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Fantasies of Extremes: Sports, War and the Science of Sleep

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Abstract
In this article, I address the enduring American interest in the manipulation and eradication of the need for human sleep through the powers of science. In particular, I focus on military research regarding the possible reduction of necessary sleep times as well as historical attempts to modify and maximize the scheduling of warfare; these military efforts are juxtaposed to the efforts of sports professionals who have attempted to test the limits of human sleep, either for scientific concerns or for that of victory. These various scientific pursuits are compared to science fictional representations of the eradication of human sleep, or its significant modification. I argue that it is not solely the actual realization of sleep's modification that impacts dominant understandings of sleep, but rather that the fantasies of science's powers reconfigure conceptions of the human and its limitations.

Keywords Extreme Sport, Insomnia, Military Science, Science Fiction

From popular to integral

Over the course of Chris Carter's *The X-files* (which ran from 1993 to 2002), a number of episodes focused on urban legends of military research into producing supersoldiers. In season two, FBI Agents Mulder and Scully discover that the mysterious death of a sleep researcher was intimately tied to his involvement in American military research to eradicate sleep. The experiment succeeds, but also results in a lack of empathy and homicidal tendencies. Similarly science fictional, the US military has had a long-standing interest in the control of sleep. In the early 2000s, a new Defense Advanced Research Projects Agency (DARPA) project related to Continuous Assisted Performance (CAP) was begun. This project attempted to eliminate the need for sleep through technologies—primarily pharmaceuticals

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and electrical stimulators—exclusive to the US military. The science of, and experimentation with, controlling and eradicating sleep is questionable, and depends on a variety of technoscientific fantasies, which take as their object a profound reordering of human biology. This interest is not only a military one, but also evident in extreme sports—notably the Vendée Globe, a round-the-world, individual yacht race—and science, as in the case of Michel Siffre's experiments with circadian rhythms while living in a subarctic cavern in the 1960s, and Nathaniel Kleitman's consultancies with the US military on the reordering of soldiers' sleep. I address each of these engagements with the extremes of sleep below, and turn finally to a rare neurological disorder, fatal familial insomnia (FFI), to evidence the limits of these projects. Like CAP, all of these attempts to ascertain sleep's functions and controls tested the limits of the human body, and helped to reshape dominant ideas about the nature and capacities of human bodies.

These scientific, sports-based and military projects are all experiments with the extremes. The extremes bring together science fictions and normative everyday regimes through technics (Stiegler, 1994). This is to say that the extremes begin with assumptions about normalcy, extend these assumptions to their ends, and then insinuate these new models of the normal into the everyday. In so doing, the extremes make the present into the future, thereby unfolding new possibilities, capacities and normative regimes. This is to argue that, rather than conceptualizing normalcy as a historically determined project which simply reproduces itself (e.g. Bourdieu, 1990 [1980]), the extremes are instead a practice which takes as its object actualizing possible futures in contemporary models of the normal. One means through which this operation occurs is science, broadly conceived. But this is science as science fiction—or vice versa. The extremes take as their object ahistorical and acultural conceptions of primordial human nature and relationships between humans and their natural environment. By putting humans into extreme environments, their primordial natures can be revealed; by pushing human nature to its extremes through technological means, new conceptions of the normal can be elucidated. The extremes bring into being a world in which new orders make sense of the bodies that they produce, not unlike the way science fiction produces new understandings of the everyday. The extremes come in many forms: the molecular, the molar and the organizational, which take as their objects the management of bodies at varying scales and through various techniques.

Dominant scholarly understandings of science fiction have focused on it as a literature of estrangement or of 'nova' (Suvin, 1979), the latter a term to refer to novel developments (scientific, technological, political) that mark a significant difference in everyday life and its potentials. Estrangement and nova make science fictions into technic fictions, attempts to make future worlds in the present—future worlds that rework cultural expectations of normalcy and its everyday possibilities. These fantasies of the extremes are not solely about a select few individuals who participate in technoscientific projects, but about all humans as models of biology and its potentials for change, along with the invention of new forms of life. In the case of sleep, this can be seen in the military attempts to redefine the capacities of the human, athletes' and scientists' attempts to reconfigure their use of sleep, and scientific projects which attempt to isolate human biology from society. But these extremes are always defined by and balanced against what human bodies are actually capable of. These human limits, as the history of military science shows, are constantly redefined by new technological developments and new concerns over what to do with human bodies.

