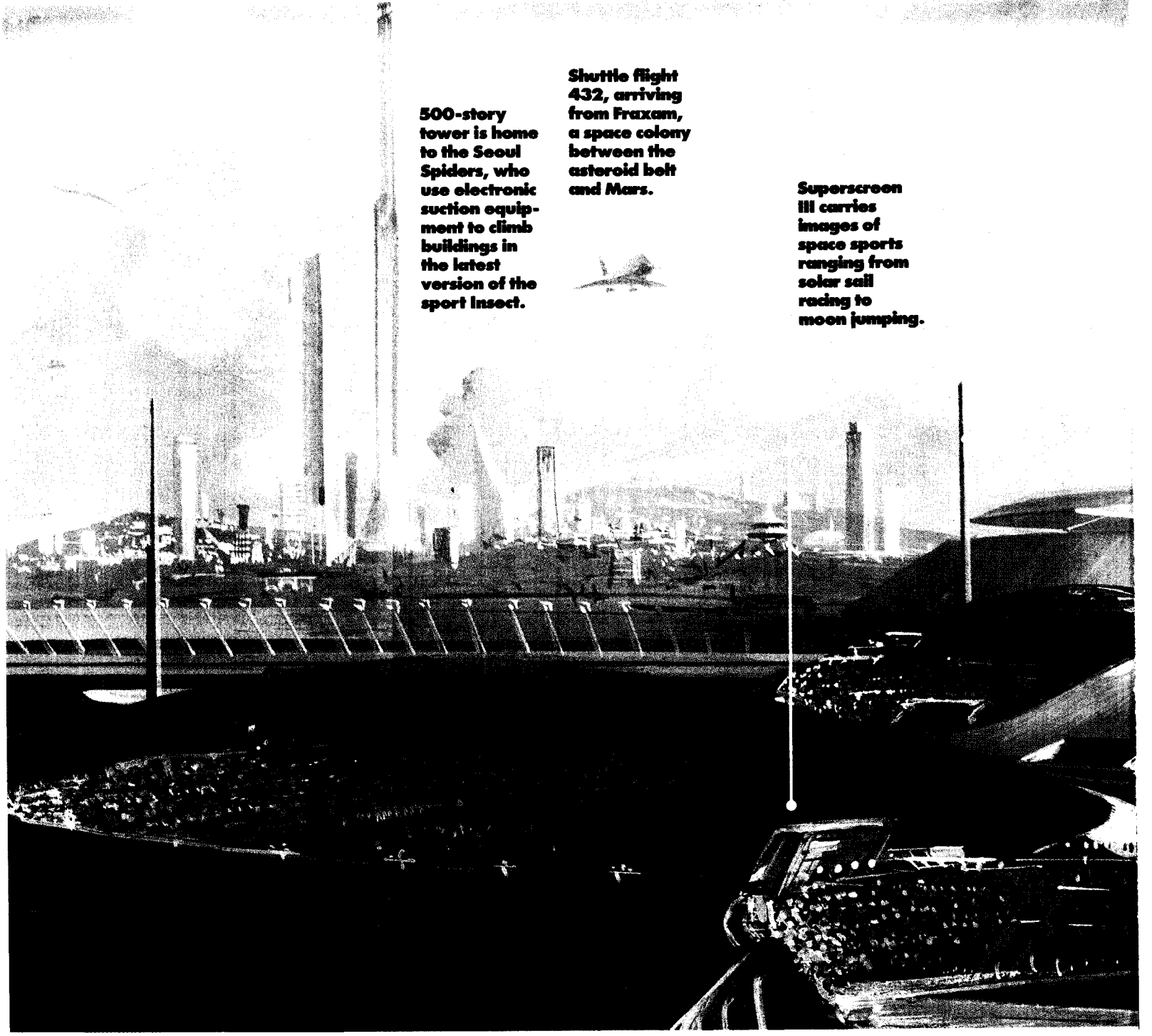
The dome sits on the outskirts of twenty-first-century Seoul, a raucous, international city of 500-story skyscrapers, robot drone workers, and some of the busiest spaceports on Earth. Millions of people from around the world and even from the sea and space colonies have arrived for this event: the Olympics of 2088. It is the first time in 40 years that international and interplanetary tensions have eased enough for humanity's best athletes to compete.

