1982'S WORST SCIENTIFIC ACHIEVEMENTS

THE BLACK BOX: SECRET DRUG TREATMENT OF ROCK SUPERSTARS

JOHN LILLY ON WAYS OF AMDUSING GOD

EXCLUSIVE: BUILD-IT-YOURSELF ROBOT

PLUS SCIENCE ON THE TRAIL OF SEA MONKEYS, APEMEN, AND LIVING DINOSAURS
It looks like a Walkman," explains Pete Townshend, the lead guitarist of and chief songwriter for the Who, the British rock band. "You clip this transistor-size unit onto your belt, and there are two wires leading from it that you attach behind your ears. Then it's a question of tuning in to the right frequency."

The thirty-eight-year-old rock star is not describing the latest advance in recording technology, but a novel treatment for drug addiction—a treatment that may...
work by striking a melodic chord in the brain. The Walkman look-alike transmits a tiny electrical signal that appears to harmonize with natural brain rhythms and, in the process, reduce craving and anxiety. Or at least it worked for Townshend. The little black box, he says, saved him from a nearly suicidal two-year alcoholic binge that eventually drove him to heavy tranquilizers and virtually any other drug he could get his hands on.

"The treatment works not only for boozers," Townshend emphasizes. "It's helped people give up cigarettes, heroin, barbiturates, speed, cocaine, marijuana—you name it. There is a different frequency that works best for each kind of addiction."

Dr. Margaret Patterson, a Scottish surgeon currently residing in southern California, is the owner and inventor of this magical device. Her black box (mimics of an early model are pictured on the page opposite) sounds suspiciously like quackery. Just twiddle a few knobs and—presto—you can be cured of every imaginable vice. But the magic is real to people in the rock 'n' roll industry, who call her a miracle worker. Apparently Townshend is not the only celebrity who has benefited from her unusual remedy. She is credited with having reformed more than a dozen top recording stars, including ex-heroin addicts Eric Clapton and the seemingly indestructible Keith Richards, of the Rolling Stones, whose reckless abuse of drugs became as legendary as his music. (For Townshend's personal account of combating drug addiction with Patterson's black box, see page 48.)

Happily, Patterson does not fit the image of either a charlatan or a cult figure. She is in her fifties, slender of frame, with a kindly face that radiates compassion. Her pale blue eyes are set off by a magnificent mane of auburn hair, which is swept up into a graceful, oversized bun. "I hesitate to use the word cure," she says in a soft, lilting burr. I prefer to call it a method of rapid detoxification. The electricity quickly cleanses the addict's system of drugs, restoring the body to normal within ten days. Most patients report that their craving also subsides in the process.

Patterson's electrical stimulator is currently pending clinical approval by the Food and Drug Administration (FDA) in the United States, where she has lived since 1981. Over the last decade in Britain, however, almost 300 addicts have received NeuroElectric Therapy (NET), the technical name for her treatment. Patterson claims that all but four left drug-free at the end of the detoxification process—a remarkable 98 percent success rate. "NET should not be confused with ECT—electroconvulsive therapy for mental patients," she cautions. "NET is far milder, involving currents at least twenty times weaker. Patients feel only a slight tingling sensation behind their ears where the electrodes are taped on." Yet this "mild" therapy, she insists, will subdue the violent physiological reactions that can make "going cold turkey" intolerable for even the most strong-willed person. Though normally soft-spoken, Patterson asserts unequivocally: "I can take anyone off a drug of abuse, no matter how severe his or her addiction, with only minimal discomfort."

Of course, not all those who complete the detoxification program remain abstinent. Patterson emphasizes that NET is most effective when backed up by counseling, remedial training, and a supportive home environment. For many individuals, however, the treatment does appear to have long-lasting effects. If we are to believe the recidivism figures she cites, they are many times lower than the national average for every class of addictive drug.

A glance at Patterson's credentials provides reassurance that she is both serious and highly capable. At twenty-one, she was the youngest woman to qualify as a doctor at Scotland's Aberdeen University. Only four years later she obtained her Fellowship at the Royal College of Surgeons, at Edinburgh University—an elite circle that few surgeons penetrate before their thirties.

And just before her fortieth birthday she was presented one of her native land's highest honors by the Queen—an M.B.E., or Member of the Order of the British Empire—for her outstanding medical work in India.