The extremes might be approached phenomenologically, interrogating the subjective experiences that individuals are induced to embody under these exceptional conditions. Instead, the extremes are about setting new rules and expectations for bodies: in so doing, they also instantiate new expectations of behaviors. Rather than any functional explanation of the extremes, where the extremes are safely held outside of the normal to evidence what constitutes the latter (Agamben, 2005 [2003]), the extremes initiate the creeping of new orders, new enframings of bodies and behaviors (Mitchell, 1991 [1988]), which slowly emerge as hegemonic conceptions of everyday practices and potentials (Wolf-Meyer, n.d.)—science fiction becomes reality. Thus, in the oscillations of the extremes and the normative there is a subtle reformulation of both categories—the normal changes based on the extremes, and the extremes are moved to new domains to again produce new norms. The four cases considered here are these: the attempts of DARPA to create sleepless soldiers, which highlights the pharmaceutical and technological reordering of sleep; the efforts of Nathanial Kleitman to reorganize the military use of soldiers' sleep during the Second World War, which attempted to create new temporal regimes for the ordering of biological activities; the experiments with circadian rhythms by French speleologist Michel Siffre in an attempt to ascertain primordial biological capacities outside the influences of society; and the training of micro-sleep patterns of competitive sailors, which capitalize upon these experiments with human biology and offer a glimpse of one possible new order of sleep and social life. These are balanced against the realities of sleepless bodies in the form of fatal familial insomnia, which may—at least temporarily—give an understanding of where the limits of human bodies lie.

Embodying the American war machine

Like many of the projects undertaken by DARPA scientists, it was precisely in the potentialities of the science fictional that CAP hoped to achieve military success. DARPA developed what later became the Internet, but also spent years researching 'remote sensing' or clairvoyance, and a host of other dubious projects. These fantasies mixed the limits of human bodies with natural and technological means in an effort to redraw the limits of embodiment and the capacities of the human. The CAP project mixed pragmatic goals—the eradication of sleep deprivation's ill effects—with research agendas that were on the controversial frontiers of science. As discussed in a declassified presentation of one CAP researcher:

> Studies have shown that sleep deprivation results in poor judgment and lowers physical performance. The ability to maintain focus and respond to the world around you is lessened, and these are precisely the attributes that a warfighter needs most. The need for sleep is a significant limiting factor for the warfighter, and, by removing it, an immediate advantage is gained in the form of a force multiplier. Continuous operations are possible, and the tempo for those operations is accelerated. Imagine if we could remove the need to sleep for periods up to one week without a reduction in our ability to process sensory input, make decisions, and respond to the external environment with focus and intention. (Bielitzki, 2002: n.p.)

The rhetorical shift from 'soldier' to 'warfighter' is a perverse one, and denotes the rationale for eradicating sleep deprivation's ill effects in the soldiers of the future: there will no longer be a

need for the auxiliary social aspects of soldiering, only the brute force of war itself. 'Imagine,' Joseph Bielitzki asks his audience, 'if we could remove the need for sleep', and leaves its possibilities ominously open; sleep's control will be measured in the 'force multiplier' that its absence confers to future warfighters. What this 'force multiplier' might be is nebulous, as are the side effects of such a radical transformation in human biology.

The goals of the CAP project were described by Bielitzki in the following terms, which left aside the more violent aspects of sleepless soldiering:

> Preventing changes seen in the brain that are caused by sleep deprivation; expanding or optimizing available memory space within the brain to extend performance; rapidly reversing adverse changes in the brain caused by sleep deprivation; and developing problem solving circuits within the brain that are sleep resistant. (Bielitzki, 2002: n.p.)

What any of these effects actually meant and how they might have been brought about were left undetailed—what, precisely, might a 'problem solving circuit' in the brain be, other than a quasi-cyborg imaginary? Although evocative of a solider who is able to fully apprehend his or her environment and respond to it effectively, what is concealed by this language of the brain is the violence that is expected to be meted out by a body that hosts a sleepless brain. Such a supposition recognizes sleepiness and the need for sleep as primarily seated in the brain, and that fatigue, aching muscles, or injuries sustained by the body might be overridden by a more capable nervous system. This model of sleep as behavioral and subject to choice rather than biological and subject to physiological demands is a popular one in research regarding sleep's eradication; for most experiments with the possibilities of human sleep in extreme situations, engaging the mind in various ways has been deployed in an attempt to keep the body vigilant, but the brain itself is supplemented with technologies and techniques of management.