Spectators entering the ten-mile-long dome are instantly isolated from the city's incessant noise and pollution. Artificial sunlight bathes their skin; simulated ocean breezes, spiked with the scent of apple, keep them alert yet calm. Computers dispense information on schedules and hotels. Four-armed robots on wheels scurry back and forth, selling souvenirs and cleaning the stands. Within the depths of the dome, different habitats contain arenas for winter sports, summer sports, deep-sea sports, and sports in zero gravity. Stadiums for football, baseball, tennis, and a host of other sports that were once exclusively professional complete the scene. Aglow overhead, widescreen displays circle the dome, projecting all the action simultaneously for everyone to see.

It is the athletes themselves, however, who capture our attention. Bred on genetically engineered food

PAINTINGS BY ATTILA HEJJA





and high-energy supplements, kept free of every kind of illness with a universal vaccine, these Olympians are strikingly taller, stronger, and broader than their counterparts 100 years before. As they compete, their natural advantages are enhanced by a multitude of sensors studding their skin. Measuring everything from heartbeats to muscle contractions to brain waves, the sensors radio information to a nearby computer station manned by each athlete's coaching staff. The coaching team radios physiological as well as cognitive-pattern updates and strategy suggestions back to the athlete via a tiny speaker in his or her ear.

When there's a break in the action, the athletes rush to the sidelines, where their teams test their muscles, organs, and neural circuits to make sure they're properly fortified; if not, the appropriate biochemicals are swallowed or injected into the appropriate body areas.

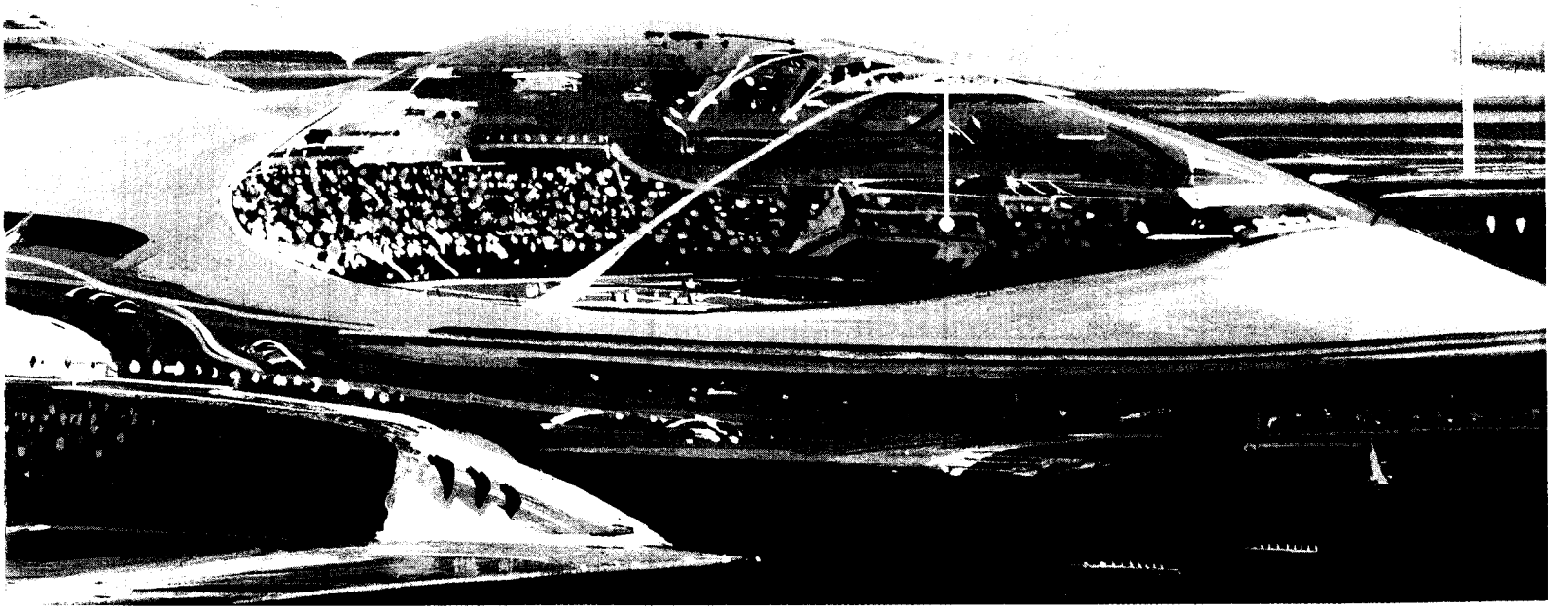
In 1988 some of these practices would clearly have violated all Olympic codes. But in 2088 people consider their blanket of technology as essential as their artificial air. How could any of these enhancements be immoral when the net result is improvement of performance and safety? The Olympic history books show that back in 1984 in Los Angeles a thirty-nine-year-old marathoner named Gabriela Andersen-Schiess was permitted to stagger and stumble the last quarter mile of her race, her eyes rolled back in her head, as spectators wildly applauded her "courage." We know now that Andersen-Schiess was unaware of their applause or anything else and that as she collapsed over the finish line, she was in danger of dying. Such a fiasco could never happen in 2088 because sensors would pinpoint the problem; if it couldn't be solved, the athlete would be removed from the race.