Colleagues and patients describe the tiny Scottish surgeon as warm, confident, and virtually unflappable. "You can't con her," says one patient who had spent years cheating and lying to get bigger drug prescriptions. "And if you try to put one over on her, she won't turn her back on you like other doctors."

"She's the sort of mother you always dreamed of having," says a female addict. Still another views her as a saintly figure "with the selfless devotion of someone like Mother Theresa."

Patterson's close rapport with her patients has made some professionals question whether her dazzling record in drug rehabilitation is really attributable to the powers of electricity. "It's her personality" is the chief disbeliever psychiatrist's oft-attested to her work. "She doesn't control for psychological factors such as people's expectations," says Dr. Richard B. Resnick, an associate professor at New York Medical College, who is recognized as an innovator in the treatment of heroin addiction. "For
example, what happens if you fasten electrodes to patients’ heads but don’t turn on the electricity? You just talk to them and feed them chicken soup. Will they do better, the same, or worse than the group that got current?”

Such skepticism is less common in England, where Patterson’s clinical practice was based until recently. There, a number of doctors have already begun to obtain the same beneficial effects with her electrical stimulator model.

Dr. Margaret Cameron, a psychiatrist with the National Health Service, in Somerset, England, reports that NET gives “very, very good results”—better than any other treatment she’s encountered.” Since May 1981, Dr. Cameron has treated 40 alcoholics, 2 methadone addicts, 4 heroin addicts, and a few individuals with mixed addictions involving cocaine and barbiturates. In follow-up interviews conducted six months to a year later, 60 percent of the alcoholics were still off alcoholic beverages and none of the other patients had relapsed. A private practitioner based in New Jersey, Dr. Joseph Winston, shares Cameron’s enthusiasm for NET: “As a benign, effective technique for withdrawing people from drugs, it is virtually unmatched.”

If NET has met with resistance, it is because its mode of action strains the explanatory powers of modern science. Until recently, orthodox medicine refused to recognize that infinitesimal electrical currents may influence the behavior or function of living organisms. Currents less than 100 millivolts—or below the threshold for triggering a nerve impulse—were assumed to have no effect on biological processes. This dogmatic view had to be reassessed when accounts of such unsettling phenomena began appearing with increasing frequency in technical journals over the last decade. NET is, in fact, only one branch of a young, controversial discipline that is still struggling to achieve respectability—the science of electrical medicine.

In the early Seventies scientists began introducing very small currents via electrodes to different parts of the body—with dramatic results. A rat amputee was induced to regrow a forelimb down to the midjoint, according to one exciting—though sometimes contested—report. In human applications, the FDA has approved the use of such currents for stitching together stubborn-bone fractures. Recent experimental trials also indicate that trickling flows of electricity promote the healing of chronic bedsores, burns, and even peripheral nerve injuries. The external currents, it is theorized, stimulate rapid healing by augmenting the body’s internal currents.

“By contrast, weak currents applied to the brain affect different physiological processes,” says Dr. Robert O. Becker, a pioneer of electrical medicine who recently retired from Veterans Administration Hospital, in Syracuse, New York. “But I believe Dr. Patterson is producing profound alterations of the central nervous system.
patients remained symptom-free for periods of longer duration.

The results of Wen's first study with 40 opiate addicts were published in the Asian Journal of Medicine, the following spring. Of this group, 39 were drug-free by the time they left the hospital, roughly two weeks after starting treatment. When Patterson returned to England in July 1973, however, she found that addicts there were far less enthusiastic about the procedure. The Chinese loved acupuncture: the British hated it. "As bizarre as it may sound," Patterson explains, "the Westerners—even those who maintained drugs—often had an aversion to the needles."

There was another reason not to use needles. Patterson had suspected from the outset that acupuncture was essentially an electrical phenomenon. Even the traditional explanation hinted that this might be so. The ancient practice revolves around the notion that all living things possess vital energy, called chi, which circulates through the body by way of a network of channels, or "meridians." Sickness was seen to be the result of disharmony, manifested by an obstruction in the flow of chi which the needling was thought to remedy. Was chi the ancients' concept for what modern man now recognizes as the internal currents that course through the body? Could it be that the Chinese, more than 2,500 years before the discovery of electricity, had intuitively sought to alter this life force in an attempt to alleviate pain and to cure disease? Perhaps, Patterson reasoned, the twirling of needles generates a tiny electrical voltage. Viewed in this light, the more recent practice of electroacupuncture was simply a more intense form of the original twirling technique. If so, the electrical signal would be of crucial significance in the treatment of addictions.