As is to be expected, the development of these supersoldiers relies in part on existing technologies, but supplements these with contemporary scientific techniques, including genetic analysis, 'novel' pharmaceuticals, and means of affecting the brain directly with electricity and magnetism to produce higher cognitive functioning while sleep deprived. These technoscientific techniques rely on the perceived differences within human bodies, but also supplements these natural bodies with prostheses that extend them towards the future (Stiegler, 1994). As described in a declassified DARPA document:

> The Continuous Assisted Performance (CAP) program is developing a wide range of technical approaches to extend the capabilities of soldiers to perform their duties for up to seven days without sleep. Unlike existing brain stimulators, such as caffeine or amphetamines, CAP will develop techniques that maintain cognitive function during long periods of sleep deprivation. . . . [The] portfolio of efforts . . . include: (i) magnetic brain stimulation; (ii) understanding individual differences in resistance to sleep deprivation; (iii) effects of exercise and diet on resistance to sleep deprivation; and (iv) the discovery of novel pharmacologic approaches. . . . [T]he program is identifying technology to successfully reverse the effects of sleep deprivation on executive function. In addition, the program is expanding approaches that enhance neurogenesis as a protection against the effects of sleep deprivation. (DARPA, 2003: 46–47)

Some of these technologies are hardly science fictional, as in the case of ascertaining the 'effects of exercise and diet' and its relation to sleep; one can easily imagine such knowledge

leaking out into American society more generally to produce new alertness-promoting food fads and sleep-friendly diets. But is there room in American society for 'magnetic brain stimulation' salons? Rhetorical questions aside, how these developments and reconfigurations of the human body might trickle into American society more broadly is entirely unforeseen, and this question is wholly avoided by the DARPA scientists associated with the project (at least in print). The knowledge of the successful development of such sleepless bodies may effect a Lamarckian shift in culture, if not biology: if the possibility of such a radical transformation is confirmed, then it might become the new foundational understanding of human biology—the extremes being the new normative regime. If it can be done, why not for every American?

Science in the twentieth century stood in its own way in trying to develop sleepless soldiers. The basic mechanisms of sleep remained undiscovered by scientists and, in the face of such ignorance, the development of sleepless bodies was only a fanciful possibility. In the language of CAP's director, Amy Kruse, this was put into the relational rhetoric of being in the 'far-term':

> For the far-term, we are studying the mechanisms of sleep—in creatures from flies to humans—in an effort to uncover the critical components, neural substrates, and modulators of sleep. . . . On a microlevel, we now know that specific genes can regulate sleep and wakefulness needs, and these genetic sequences will be used to identify candidate biomolecules that might eliminate the deleterious effects of extended sleep loss. (Kruse, 2005: 44–45)

The genetic understanding of sleep, its causes and solutions, brings together the evolutionary past with the high-tech, science fictional near-future. Such future-talk brings together time and biology in ways that firmly root the future in the biological, not the cultural or social. The future to come will—in this view—be one wherein biology and knowledge of biology are ascendant, and social life and cultural expectations will be reshaped by such intimate knowledge of how sleep might be controlled. The danger of such a prospect, or rather of such prospective thinking, is that contemporary science is 'far' from being able to explain basic functions of sleep and its abatement, and such fantasies—if taken increasingly as reality—might initiate new orders that restructure everyday life in ways increasingly antagonistic to sleep; such scientific fantasies may initiate a 24-hour society that relies upon and expects fully vigilant bodies. But turn-of-the-century science was unable to make bodies that were able to maintain a 24-hour existence for long enough to make it a tenable fantasy, let alone a new 'natural' order. These interests are not wholly new, nor only fictional: Nathaniel Kleitman, the father of modern sleep science, was intensely interested in how he might aid the Allies during the Second World War with his knowledge of sleep and circadian rhythms, and in so doing helped to initiate this modern interest in sleep's control in both military science and extreme sports.

Organization as the extreme

In March 1942, professor of physiology at the University of Chicago, Nathaniel Kleitman, prepared a report on 'Suggestions for improving readiness for combat and increasing