True, a few practices are controversial, even in 2088. The shaping of some countries' athletes, for example, began before they were

Human-powered flight race: These extremely light and well-designed planes, propelled by human pedalers within, race to the finish.

An environment chamber, which boasts the 2088 Olympic insignia, has chambers for winter sports, undersea sports, and several zero-g sports.

Domed stadium for football, basketball, tennis, and a variety of other traditional terrestrial sports events.



born, when their parents were selected from past champions and literally bred for qualities such as endurance, flexibility, coordination, and strength. Other parents had scientists genetically engineer their sperm and ova to produce a consummate athlete.

Whether parents in 2088 produce their offspring by these radical means or through more conventional courting and conception, they know within the first few years of their child's life if he or she has the potential to be an elite athlete. Indeed, in 2088 *all* young children are taken to aptitude centers, where experts measure their every mental and physical trait. The data are fed into a computer, which tells the children whether they are sports star material; if so, the computer also directs them to a particular sport.

Almost from the time they're toddlers, these natural athletes are exposed to the best sports technology. Each performs daily before video cameras while wired with sensors that measure energy output, muscle patterns, brain waves, oxygen metabolism, and more. The information is radioed to a computer programmed with the ideal patterns for every athletic movement under any condition (heat, rain, high altitude, low gravity) in every conceivable sport. After the computer analyzes the developing athlete's performance, it issues suggestions for improvement.

Athletically speaking, in fact, the computer is the young athlete's mother, father confessor, and coach. It precisely monitors every aspect of training so that he or she safely builds strength, coordination, and agility over the years without interrupting natural growth patterns. The computer suggests what to eat each day, how intense each workout should be, and what exercises to do to recover from an injury.

But computers aren't just an *external* support system anymore; they've become *internalized* as well. In the distant 1980's scientists at a few small laboratories invented an extraordinary

technology known as the biochip—an organic computer chip that provided the perfect interface between the body on one end and real silicon chips holding intricate data on the other.

Today the biochip connects athletes' nerves and muscles to innumerable bionic parts, some boasting greater strength and flexibility than natural counterparts. Golfers with high-grade bionic shoulders, for instance, can hit drives of 500 yards or more. Gymnasts with bionic knees and ankles can perform entire one-legged routines on the balance beam.

Chemical aids to performance have also finally been embraced because they simply aren't harmful anymore. Shortly after the turn of the century, for example, scientists altered the steroid molecule, increasing its growth-producing benefits and totally eliminating its side effects. By the year 2020 steroids were being routinely prescribed by doctors and trainers in a safe, controlled, systematic program. Ironically, because steroids have built up their overall strength, athletes nurtured on them are now far less prone to injury and disease than their drug-free predecessors.

Athletes also now take daily doses of DNA repair pills. These extraordinary enzyme supplements not only fix cells destroyed by injury, they also repair genes worn down by age. Thus the rate of healing has sped up while the rate of aging has significantly slowed. In 2088 a pitcher with a broken arm needs to wait only days to heal. And he can count on the length of his career virtually doubling.