Years of clinical trial and error eventually confirmed her hunch. First Patterson replaced needles with surface electrodes. Then she went on to compare direct current with alternating current, while varying the voltage, shape, and other aspects of the electrical signal. Next she altered the electrode placement, finding a position just behind the ear over the mastoid bone to be more effective than the lung point. But, of all the variables explored, electrical frequency quickly emerged as the single most important element for success. Those addicted to narcotics and sedatives preferred frequencies within the 75-hertz to 300-hertz range. Barbiturate addicts responded to lower frequencies, and stimulant addicts, especially those dependent on cocaine or amphetamines, benefited most from frequencies as high as 2,000 hertz. "Musicians," she fondly recalls, "really helped to strengthen my guesswork during those early days. They invariably found the correct therapeutic setting right away. It was as if their brains were more attuned to frequency."

A further refinement of the therapy was prompted by still another fortuitous discovery: A heavy abuser fell asleep with the electrical stimulator on and awoke 30 hours later well-rested and eager to take Patterson's children ice skating from that moment onward. Patterson advocated continuous current application in the initial phases of treatment. She began the search for more comfortable electrodes that could be worn during sleep and for smaller electrical stimulators that could be clipped onto belts, permitting mobility during the day. By 1976 Patterson had transformed electroacupuncture into an exciting new experimental treatment mode that she christened "NeuroElectric Therapy." In her first clinical study, which was reported that year in the U.N. Bulletin on Narcotics, opiate addicts given NET as in-patients were all found to be drug-free an average of ten months after completing treatment. In contrast, opiate addicts who received NET only during the day as out-patients did not fare as well: 47 percent were drug-free at the time of the follow-up.

Because this preliminary investigation was limited to 23 patients, her results could not be extrapolated to a larger cross section of addicts. To provide better information about the long-term effects of NET, and also to assess its value in the treatment of other kinds of addictions, Patterson was recently awarded a research grant by the British Medical Association.

Last fall at a Washington, D.C., symposium sponsored by the American Holistic Medical Association, Patterson presented the findings from this follow-up evaluation which tracked the progress of patients treated between 1973 and 1980. Data were obtained from confidential questionnaires and, when possible, from personal interviews. In fact, respondents to the survey included 66 drug addicts (mostly mainline heroin or methadone users and mixed-addiction cases), 9 cigarette smokers, and 18 alcoholics. At the time of the follow-up, total abstinence was said to be achieved by 80 percent of the drug addicts, 44 percent of the cigarette smokers, and 78 percent of the alcoholics who stated abstinence to be their goal. An additional

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7 alcoholics whose goal on admission was controlled drinking all reported success. (As Patterson herself cautions, however these figures probably represent too favorable an outcome since patients who relapsed, especially alcoholics, may have been less likely to reply to the survey.) Of those who were successfully weaned from their dependence, 68 percent said they never or only rarely experienced craving. 15 percent said they occasionally felt craving, and another 17 percent said they frequently felt craving.

Interestingly, none of the drug addicts at the time of reporting had substituted alcohol for their earlier addiction—a finding that contrasts sharply with the figures cited in other studies. In one national survey, for example, 60 percent of addicts who had given up narcotics became heavy drinkers or alcoholics. Equally noteworthy was the extremely low dropout rate of all addicts enrolled in the program. Only 1.6 percent did not complete detoxification.

All things considered, the success of Patterson’s patients is probably most remarkable from the standpoint of the brief duration of the therapy, which, including counseling, rarely extends beyond 30 days. According to a large study of drug abusers admitted to a variety of government-sponsored programs, addicts treated less than three months did not fare any better than those in a no-treatment comparison group.

So NET seems to achieve in a few weeks what few, if any, orthodox treatments can accomplish after months or years.

Not everyone, however, is convinced by the report’s conclusions. A look at the history of drug reform in the United States shows that its cynicism is not ill-founded. Consider the government’s efforts to curb narcotics use. The first U.S. Public Health Service hospital for heroin addicts opened in Lexington, Kentucky, where 18,000 patients were admitted between 1935 and 1952. All except some 7 percent of the total promptly relapsed after dismissal from the institution—a dreary record that other institutions scarcely improved upon in subsequent decades.