efficiency of performance' for the US Army and Navy Fliers, the precursor to the Air Force.[1] Kleitman was the father of modern sleep science in the United States, and was interested in elucidating the basic processes of sleep (Kleitman, 1963 [1933]); his work would only later be employed to develop modern sleep medicine, principally by his student William Dement (Dement and Vaughan, 1999). Kleitman's scientific efforts were often supplemented with attempts to operationalize his findings in public ways—he was intensely interested in popularizing knowledge of sleep and the ill effects of poor sleep hygiene (Wolf-Meyer, 2007). His suggestion to the Navy Fliers was to have two shifts of sleepers, one which 'would sleep between 5 a.m. and noon or 1 p.m. and the other half between 8 or 9 p.m. to 4 a.m.' Kleitman explained that 'irrespective of the number and distribution of the watches or flights, the latter would always fall, day or night, during the *regular* waking hours of at least one-half of the fighting force,' thereby preserving the reliability of something akin to diurnal everyday life, even during wartime. This was instead of the use of rotating shifts—much like shift work—which were exhausting for the pilots. Kleitman went on to suggest three methods to determine how the armed forces could be temporally split, suggesting 'preference', 'selection, on the basis of physiological tests' and 'by rotation—at equal and sufficiently long intervals, so that each group will become adapted to and maintain its own activity cycle.' Ultimately, he suggested that these three methods should be combined to offer the most fair—and scientifically sound—method for choosing which soldiers would be active at what times. The response given to Kleitman by the Surgeon General of the US Navy, Ross McIntire, dated 25 July 1942, argued that the proposal is 'wholly impractical'. McIntire went on to state that: 'Certainly its material value would have to be established most conclusively before it could be allowed to supersede routine which has been [sic] evolved through centuries of maritime warfare and proved by experience in all navies.' In July 1942, Kleitman forwarded the same proposal to the Assistant Secretary of the Navy for Air, Artemus Gates, in the hopes that the newness of the Air Force would circumvent the traditions that would otherwise stall the experimentation with Kleitman's schedule in the other armed forces. Kleitman closed his overview of the schedule with the following appeal to military rationale: 'A SLEEPY FIGHTER IS A MENACE TO HIMSELF AND HIS COMRADES, BUT NOT TO THE ENEMY.' Kleitman pursued two lines of reasoning in his appeals: he argued for understanding biological predispositions as underlying any scientific attempt to maximize the military control of sleep, as well as the tactical advantage of a military that can manage their sleep and wakefulness—the same basic tenets as DARPA's CAP project.

Seemingly ignored by the military establishment, Kleitman then addressed his appeal to Detlev Bronk, Coordinator of Research for the Air Surgeon's Office, arguing that 'I seek no "contracts" for research projects to be done in a laboratory. What I have to offer has been through the laboratory mill with success and is ready to be tested under field conditions, in training as well as in combat.' Bronk's response, received by Kleitman in the winter of 1943, suggested that failure to adopt Kleitman's experimental schedule was due to factors relating to the training of new soldiers and pilots, and not the fault of perceived inadequacies in Kleitman's proposal. Bronk claimed that:

1 This material was derived from the Nathaniel Kleitman archive at the University of Chicago.

> During the training program, it is necessary to rotate duties in order that each trainee will have some night flying experience and, of course, all must have most of their training during the daytime.... Certainly, it is true that many conditions other than physiological would determine the use that is made of a man and the time of day he is required to operate.

Kleitman's eager reply argued that:

> [T]he Army and Navy do not hesitate to call for expert opinion on all sorts of subjects pertaining to the welfare and efficiency of their personnel. These subjects range from nutrition and sanitation to the design of helmets and breathing of oxygen. But matters pertaining to sleep and wakefulness, the latter even more important than the former, seems [sic] to be neglected, largely, in my opinion, because of the ignorance as to the existence of such a problem and the means available to solve it in a rational manner.

Despite his appeals, there is no evidence that Kleitman's experimental rearrangement of the social organization of the American military was ever enacted. Only at the turn of the twenty-first century—as evidenced by DARPA's CAP initiative—would such pursuits be seriously considered, and not through social manipulation of sleeping times, but largely focused on biological means. The relationship between biology and society was also often challenged by athletes who, under extreme circumstances, attempted to acquire tactical benefits through challenging the boundaries of biology and society, sometimes for the sake of victory, other times for the sake of science. These boundaries of human nature helped to invent other biological models of human life's actualization.

Ascertaining primal sleep

> All nature is in a state of becoming. Yet here in the cave it seemed to be immobile, as if spellbound for eternity. (Siffre, 1964: 105)

In 1962, Michel Siffre descended alone into a subarctic cave in the French Alps. He had previously led expeditions into caves throughout Asia, northern Africa and mainland Europe. For Siffre, this expedition had both speleological and geological importance, as well as potentially profound impacts for the study of human circadian rhythms. His account of the experiment is presented in *Beyond Time* (1964), which is comprised of his philosophical musings on the nature of the experiment, his edited diaries as recorded during the two months that he resided in the cave, and ample evidence of his unfailing enthusiasm for spelunking. His intent was to prove the social and environmental impacts on reckoning time, as he perceived the patterns of human behavior as primarily conditioned (e.g. cultural) rather than natural:

> Down in the cavern I would isolate my personal life rhythm from all cosmic and social references. I remembered how excited I had got in philosophy class over the studies made by Pavlov. My intuition was that men and animals alike are conditioned by the regular alternance of day and night. Would I, living underground, rediscover the original life rhythm of man? (1964: 30–31)

What Siffre sought in his descent into the subarctic cave was biology devoid of society, the very foundations of animal being, which he presumed had been obfuscated through centuries of accruing civilization and normative temporal regimes—he was seeking to enact the extremes.