With this dazzling array of tools and abilities, today's athletes have made a mockery of the records of the past. Back in the Eighties Marvin Clein, a sports scientist at the University of Denver, wrote a computer program showing that as nutrition improved, diseases and injuries waned; and as size increased, athletic performance would increase exponentially. Exactly as Clein suggested, today's average seven-foot-seven-inch, 383-pound football punter can kick the ball 85 yards or more on the fly; the average seven-foot baseball pitcher can throw a 117-mile-per-hour fastball. Some punters, in fact, can now kick the ball from end zone to end zone, and the fastest flamethrowers in baseball have actually broken the 150-mile-per-hour barrier.

As twentieth-century-style sports have gotten easier for the athlete, governing bodies have been forced to raise their level of difficulty to keep fans interested. In baseball, for example, biomechanical analysis and extremely flexible wrist and elbow implants have allowed pitchers to put inordinate rotation on the ball; by the mid-2000's, consequently, they had developed so many complex breaking pitches that they were virtually unhittable. The leagues then reluctantly retired the traditional wooden bats, replacing them first with broad aluminum bats and then with ones made of boron and other powerful composites. As a result, 600-foot home runs became common; the subtle balancing act between offense and defense had shifted to the hitters' advantage. To compensate, teams have now extended their fences by as much as 200 feet, beyond the 650-foot mark. Fielders all wear long, lightweight, synthetic gloves with deeper webbing so they can grab more balls. The catcher's mitt, once piled with wads of padding, is now made of a protective layer of impact-absorbing composites. This has eliminated most of the padding, making the mitt as pliable as any fielder's glove.

Other equipment changes have even more drastically changed the nature of certain sports. In tennis, racket strings have been replaced by magnetic force fields, which repel balls with their negative charge. The field provides equal power at all points on the head and eliminates the old dead spots near the edges of the frame.

Totally new sports have come to the fore as well. The 26-mile marathon has been passed in popularity by the 2,000-mile run, and the bicycling Tour de France has given way to a Tour d'Europe.

"Tennis racket strings have been replaced by magnetic force fields that provide equal power at all points on the head, eliminating traditional dead spots along the edges of the racket frame."

The unique inhabitants of domed underwater cities have created new competitions. Partly because they are surrounded by water and partly because they have easy access to artificial gills, these aquatic athletes regularly hold underwater marathons. Residents of the aquaworld have also created elegant underwater versions of gymnastics and synchronized swimming; because their bodies are buoyed by the surrounding water, they can be far more elaborate in their routines than an athlete moving totally or partly through air. The judging of these events is done by video.

Even the boundaries of the earth and sea have not been able to contain man's lust for new sports frontiers. When colonists settled the moon, which has one sixth the gravity of Earth, they became adept at the one-sixth-gravity run and jump. At the start of their sprint, athletes lean forward with their chests just off the ground. Then just before they jump, they splay their feet and spread their knees, frog fashion, to keep their balance. Their leaps carry them six times farther than they would on Earth.

Watching one giant screen in the Seoul dome, we can even glimpse the spectacle of the space cup, in which competitors use solar sails to race around the moon. On the sun side of the moon, they are propelled by solar winds. When they pass the dark side of the moon, they use energy already stored up by solar collectors in the sails.

As we witness the space cup and three dozen other Olympic events, the primary attribute of the twenty-first-century athlete quickly becomes plain to see. In a word, it is *intelligence*. Prodded by computers and stoked by chemicals, the competitor has leaped into a world of dizzying complexity, where only the clearest thinkers can prevail. In an instant or two during competition, athletes must adjust strategy to electronic and physiological input from several teammates. Then, through self-hypnosis and biofeedback, they must alter brain wave and muscle patterns as well.

If our ancestors 100 years back could see us now, they might well complain that the joy and simplicity of sports has been sacrificed to science. But like all living creatures throughout history, the athlete has had to evolve. As long as our athletes are human, they will evolve along human lines—and in 2088 that means breaking records not just with drive and perseverance but also with tools and ideas.

EVERYMAN'S GUIDE TO SPORTS TOOLS AND TECHNIQUES FOR 2088

"Man is a tool-using animal. Without tools he is nothing. With tools he is all."