By the 1950s heroin addiction had spread like cancer through inner-city ghettos. To control the expanding epidemic, health professionals turned to methadone, a synthetic opiate that is legally prescribed. Today thousands of clinics throughout the nation dispense methadone to certified addicts, and those maintained in these programs show higher rates of employment and fewer criminal offenses than before they began treatment. But methadone, alas, is even more addictive than heroin. As one medical authority points out, "The tragedy of methadone is that we cannot get people off methadone."

For narcotics addicts who aspire to a drug-free existence, society offers two main alternatives: the highly structured and insulated environments of such residential homes as Daytona Village, Phoenix House, and Odyssey House or out-patient clinics, which provide daily counseling services. As many as 30 to 40 percent of the people who enroll in these community-based programs remain abstinent a year after leaving treatment. But to enter most of these programs, one must first detoxify in a hospital. And here’s the hitch: 64 percent don’t make it past the acute withdrawal phase to qualify for further treatment.

"It is still not understood why simple detoxification is so ineffective, the facts are clear and inescapable," says Dr. Avram Goldstein, professor of pharmacology at Stanford University. "As I see it, the reason for the dismal failure is that the newly detoxified addict, still driven by discomfort, physiological imbalance, and intense craving, cannot focus attention on the necessary first steps toward rehabilitation, but soon succumbs and starts using heroin."

Jean Cocteau, the French writer, who resumed smoking opium after medicine had "purged" him of the habit, put it another way: "Now that I am cured, I feel empty, poor, heartbroken, and ill."

In sharp contrast, NET patients are said to emerge from treatment feeling healthy, energetic, even cheerful. Dr. Joseph Winston, the American physician who collaborated with Patterson in the treatment of...
Keith Richards, recalls that the musician came to us terribly ill. He was literally green. But he slept eighteen hours the first day and ten days later he was playing tennis and the group said he had not looked so good in years.

If Patterson’s findings seem at total variance with the bulk of the clinical literature, the firsthand accounts of NET patients may help explain why.

Stuart Harris started shooting heroin as a twelve-year-old cadet in the Royal Navy. By the time he underwent NET in the spring of 1981, he had been addicted to heroin for fifteen years and for most of those years he had also injected methadone. Miraculously, I had the sweats very badly. He says of his experience on NET: You’re emitting all this bad grunge from your body and you feel you’re sweating [on amphetamines]. But there’s no withdrawal at all. That means I’ll tell you. It means when they told me about it I just took it with a pinch of salt — another treatment they’ve lobbied off on the poor junkies. But believe me — I was getting any pain as I used to have with heroin. I wouldn’t have stayed there. Usually I was a volunteer patient. When I discharged myself from hospital, I didn’t go searching out for drugs as I would normally have done in the past. They gave me a massive shot of heroin. But after NET all you really want to do is sleep. Everything is so easygoing. I can’t say that it [heroin] doesn’t drift in my mind. Like the other day, I fancied a fix. But I passed over in a few minutes. Before, if I’d felt the slightest urge for a fix, I’d go to London. Something has changed. You feel calmer. You can accept the ups and downs.

A man in his thirties, who requested anonymity, had injected heroin for eight years. He received NET in 1980. The treatment was rough. He says: I felt as if I had a mild case of the flu. Combined with short periods of feeling spaced out — even a bit euphoric. My anxiety and craving subsided right from the beginning but a few weeks later my craving for heroin went back up again. I wanted to go out and score. And as a matter of fact, I did. But it was different. It wasn’t satisfying. It didn’t make me feel the same. I know this treatment changed my head, because I never thought about heroin again after that. You see, I hadn’t had heroin for so much as a month, even two months, at a stretch. But the whole of that time I would be thinking of heroin and nothing else.

A twenty-eight-year-old man, who also requested anonymity, combined a high level of alcohol and marijuana consumption with a cocaine habit of two to six grams each week for more than seven years. (The cocaine alone usually cost him more than

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$1,000 a month.) He agreed to speak to Omni immediately after completing NET treatment in the summer of 1982. "Until this therapy, he says, "I couldn't go three days without feeling an enormous craving for drugs. Cocaine and, to a lesser degree, alcohol would always be on my mind. But from the moment the electrodes were put on my head, my craving immediately diminished. When I had passed the three-day mark, I felt no craving at all, and I still don't. Drugs never enter my mind. Now that I remember what it's like to feel good-to be clearheaded after all these years-I'm certain that I won't go back on drugs." 