But the site of the experiment was flawed, and Siffre was in questionable condition for submitting himself to the experimental protocol. Siffre suffered from both incidental problems—notably some anxiety about the experiment and attendant insomnia prior to his descent into the cave—and ongoing gastrointestinal issues. He wrote:

> I spent a restless night turning and turning in my sleeping bag, thinking about what was to happen next day, the day so long awaited, now so near and frightening. . . . Toward dawn, utterly worn out, I sank into a deep sleep. (1964: 57–58)

After awakening, and on his way to the cave opening, which he was to descend 130 feet for the purposes of the experiment, Siffre was struck with another health concern: 'Then—oh, the weakness of human flesh!—during this rapid and tiring climb on the frontier ridge, I suddenly fell victim to a violent attack of amoebic dysentery' (1964: 58); Siffre's experiences of the 'weakness of human flesh' were only just beginning. During his time underground, Siffre's average sleep time extended to slightly over eight hours in every 24, whereas he claimed that while living in Paris his nightly sleep was either six or seven hours per night. His appetite virtually disappeared, as he ate only one meal per 'day', and often reported eating not out of hunger but obligation. His infrequent eating was compounded by malnourishment, as he failed to equip himself properly for the experiment—having a shortage of funds for the expedition, he bought provisions last, and with little forethought. Siffre anxiously rationed his most appealing food for his second month underground—but when the experiment ended, he had half of his food stores still waiting to be eaten due to his temporal disorientation. Finally, the cave was often flooded, soaking his food, tent and clothes in near-freezing water, which ruined much of the stored food and managed to keep Siffre in bed for long periods. This malnourished and sleep-deprived man thought himself the 'everyman' who would provide a basis for understanding the naturalness of human circadian rhythms and their conditioning, largely through his own dedication to the experiment, but with the unflagging support of an entire team of people who acted as observers, travel companions and support staff. The concerns of a low sample size (of one), his health and the experimental conditions were never raised, or at least not presented in *Beyond Time*; Siffre seemed to have convinced his spelunking colleagues and scientific enthusiasts that the experiment was sound, and that its results would be a meaningful glimpse of human biology in a social vacuum.

Not only was Siffre seemingly oblivious to his own biological failings and the inadequacy of the experimental conditions, but he also carried ideas about the naturalness of time and its divisions with him into the cave. Siffre was intensely aware of the subjective and objective differences in time, which comprised a central part of his experimental protocol: Each day, upon awakening, again at meal time, and finally before bedtime, Siffre would call his handlers to inform them of what time he thought it was. These phone calls were intended as one-way communication, and Siffre was precluded from having conversations about anything other than his perception of the time with the people on the other end of

the phone. His subjective sense of time was then recorded alongside objectively measured time. Siffe explained:

> [I] was to telephone the surface when I awoke, when I was ready to eat a meal, and when I was about to go to sleep; in this way, my hazarded time of day could be checked against the actual time which those on guard must never tell me. I kept a chart of my subjective 'time' and they kept a chart of the actual time. Thus we were able to calculate the length of my periods of repose and activity in the course of twenty-four hours, and the quantitative extent to which I lost my sense of time. . . . My only way of estimating time was by means of my physiological functions, and these functions in man have been conditioned since the beginning of his existence on earth by the regular alternation of night and day, so we thought. (1964: 77)

Siffre immediately began to vary from objective time, at first about four hours, and by the end of the experiment was off from surface time by two weeks' time. This variance was attributed to a phase advance, and was compounded by his sense of what time and day it should be—at three points in the course of his diary, Siffre attempted to deduce the day, averaging his number of awakenings with what day he thought it must be. His surprise at being told the experiment was to come to a close by his handlers was due to his disorientation, which—despite his knowing that his subjective sense of the time was very likely wrong—held that the end date was nearly a month away. Siffre's established perceptions of time and their value shaped the very structure of the experiment, as he explained that:

> Willfully I cut myself off from time, that regulator of man's occupations; I wanted to find out how a man behaves when so cut off, and had reverted to a primitive animalistic way of life in which everything was subordinated to my natural needs. I was no longer a slave, either to men and their social habits or to the effect of the rotation of the earth on its axis. I told myself, 'I am free!' But was I in fact free? (1964: 103)

Strangely, Siffre ended his account with an appeal to 'young aspirants' not to overvalue their equipment or their physical healthiness, but rather to lay emphasis on what he accepted as an innately human trait, the power of the mind: 'Will power plays a part as important as, if not more than, the careful choice of equipment and a rigorous course in physical training. I would tell young aspirants that, armed with this weapon, you can do a great deal; you can do anything' (Siffre, 1964: 228). Considering Siffre's own mental health concerns while underground—his diary reads as an account of manic depression—this may seem strange, but it was only in his identifying of something that he perceived to be exclusively human that Siffre could maintain scientific credibility—if the same experiment could have been conducted with rats, dogs or any other animal species, what was the point of putting a man in a subarctic cave for two months?