—Thomas Carlyle

In 2088 the fruits of sports science are ripe for the picking. Today elite athletes no longer have a corner on the market; they have to share the wealth with the rest of us. With this in mind, we bring you our "Everyman's Guide to Sports Tools and Techniques for 2088," a directory of resources tapped by the twenty-first century's best athletes—and now available to you as well. Presented within are the most sophisticated products and services in sports nutrition, sports medicine, sports psychology, biomechanical analysis, and more. The resources in this listing, for years available only to the elite, can now help *you* reach your personal performance peak.

SOFTWARE

Program perfect. Athletes have always sought perfection. A century ago, achieving truly perfect performance was all but impossible, a hit-or-miss process that eluded even the elite. But now every dedicated athlete can attempt to reach the peak with *Ideal Disk*.

To create *Ideal Disk*, scientists first modeled in infinitesimal detail the techniques of the world's best athletes across the spectrum of sports. The models were then analyzed by a computer, which generated composite figures representing optimum performance in each sport.

To use *Ideal Disk*, load the program into the hard drive of your personal computer.

Then record your performance on high-speed videotape. Run the tape through your PC, and in seconds the computer will break down your image into dozens of discrete segments, calculating force and motion for each of 600 muscles and 200 bones. *Ideal Disk* will then adjust the original composite of the athletic ideal so that it retains its biomechanical efficiency while taking on your exact body size and shape. Then it will tell you how your performance departs from your *personal* ideal. To make the comparison clear, the program will generate an animated stick figure of the desired technique and superimpose it over the video image of your current, imperfect game. By studying the twin figures, you will be able to correct your technique.

A more elaborate version of *Ideal Disk*—model 2088—works as you perform your sport. Model 2088 superimposes the stick-figure image of the ideal performance over the video image of your current performance on a large overhead screen. You simply watch as you play, adapting movement from one second to the next.

Holographic partners. To gain true greatness in sports, you must play against the truly great. In the past, only world-class athletes had access to others of their ilk. But now with the creation of *Body Double,* you can practice against holographic images of the best athletes in the world.

To increase your competitive edge, Body Double, Inc., has traveled around the world filming the performances of elite athletes. These images have been fed into a vast computer library and converted into holograms—lifelike, three-dimensional pictures of athletes projected into the center of a room. These holographic ghosts can spar with fencers and pitch to hitters, providing superbly skilled partners that will give you the best workout of your life.

The *Body Double Tennis Pro,* for instance, includes the best tennis players of the last two decades and projects dozens of types of serves. On each cycle of practice, the *Body Double* system projects the life-size, three-dimensional ghost of a particular tennis great, including the specific arc of the racket and the path of the ball. You practice by returning the hologram ball with a special racket; if there is a hit, the strings, which are coated with a light-sensitive chemical, buzz and flash. Because the racket is also electronically wired, it radios the features of the hit to a computer. The computer then analyzes the accuracy of the return: Did you swing too early or too late? Did you swing too high or too low? Not only will the computer answer these questions, it will also tell you what type of mechanical adjustment you need to make—in millimeters and milliseconds. *Body Double Baseball King* serves a similar function, projecting images of pitchers and hitters. To practice, you wield a special bat coated with a light-sensitive chemical. When you swing, the characteristics of your stroke are radioed to a computer and analyzed; suggestions for modifying your technique then ensue. *Body Double* programs also come ready-made for hockey, basketball, soccer, golf, running, and cycling. Those interested in other sports must custom-order a program that will respond to their personal needs.

Athlete clones. There's something special about superstar athletes—their styles of motion and thought are part of a unique combination that makes them great. But elite athletes are perhaps most distinguished by the pattern of electrical signals that make their muscles move. After a decade of work, physiologists at the Tribuco Research Center have recorded the muscle patterns of top athletes in three dozen sports. They have stored these patterns in their computer system and, using electrodes, have transferred these patterns to the arms and legs of talented up-and-comers. With an eye on profit, the company has now decided to make the patterns available via mail order to the public. Donna Moses, public relations coordinator at Tribuco, says, "We have every major athlete of the decade on file. We have Carl Lewis and Dwight Gooden, too."