Rachel Wall, a heavy smoker for five years, was treated for her cigarette addiction in June 1981. "For the first three days on NET," she recalls, "I still had the urge to smoke, and I probably would have lit up had a cigarette been handy. However, by the end of the treatment I had changed my mind. I don't want one. When I took an experimental puff, it was I different sensation altogether. I tasted toul, and there was no hit whatsoever. It was as if I was smoking on hot air." 

Surprisingly, many patients who go on to build drug-free lives do not receive any formal counseling beyond that provided during the brief detoxification program. Yet NET, by itself, cannot remove the root causes of addiction, nor can it replace years of maladaptation with healthy skills for coping with life's stresses and disappointments. Why then do so many patients experience such a metamorphosis? 

The treatment, Patterson believes, simply sets the stage for further growth. "Because they feel so good," she says, "they are better able to face the sort of problems that drove them to addiction in the first place. You see, most people who come off drugs without NET enter a phase of prolonged dysphoria. They suffer from fearful depression and passivism. They can't eat. They can't sleep. They have no energy. This can last for six months in the case of heroin and even longer in cases of methadone and barbiturate addiction. But NET restores psychological normality within ten days, which enormously reduces the amount of time needed for readjustment."

If anything, Patterson thinks that euphoria—not dysphoria—is to blame when rehabilitation fails. The newly detoxified addict is optimistic to the point of being overconfident. "In their elated state," Patterson says, "they think it will be easy to stay off drugs and then end up stumbling because they don't make enough of an attempt to change their ways."

As if obeying Newtonian mechanics, the black box appears to counter one mood shift with an equal swing in the opposite direction, until the emotional pendulum finally comes to rest. Is the black box, in reality, an electronic substitute for a chemical high? How can a physical treatment cause such a swing toward euphoria? 

As late would have it, a scientist who had taught Patterson years earlier, Dr. Hans Kosterlitz, would once again serve as her mentor by illuminating the mainspring of euphoria in the brain. While working with Dr. John Hughes at the University of Aberdeen in 1975, Dr. Kosterlitz identified an endorphin, a natural brain chemical, with a molecular structure very similar to the opiates. For this outstanding discovery, the investigators later received the prestigious Lasker Award, revered as America's equivalent of the Nobel Prize in medicine. Almost overnight their finding triggered an explosion in the understanding of the biochemical basis of behavior, opening a new vista on the controlling factors behind addiction. Opium, heroin, morphine, and other related drugs owe their potency to what Avram Goldstein calls "one of nature's most bizarre coincidences"—their uncanny resemblance to the endorphins.

Over the succeeding years researchers uncovered evidence of myriad other brain chemicals that mimic psychoactive drugs from Valium and angel dust to hallucinogens. Almost every mind-altering substance, it is now assumed, has an analogue in the brain. And the precise mixture of neurotransmitters in this biochemical cocktail can mean the difference between tripping, speed, crashing, or seeing the world through sober eyes.
These insights immediately suggested how the addict becomes trapped in a nightmarish cycle of dependency. In the initial phases of narcotic use, for example, the individual is assumed to have normal levels of endorphins in the brain. Injecting heroin causes a sudden and drastic elevation of opiates, which is subjectively interpreted as ecstasy. If, through repeated use, the brain is regularly flooded with opiates, it redresses the imbalance by cutting back on the production of its internal supply. Hence, the well-known condition of tolerance develops. The addict "steps up his dosage, and the brain further compensates by calling a massive shutdown of production. Eventually, according to theory, the addict is shooting up only for the purpose of feeling normal. Should the drug supply be cut off at this stage the opiate shortage cannot be instantly remedied. Drought ensues, unassuming withdrawal symptoms.

If an exogenous drug ceiling the brain of its natural counterpart is logical, that NET might quite literally purify the system, rapidly repulsing the scarce and neurochemicals. Might certain frequencies of current catalyze the release of different brain hormones? Patterson wondered.

To find out, she conducted animal experiments in collaboration with biochemist Dr. Ilo Capel at the Mayo Cancer Research Foundation. In a study published in the journal Science, by monitoring the brain's NET levels, she discovered 

"As far as we can tell," says Dr. Capel, a rugged Welshman with a melodic voice, "each brain region generates impulses at a specific frequency based on the predominant neurotransmitters that secrete. In other words, the brain's internal communication system is its language. If you like, it is based on frequency.