What did Siffre's experiment actually show? Siffre was convinced that it evidenced the adaptability of the human body to extreme environments, which he summarized in the following way: '[I]t showed how a man . . . was able to adapt himself to an environment differing greatly from the conditions existing on the surface of the earth' (1964: 217). Moreover, it evidenced for Siffre the innate superiority of the human species within the animal kingdom, as humanity alone could overcome such adverse environments. He wrote: 'There are situations in which animals perish but in which a man can survive, thanks to his mental

powers and his astonishing ability to adapt to new environments' (1964: 192). It is telling that in his appraisal of his ability to survive within the cave, Siffre credits his 'mental powers', not the various technologies or foods that he brought with him into the cave. Siffre's experiment is more akin to extreme sports than to rigorous scientific testing: in his experiment, it was Siffre alone against his sense of time and the environment, which hardly allow for reproducible scientific conditions. What this could evidence was necessarily limited, but the scientific and technological control of sleep was often pursued in other contexts, again testing the limits of the human body and its mastery of itself and the environment, inaugurating other extremes.

Insomnia at sea

The control of sleep plays a central part in the Vendée Globe, a one-person yacht race from the coast of France around Antarctica and back to France. The race can take over three months to complete, with many racers taking over four months to cross the finish line. The stretches between France and the southern oceans are often problem-free, but around Antarctica the dangers of strong winds, icebergs and other environmental hazards are constant. Sleeping for long periods under these circumstances can seriously endanger both the sailor and his or her ship. Unlike Siffre underground, with handlers only 130 feet above him, there is no ready escape for sailors in the Vendée Globe, and the death of sailors has come to be an expected occurrence during the course of the race, which began in 1989 and runs every four years. Under the conditions of the race, experimentation with sleep has become a necessity, as sailors suffer from chronic sleep deprivation and can go for four months (and possibly more) without a full day's ration of sleep. As might be expected, caffeine plays a central dietary role, but it is sleep's manipulation that is of primary importance, as detailed by sleep researcher and competitive sailor Claudio Stampi:

> Today, the limiting factor is no longer technology—virtually all competitors sail on extremely fast and state-of-the-art racing machines—but the human element. Races are won by solo sailors who, pitting themselves against nature's elements for months at a time, are capable of wisely administering their own resources of stamina, skill, organization, self-discipline and determination. The key to success in these great human adventures and athletic contests is proper management of sleep and rest. For these solo sailors, the temptation to reduce sleep to dramatically low levels is constantly present at any time of day or night in order to continuously optimize boat performance and speed, to survey tactics of competitors and study meteorological reports, and to avoid collisions with ships or with icebergs in the Southern Oceans.[2]

As in the case of Siffre, it was 'the human element' that is of the greatest concern, which is presumably better managed by some competitors than others.

Stampi's research on 'ultrashort' sleep was the state of the art at the turn of the twenty-first century, and the result of a long-standing personal interest in understanding how long the human body can survive with only minimal sleep. His approach within sleep science was

2 See: http://www.poly-phasers.com/readarticle.php?article_id=17 (accessed August 2009).

heterodox, but evidenced that napping might be employed in situations where vigilance was needed and wherein other more conventional chemical or technological means of assuring such levels of awareness were inoperable or already maximized. Thus, Stampi's research protocol involved highly regulated sleep and wake periods, shortened overall daily sleep, and objective and subjective attempts to measure the performance of these ultrashort nappers. Stampi's most compelling experiment involved monitoring the sleep and daily activities of a lone subject who was subjected to 48 days of sleeping only three hours per day in an attempt to model Leonardo da Vinci's mythical sleep patterns of 15 minutes every four hours (Stampi and Davis, 1991). The test subject became more difficult to awaken as the test went on, but once awake performed well on all tests that were assigned to him. It was this model of sleep that Stampi exported to the Vendée Globe, long-distance boat racing more generally, and possibly society ashore as well.