To use the Tribuco system, you need a strength machine that can be hooked up to your personal computer at home. A kit comes with a computer disk containing the pattern of the athlete or athletes of your choice and an easy-to-use electrode set. Put the disk in your computer, attach the electrodes to your arms and legs as directed, and then do an ordinary workout on your strength machine. Whenever the machine detects the slightest irregularity or weakness as your muscles contract, the electrodes will supplement your performance with feedback from the superstar.

Customers interested in the advanced Tribuco system can find the muscle patterns of selected athletes in a model dubbed the Bodysuit XL. The XL is a skin-tight, custom-designed suit fitted with tens of thousands of electrodes. Each electrode in the suit lies directly over a motor point in your body. As you exercise, the suit will communicate your precise movements to your computer, which, in turn, will send the superstar's electrical signals back to virtually every muscle group in your body.

BRAINWARE

Mind waves. During the last half century scientists have gathered highly sophisticated data on what goes on in the brain during every phase of an athletic event. They have done this by using electrodes to measure brain wave patterns (known as electroencephalograms, or EEGs) as athletes perform. They have discovered the ideal brain wave patterns for each type of motor activity, for example, by placing electrodes on the temples, above the motor cortex. To measure emotional response, they put electrodes on the forehead, next to the frontal region of the brain. And to measure information processing,

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SEOUL

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they put electrodes up near the top of the head. By taking EEGs for each type of activity in each and every sport, researchers now know the myriad brain wave combinations that comprise the ideal cerebral patterns for success. For instance, they discovered that when world-class archers prepare to shoot, not only does right-brain activity increase, but the left brain produces alpha waves, indicative of relaxation. In essence, the analytic left brain relaxes until it shuts off; in its absence, the intuitive right brain takes over, controlling the subtleties of performance.

This knowledge has enabled the Mindwave Corporation to develop its latest biofeedback tool, the Mindwave Monitor. The entire technology has been enclosed in a single, ultralightweight cap, lined with electrodes that measure brain waves as the athlete performs. Whenever waves emanating from any portion of the brain depart from the ideal and impede performance, the helmet emits a tonal blip; different tones represent each sort of error. At the same time, the cap sends appropriate brain wave patterns back through delivery electrodes, improving performance on the spot and also training the brain so that it will be able to follow such patterns *without* help as the program goes on.

Couch potato. Brain wave biofeedback can obviously aid performance on the athletic field. But now such feedback can be a boon even when you're just *thinking* about your event. The most accessible product yet based on this notion is Armchair Athlete, an isolation chamber that includes a comfortable armchair, an electrode-lined head cap that monitors and alters brain wave patterns, and an audiotape that induces hypnosis in 30 seconds. After hypnosis has occurred, a recording played within the chamber verbally takes you through each step of your chosen sports event. Meanwhile the head cap measures the hills and crests of the electrical patterns created as you go through the event in your mind. If the patterns do not match the ideal established by scientists, the recording would suggest that you attempt a correction in your mind. At the same time, electrodes would prime you with the appropriate signals, thus fine-tuning your mental preparation for an upcoming event.

BIONICS

Superjoints. The process of evolution is supposed to render a species ever more perfect, ever more capable of dealing with its environment over the course of time. But humans have been left with a few weak links. The cartilage in the knee joint, for instance, tears or erodes with extreme use over time. The ligaments that connect the knee can snap like rubber bands. Shoulder joints, elbow joints, and hip joints can become damaged.

Now, however, anyone interested in truly world-class ability can order a custom-made joint from The Joint Factory in New York. The factory uses a technique known as computer-aided design and manufacturing (CAD–CAM) to custom-design entire joints on the computer screen. First the computer scans a three-D X ray of your body, designing the ideal joint (CAD); after the design is complete, the details are sent electronically to computerized machine tools (CAM) that produce a perfect version of the hip, wrist, thumb, or knee.