Unfortunately neuroscientists are not yet fluent in this foreign tongue. NET is a very blunt tool. Capel acknowledges. Presumably when we send in waves of electrical energy at say ten hertz certain cells in the lower brain stem will respond because they normally fire within that frequency range. As a result particular mood-altering chemicals associated with that region will be released. That is, what we hope is happening in reality however much of the signal may be lost before it actually reaches the larger cells. We just don't know.

If we can tune in the signal, I am confident our results will steadily improve at her small two-bedroom home in Corona del Mar, Patterson has begun testing a new improved model of the "Time-Hero" goal and the major impetus behind her decision to come to the United States - is to obtain funding for the establishment of a center where human and animal research can proceed in tandem. Until FDA clearance is given however, she cannot begin treating addicts on a routine basis.

Will NET open a new route to salvation for the millions of Americans who each year flock to Alcoholics Anonymous, Smoke Enders and methadone maintenance clinics? Clearly the final verdict is contingent upon replication of controlled studies. But if a feasible electrical current can truly curb the mind's excesses - from uncontrollable lusts to extremes of mood - its impact is sure to be far-reaching.

"Addicts may represent only a tiny fraction of the people who will eventually be helped by NET" Capel predicts. "In all likelihood it will find an enormous range of uses, especially in the area of pain control. In one preliminary trial, terminal patients suffering from chronic pain found NET just as effective as their daily dose of morphine. By stimulating the brain's own painkillers, we didn't have to administer drugs," Capel notes.

Early data also indicate that NET may prove highly promising in the treatment of mental disorders. The frequencies that induce euphoria and reduce tension according to Dr. Cameron of Britain's National Health Service "seem to work wonders for patients suffering from severe depression and acute anxiety. Though it is far too soon to draw any conclusions..."
she notes that "a few of the half-dozen chronic depressives we’ve treated have found themselves jobs after years of unemployment."

As for Patterson, she hopes eventually to broaden her practice to include behavioral addictions, from overeating and compulsive gambling to video-game fascination. "Absurdly, aside these wider applications, follow a certain logic. “Her ideas make perfect sense if one accepts the idea that behavioral addictions have a chemical basis,” says Dr. William Regelson, at the Medical College of Virginia. “It is very likely, for example, that all activities vital to survival—from sex to physical exercise—are physiologically addictive. It is now thought that the phenomenon called ‘jogger’s high’ is actually endorphin-mediated. In all probability, eating also releases some kind of pleasurable molecule. After all, why do we crave food? Low-blood-sugar levels don’t explain why. The truth is that we feel abnormal when we haven’t eaten in a while. Some chemical in our brain has become depleted. We become restless and agitated, and, as a result depression. We suffer withdrawal symptoms, commonly known as hunger pangs. The only way to relieve our discomfort is to get more food. It’s a fix—plain and simple."

If basic drives are addictive, then drugs are an ingenious means of short-cutting the elaborate device nature designed to ensure that we maintain health and reproduce ourselves. Merely by popping a pill we can top off our neurochemical reservoirs with no sweat expended. Instant orgasm without any foreplay. A cheap thrill. But can’t the same be said of NET? "Is it not, after all, an electronic fix?” asks Reigelan, who fears the black box may become addictive in its own right. Patterson has kept her eyes open to any signs that her patients are becoming physically dependent on the equipment. But she rules out the possibility that there will ever be a black market in black boxes, because individual models can cost upward of $1,000—a hefty sum to cough up for purely recreational use. Besides, she has not encountered a single instance of electronic addiction in her ten years of practice. The explanation, she believes, "is that drugs—

The intuitive feelings of her patients support this view. As reformed heroin addict Stuart Harris says, “At first I thought it would be fun to wire up the human race, so we could all go whizzing about. But after the initial buzz, you feel, well, normal. Frankly, all NET does is help you face reality.”

Patterson concurs: “All we can do is give people a chance. We can get them off whatever drug they’re hooked to, but it’s up to them to fill the void. They’ve got to find a constructive substitute for the drugs that have dominated their lives.”

MONSTERS

CONTINUED FROM PAGE 113

Bartholomai, the museum’s director, doesn’t believe the skin comes from the long-lost giant squid. Instead, he’s convinced it was torn from the flesh of a giant pufferfish. "Domestic cats may have escaped to the rain forest decades ago," he speculates. "Then, through the process of natural selection, they may have grown frightfully large to survive in the new terrain."