Stampi was famously consulted for managing the sleep of Ellen MacArthur, the youngest participant in the Vendée Globe and only the second woman to compete in the race: 'What Ellen is doing is finding the best compromise between her need to sleep and her need to be awake all the time. The best compromise appears to be like cats and dogs and most animals, which is to break up sleep into short naps' (see also MacArthur, 2003).[3] His expertise was often drawn upon by other sailors, and has been incorporated into articles in the Vendée Globe online magazine. Despite these naps being construed as something primordial and natural for all of the animal kingdom (much like Stampi's appeal to 'cats and dogs and most animals' above), the ability to nap is construed as something almost athletic, requiring training to achieve competitive napping skills and maximum efficiency:

> [I]t's up to each participant to discover his own needs and his own rhythm and to learn how best to manage them. It's a very special skill, which takes a long time to acquire and you have to develop it constantly in order to maintain it. Hoping to win these ocean racing sportsmen must also become top level sleepers.
>
> Why these cycles of sleep? Our sleep pattern is based on the genetic make-up from prehistoric man, who could not remain asleep for 8 hours without endangering his life. He woke up at the end of each [2-hour] cycle, had a look around before going back to sleep for another cycle. With the absence of predators, modern man no longer needs to wake up so often. So we sleep in one stretch, bringing together all the cycles in one. Sleeping in single periods is an ancient ancestral predisposition, which the ocean racers, facing danger, must find again.[4]

Good nappers, it seems, are exceptional in their ability to tap into their 'ancient ancestral predisposition', effectively overcoming their enculturation and expectations of normal sleep and everyday life. To be a competitive sailor in the Vendée Globe means also being a competitive sleeper, and acquiring the ability to alter one's sleep schedule efficiently and at will sets many racers apart from the otherwise untrained, sleep-deprived sailors who attempted to maintain normal sleep patterns while at sea.

3 See: http://news.bbc.co.uk/2/hi/uk_news/1180274.stm, accessed 22 May 2007.

4 See: http://vendeeglobe.org/uk/magazine/2609.html, accessed 3 March 2007.

Pete Goss, by his own admission, was a competitive sleeper, but an unremarkable racer, his first Vendée Globe race being his only attempt to date. He described his ability to sleep at sea in the following way, nearly an ideal embodiment of Stampi's ultrashort napper:

> I love my eight hours' sleep when ashore, but can reduce it to about four in every twenty-four when competing; it's a necessity if you want results. I break my four hours into twenty-minute catnaps. It's at least ten days before my system settles into it. Until then I feel old and ache all over. (Goss, 1998: 167)

Throughout *Close to the wind* (1998), Goss makes casual references to his general lack of sleep, his desperate need for caffeine, the carelessness of his actions while sleep deprived, and the uncomfortable conditions for sleep, as lying abed while circumnavigating the Antarctic required being strapped into bed to avoid serious injuries incurred from being thrown from one's bed after hitting large waves or other obstacles. Goss was an ideal sleeper, able to adjust to the demands of his racing, but also able to 'love [his] eight hours' sleep when ashore', and it may be this ability to shift between modes of sleep that bring Goss to the following realization about the role of sleep in everyday life in his native England. He wrote, identifying the gentle tyrant of sleep in the ordering of social life:

> In normal society, everything is geared to that eight-hour sleep. Transport, shopping, radio, television—it goes on and on, ruling your life, confining you like a straitjacket. At sea my pattern varies with the weather and although I feel tired for much of the time I am not debilitated. Physically I feel lean and mean. My pain barrier rises considerably and a knock that would have hurt like buggery ashore is shrugged off as if it were nothing. There is the odd day when my limbs feel heavy, my eyes are gritty and I catch myself gazing into space in a kind of exhausted trance. (Goss, 1998: 203)

Such sleepers as Goss—and all humans may share the same biological potentials as he does—are the most likely road to scientifically identifying means for adjusting one's sleep patterns in extreme conditions. But because this simply relies upon the reordering of sleep and not its eradication through pharmaceuticals or other technologies, it is a strategy that is available to any society, any army, and fails to confer a tactical advantage on any one group or individual, unless their enemies are too confined by the 'straitjacket' of consolidated sleep. Goss's experiment, like Stampi's, might lead to a radical reorienting of everyday life for those in pursuit of temporal advantages and who are willing to flirt with the possible side effects of sleep deprivation and desynchronization from normative models of everyday life. As such, it is the extremes as a new model of the everyday. But this is only one possibility; another lies in the genetic make-up of sufferers of fatal familial insomnia, a chronic form of sleeplessness.

The ends of sleep

In Brad Anderson's film *The machinist* (2003), the protagonist suffers from acute, chronic insomnia, his metaphysical punishment for prior bad acts. It is only when he is able to identify and atone for these bad acts that he is once again able to sleep; until then, however, he exists in a reality contaminated by dreams (in the form of hallucinations). This portrayal of sleeplessness is not