Made of superstrong elements such as titanium and boron, the joints are virtually unbreakable. They come with porous metal pads into which bone can grow, and other sections are designed so that muscles and tendons can attach. Each joint, moreover, is custom-designed on the computer for the specific needs of the particular athlete within the context of his or her sport. For instance, the gymnast's knee and elbow joints are made with extreme flexibility and a range of motion approaching 360°. For football, joints are not as flexible but are ultratough—one halfback with replacement joints survived a plane crash virtually uninjured. "We interact with the computer," states The Joint Factory founder Raju Khan. "The computer knows the characteristics of the body, the materials, and the prosthesis. It knows how the body works with artificial joints, and it knows the rules for designing the joint to meet the needs of each particular sport."

Track-and-field fantasy. The artificial leg (AL) workshop at the Southern California Running Club has the look and feel of a magician's lair. Located in the bowels of the club—the basement—the AL lab is filled with the white dust of cement casts, as well as screwdrivers, files, and other assorted tools that hark back to the past. This yeoman's effort, says prosthetics and orthotics expert Kelsy Lee, is still less a science than an art. As if to support this contention, Lee points to her brainchild, dubbed AL—a lifelike leg (raised toenails, porous skin, veined foot) sitting on a table by the door.

The AL, Lee explains, is made of superlight composites such as carbon fibers and acrylic laminates. Because it has a human–silicon interface that attaches directly to nerves in the body, it reacts to brain signals at least as quickly as legs of flesh and bone. But it's better than legs au naturel, Lee contends, because it boasts an energy-storing foot made with an ultraflexible plastic called Resilion; Resilion literally stores energy, bouncing back off the ground and enabling users to run significantly faster than they could with a normal foot. AL also contains a hydraulic knee joint with adjustable flexion and extension; to adjust performance for different types of events, the user need only operate an electronic control attached to the calf. One setting, for instance, allows the user to go

"Try pressing down."

superfast during a running event. Yet another adds inches to a pole-vaulter's jump.

Blood type bountiful. Back in 1984 a group of American cyclists got in trouble for something called blood doping—they withdrew some of their blood weeks prior to competition and then reinjected it shortly before the race. Their intent was clear: Because red blood cells carry oxygen to the muscles, they hoped that by shoring up their red blood cell supply they could prolong the muscles' ability to do work at a faster pace. At that time, of course, blood doping was illegal. Not only did it fly in the face of the Olympic idyll of the day, it also came with side effects: infection, blood clots, cardiac arrest, and in the most extreme instances, death.

Today, however, you can increase the amount of oxygen reaching your muscles without risking any side effects at all. The answer to your dreams: Bionic Blood. Starting this year, the product will be available via transfusion from sports clinics around the world. Bionic Blood contains densely packed clusters of synthetically created molecules known as hemocarts, which serve the same function as real red blood cells while transporting three times the oxygen. After your event, the body simply flushes Bionic Blood out naturally, and your own blood supply is restored.

ELIXIRS

Fat cats. Most people still associate fat with such evils as cholesterol, cardiovascular disease, and cancer. They also believe that the best possible diet for endurance athletes consists of huge quantities of complex carbohydrates and hardly any fat at all. But now scientists have discovered that athletes who consume a special fatty derivative for weeks on end actually begin to metabolize it as efficiently as they metabolize carbos. That's good news because fat stores nine calories of energy per gram, while carbohydrates and proteins store less than five. Athletes on the high-fat diet, therefore, can keep going more than twice as long as those who load up merely on carbohydrates. Recent tests have shown that once these athletes start to metabolize fat, they are no more prey to high cholesterol, heart disease, and cancer than the rest of us. The result of all this research—a liquid supplement called Fat Pack—should be on the market soon.

Hyperdrive. If you have trouble achieving that primal state of intensified awareness that may guarantee success, Superjuice is for you. Enriched with the amino acid tyrosine, normally found in more moderate quantities in protein products, Superjuice stimulates the production of the brain chemical norepinephrine, pushing you to a life-or-death state of intensified alertness. An hour after drinking Superjuice, the drive to win takes on primal proportions, and you can roar your way to success. And if you happen to get injured, you can use the excess norepinephrine to balance blood pressure and avert shock.

Fetal feats. It's common knowledge that muscle power increases during the first few months of pregnancy. But these days there's no reason to conceive a child just to win a race. Pro-utero, now manufactured in milk shake form, simulates much of the hormonal environment of early pregnancy for both women *and* men, increasing muscle power without any of the side effects associated with injections of steroids or growth hormones. Since Pro-utero creates the hormonal environment of early pregnancy only approximately, users avoid such symptoms as nausea and exhaustion. This vanilla-flavored drink must be consumed on a daily basis for a week before effects take place.