GIANT OCTOPUS

The Queensland cat may seem big, but it pales before what could be the world’s largest invertebrate—a six-ton octopus said to lurk off the Florida coast.

The beast came to light on November 30, 1896, when two boys cycling along the beach in St. Augustine, Florida, discovered a huge carcass buried in the sand. News of the find soon reached medical doctor and naturalist DeWitt Webb, who rushed to the scene, expecting a whale. But after careful examination he reached the astonishing conclusion that the beast was a giant octopus, the first ever glimpsed by a scientist.

With the help of a Yale professor named A. E. Verrill, an expert on the giant squid, Webb did further studies on the creature. Verrill himself eventually published accounts in local newspapers and a few scientific journals. The reaction of their peers? Outrage. Webb had found a mass of blubber, they charged—nothing more.

The story would have ended there but for a chance find in 1957 by Forrest Wood, newly appointed curator at Marineland of Florida. Wood was going through some of his predecessor’s papers when he discovered a yellowed newspaper clip describing the beast—a six-ton octopus stretching 150 feet tentacle tip to tentacle tip.

Amazed, he began an intensive investigation, finally discovering a jar filled with samples of the 60-year-old carcass stored away at the Smithsonian Institution. Then he recruited the help of his friend and fellow marine biologist Joseph Gennaro, Jr. of the University of Florida.

Gennaro persuaded the Smithsonian to let him take a few pieces of flesh back to Florida, and soon he was hard at work. Doing a microscopic analysis of the tissue, he found that it resembled neither whale blubber nor squid tissue. Instead, the cells formed a broad pattern of dark and light stripes seen only in the octopus. He and Wood published their account in Natural History magazine in 1971, only to receive a nasty letter from the Smithsonian. How dare they suggest the tissue was anything but whale blubber. The institution demanded, requesting that Gennaro return the borrowed sample at once.

Gennaro ignored the request, and just recently he conducted yet another study suggesting that the tissue was in fact something totally unique.

Working from his current lab at New York University, Gennaro cut a snippet of tissue from the Smithsonian sample. Then he removed tissue from a whale, a 60-year-old giant squid preserved in formaldehyde, and an ordinary squid, and an ordinary octopus. Carefully labeling each sample with a number, he sent the batch off to Mackal at the University of Chicago.

Without knowing the identity of the samples, Mackal conducted a biochemical analysis of each. They were all more or less similar, he found, except for one containing huge quantities of the supportive substance known as collagen. That sample, of course, turned out to be from the benemoth beached at St. Augustine.

As far as Gennaro is concerned, these results combine with Webb’s detailed descriptions to indicate that the monster was indeed a giant octopus. Without any internal skeleton, he explains, an octopus grows large with huge amounts of collagen to give it support. Whales, with strong internal skeletons, and squids, which use a substance called elastin for support, would have no such requirement, even if they did weigh live or six tons.

If any kin of the giant octopus still roam the sea, Gennaro says, they would count among the ocean’s greatest beasts. "It’s anything like the octopus we know," he adds. "It lays hundreds, even thousands of eggs at a time. There could be more than just a few of them: but they’d be harder to find than lake monsters. The ocean is a pretty big lake."

Monsters are a part of our heritage. The first sailors believed that if they didn’t sail off the edge of the earth, a man-eating sea serpent would devour them alive. Reports of leviathans and mermaids continue to this day. Most of these, when examined, turn out to be mistaken identifications of known animals. Yet every once in a while a rumor turns out to be something extraordinary: a previously unknown animal. As in the case of the pygmy hippopotamus. For years natives in Africa talked about these miniature hippos, and no one believed them—until one was finally captured.

Yale University biologist Alvin Novick doubts that cryptozoologists will uncover anything significant. "There are far more important challenges to biologists, and far more important uses for large expenditures of time, money, and talent," he says. "than seeking man-eating apes in the Aleutians, sea serpents in Maryland, or zeuglodon in Vermont. Belief in these creatures is nothing more than a reflection of anxiety in the modern world of science, and an obvious extension of current interest in the paranormal."

To Richard Greenwell, though, the future of cryptozoology is bright. "From a statistical perspective, it’s the contest of these animals just have to be real. The field won’t all crumble on one claim; we may be wrong about Bigfoot, and right about Loch Ness."

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