unlike that from *The X-files* episode mentioned previously: something intimately human seems to be missing from these engineered or accidental insomniacs, represented in both narratives through the sallow appearance of the sleepless characters and their subtle (or not-so) insanities. Their inhumanity is further evidenced through their callous disregard for human life (which they may have no longer counted themselves among), emblematized in the explanation of one of *The X-files* warfighters who claims that the atrocities he and his cohort committed against the Viet Cong found their roots in the physiological loss of sleep. Chronic insomnia of such a sort—despite the US military's attempts to produce it alchemically—is a rare occurrence, and known in only one form, fatal familial insomnia (FFI) (Lugaresi *et al.*, 1986; Montagna *et al.*, 2003). By all accounts, FFI is an incredibly rare prion disease, and is genetically transmitted through about 30 family lines, located primarily in Europe and the United States. As such, it has rarely been clinically observed in detail and no cure for it has been identified; most often, patients are only admitted for care once the disease has firmly taken hold of their social and biological lives, and their deterioration commences quickly thereafter. Sufferers, like the fictional insomniacs of *The X-files* and *The machinist*, descend into illness, often resulting in a compromised immune system and eventually death. In this concluding section, I discuss briefly what was known about FFI and its sufferers at the turn of the twenty-first century, as a cautionary tale regarding human limits and the possibility of these extremes of sleep being actualized.

Onset of FFI usually occurs between age 36 and 62, and from the time of diagnosis, sufferers can live anywhere from eight months to six years. Because the disease initially presents itself as insomnia, it can often go unrecognized as the serious problem that it is until it takes more debilitating forms. FFI sufferers generally suffer from a severe decrease in their sleeping times through the night, and as a result lapse into fugue states throughout the day; concomitantly, FFI sufferers develop parasomnias, such as sleepwalking. Throughout this intensification of symptoms, FFI sufferers are resistant to traditional sleep-inducing pharmaceuticals. Pasquale Montagna and his laboratory—who diagnosed the first cases of FFI—described this descent into apparent madness:

> Worsening of sleep and autonomic disturbances is associated with the onset of peculiar oneiric behaviours, whereby patients, especially if left to themselves, fall into a hallucinatory state and display motor gestures related to the content of a dream; these symptoms can be mistaken for psychotic signs. (Montagna *et al.*, 2003: 167)

FFI is hardly the sleeplessness that is desired or imagined by military scientists, athletes, or individuals beleaguered by their daily social obligations. Rather, these genetic insomniacs embody wakefulness in perverse ways:

> Later stages are characterised by ever-increasing oneiric stupors (from which patients are awakened with difficulty), persistent drowsiness and myoclonus, inability to stand and walk, increasing dysarthria and dysphagia, and loss of sphincter control. . . . Some patients die suddenly in full consciousness and others lapse into a vegetative state, with death occurring because of respiratory or systemic infection. (Montagna *et al.*, 2003: 168)

FFI, like the sleeplessness in *The machinist* and *The X-files* is a slow torture, not a productive, alert means of being in the world, nor a reliable 'force multiplier'; it is a radical

disruption of basic human biology, and one which leads, inevitably, to an estrangement from everyday life, despite being able to be present at all times.

I intend no romanticization of the sleeping body, or human biology. What I hope the preceding material evidences is other ways of being sleepers, both fantastic and actual, in an effort to show how divergent the ideal forms of sleeplessness are from actual sleepless bodies—how the extremes produce and rely upon untenable but seductive technic fictions of human biology. As Jonathan Moreno describes, the need to change the lowest common denominator of the military—the human body—was and is a persistent fetish, and new manipulations of human bodies may lead to an entirely new kind of 'arms race':

> The military wants to juice up personnel's brains because the human being is the weakest instrument of warfare. Although for centuries astonishing and terrifying advances have been made in the technology of conflict, soldiers are basically the same. They must eat, sleep, discern friend from foe, heal when wounded, and so forth. The first state (or nonstate) actor to build superior fighters will make an enormous leap in the arms race.[5]

This 'arms race', if successful, could lead to new 'social races', new configurations of the social based upon altered biologies, whether they inaugurate alert, sleepless bodies, or societies of oneric zombies—both extreme forms of life. In either case, the decision about the coming of these new communities may not be made by those whom it will impact the most, but rather by the scientific stewards of humanity's biological futures. In concluding this article, I offer the penultimate word to David Dinges, noted sleep researcher with a long-term research agenda pursuing the extremes of human sleep, which has been supported in part by NASA: 'Now is the time to have an open and frank discussion on how far we will go as a culture. What are our priorities? How regularly do we want to manipulate our brain chemistry? What are the limits?' (quoted in Moreno, 2006: 120). There are no limits to experimentation with human sleep; there will always be the extremes, and they will be subject to exploration, manipulation and contestation. And human life and the social order will continue to be shaped and reconceived based upon these extremes and their actualizations.

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5 See: http://www.sciammind.com/article.cfm?articleID=31373133-E7F2–99DF-3B50B89EA1ADBBFB, accessed 22 May 2007.

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