SERVICES

Sports crystal ball. Throughout his playing career, Mickey Mantle, one of the baseball greats of the last century, could run, throw, and hit with frightening power. But he had a single, tragic flaw—he was injured almost as often as he was healthy. In fact, the grand variety of strains, sprains, and broken bones that beleaguered him not only cost him weeks of play each year but eventually shortened his career. Mantle wound up in the Baseball Hall of Fame, so he had to be doing something right. But the truth is that he might have done something else better. One of the greatest outfielders of all time, he may actually have missed his calling as a shortstop, quarterback, or champion tennis player.

If the Sport Profile had been around back then, Mantle might have found a truer calling, and his grievous injuries might not have occurred. The reason is the protocol of the profile itself. The Sport Profile involves a complex, comprehensive battery of diagnostic tests that measure every aspect of your internal and external physical structure. By minutely examining the strength and flexibility of your joints, testers can tell you whether you will be able to withstand the jarring pivots of tennis or the leaps and crash landings of basketball. By gauging the capacity of your heart and lungs and the overall cellular composition of your muscles, they can determine your endurance for such sports as swimming or running. By calculating equilibrium, they can predict your future as a platform diver or gymnast. And by determining your bone strength, they can encourage or discourage performance in contact sports like wrestling or football. You can go through the procedure at most sports clinics, where results of the evaluation are fed into a computer programmed with the physical and physiological capabilities required for every major sport. The final printout will tell you what activity is best suited to your body and your life needs.

Olympic network. Even with all the computer help—not to mention elaborate biofeedback systems for strength, flexibility, and aerobics—you can't do it all. In fact, it's almost impossible to plan the optimum sports training program without the help of experts who have access to all the latest research findings and techniques. The answer is a subscription to the Olympic Network system, which will become your ultimate coach.

Network subscribers receive ultrasensitive microsensors that record heart rate, muscle patterns, brain waves, nutritional status, and more. Every bit of pertinent data goes via computer modem to a central clearinghouse. There, a vast mainframe computer programmed with the most up-to-date training information and the subscriber's data makes changes in the training regimen as required.

TOOLS

Magnetic racket. Powerful control of the ball can be yours with the first stringless tennis racket, called the Magnum Force. The racket frame is made of Kevbor, a composite substance that is completely maneuverable yet has the strength of a sledgehammer. The frame is unbreakable and highly efficient at absorbing shock and trauma. But the most spectacular feature of Magnum Force concerns the strings—or rather, the lack of them. Instead of strings, Magnum Force has a magnetic force field that repels the ball. A battery in the racket handle generates electromagnetic pulses in the frame of the racket head; when you swing, the ball is repelled by the negative charge of the force field. The field provides equal power at all points on the head, eliminating the old dead spots near the edges of the frame. It also absorbs much of the shock that would otherwise travel up the arm, so tennis elbow and rotator cuff problems have all but disappeared. What's more, the field can be adjusted depending on the type of shot you want to make. Conventional rackets come at a fixed tension of, say, 60 or 70 pounds; but Magnum Force comes with a computerized adjustable-tension system. With a dial on the handle, you can change the force field to choose one tension for serving, then quickly switch to another tension when you charge the net. Some players may put the racket in auto mode, where an electronic sensor determines what the tension should be, depending upon the location of the ball, and changes it from one moment to the next.

Tripping the light fantastic. Solar sailing, once the province of a few space nuts, is now accessible to everyone with The SpaceSport Company's newest product, Sun Wings. The Sun Wings kit comes with space mask, bodysuit, jet pack, and oxygen tank. But the truly innovative part includes a sail and scaffold that resemble a hang glider's apparatus. The sail itself—a rigid, flat, lightweight sheet of tiny photovoltaic cells—can store enough solar power to propel you to the moon and back. Should you run out of power within the shadow of a space colony or around the dark side of the moon, the sail comes with a portable laser light. Just activate the laser and it will energize your sail, propelling you until you get out of your fix.