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## Color and Light

The Soviets have reported that low intensity red light creates an irregular alpha rhythm in humans. Another study was conducted on the effects of low intensity red, green, and yellow light on humans. Physiological tests were administered to 412 females working in a film processing plant under red, green, or yellow light of low intensity 25 watt bulbs. Complex shifts were found in the central and autonomic nervous system which included marked increases in optical rheobase and chronaxy and lengthening of the latent period of visual and motor reactions during the course of the day. The ECG was characterized by an irregular alpha rhythm, frequently followed by more rapid low-amplitude oscillations, an indication of decreased reactivity of the cortical processes. The condition of the autonomic nervous system was judged from shifts in skin temperature and arterial pressure, both of which were much lower at the end of a work shift than at the beginning. The physiological data were supported by the results of a neurological examination which showed a large number of functional shifts. In general, the adverse effects were most pronounced in those who worked in soft red light. Yellow light was less irritating than green.

Further evidence of Soviet interest, especially in red light, is provided by research emanating from Soviet military institutes. The dynamics of work capacity of healthy human subjects during adaptation to colored lights was evaluated from the rate and quality of sensorimotor reactions of varying complexity. The subjects, seated at a specially designed control board, were required to press buttons to switch off the lights at appropriate signals during a 2 hour adaptation period. Adaptation resulted in changes in the rate and quality of the reactions in relation to the color of the light source and the adaptation time. An increase in wave-length increased reaction

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speed but impaired quality, while a ~~marked~~ decrease in wavelength has the opposite effects. Red light produced tension and irritability. Yellow light induced a mood characterized by "increased motor readiness" and sustained attentiveness. Sluggishness and sleepiness were the characteristic reactions to blue light. Green light did not seem to produce an emotional reaction.

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### Light and Color as a Means of Altering Human Behavior

According to Dodge, there have been persistent reports of unusual flashing or bright lights emanating from Soviet naval vessels and long range aircraft (BEAR, BADGER, BISON). Such activities have coincided with US and NATO surveillance operations conducted from interceptor aircraft and naval vessels. In some cases, surveillance personnel have been temporarily blinded and disoriented by various intensities and colors of continuous or intermittently flashing lights during nocturnal missions.

Dodge further relates that in 1968, a night watch officer aboard the HKS Valiant was temporarily blinded by what appeared to be a bright blue light situated slightly below the mast of a KOTLIN destroyer. When his night vision recovered, he reported perceiving red lights which appeared to be situated above and behind the blue light. Both sources of light appeared to be portable. In 1970, an aircraft was tracked by a spotlight trained from a Soviet naval vessel. Several pinpoint bursts of amber and amber-green light were noted aft of the spotlight and shined in concert with it.

(There's an account of ~~some~~ a US Air Force F-102 interceptor which was in close range with a Soviet BEAR in 1968. I didn't type, too long.)

Another. Again in 1968, another F-102 pilot reported that a steady brilliant white light was shined from a hand-held aldistype lantern situated in the tail blister of a BEAR B aircraft. In late 1968, still another F-102 pilot reported a blinding light from a BEAR aircraft. (a blinding light in concert with a pulsating (1.5 flashes/second) red strobe light). In 1970, an F-102 pilop reported that a BEAR C aircraft shined a hand-held ~~lx~~ light of brilliant intensity from its left rear tail

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blister. The light was trained on the pilot from 15 to 20 times with a flash duration of two to seven seconds.

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A report that appeared in 1971 discusses some US air personnel problems encountered by Soviet aircraft over the Mediterranean Sea. "By far, the most dangerous encounters occur after dark. For safety's sake, both the BADGERS and the PHANTOM usually turn on their navigation lights (which they would never do in a combat situation) but sometimes the Russians come in blacked out, or shine searchlights in the eyes of the PHANTOM pilots - causing a temporary loss of night vision - or trickily turn their navigation lights on and off."

Some of the nocturnal incidents described above suggest that the Soviets have not overlooked the possibility of utilizing bright and flashing lights as a means of altering behavior. It is interesting to note that the period of active research in Soviet labs, as will be discussed in Part B below, coincides with the reports of employment of unusual ~~lights~~ flashing lights against US and NATO personnel.

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### Sound as a Means of Altering Behavior

The psychological and behavioral effects of infrasound and the low ranges of audible sound (those frequencies in the range of 1 to 100 cycles per second, i.e. Hertz (Hz) are poorly documented, especially Soviet. There is some sketchy data available on sonic (20 to 20,000 Hz) and ultrasound (usually any frequency greater than 20,000 Hz).

The Soviets are, however, aware of the biological effects of sound and seem to be interested in establishing protective measures for humans. The Soviets believe that the fact that human beings are not biologically adapted to the rapid tempo, noise, and pressures of an urban industrial society accounts for the increase in cardiovascular and nervous disturbances. Therefore, the Soviets are experimenting with a concept they call "The Zone of Health." One such zone has been established in Baku. The facility includes parks and seashore with provisions for 28 kinds of natural therapy including climatotherapy, kinestherapy, diet therapy, phototherapy, psychotherapy, etc. During 1969, 142,000 "patients" were treated with some 98 percent going home "healthy". Apparently the zone is a form of rest and relaxation with complete absence from excessive sound stimuli. This would appear to be an expensive project and therefore illustrates the Soviet concern for the effects of excessive noxious stimuli on its people.

Very little information is available on animal reactions to infrasound at this time. According to Maire, it has been reported that a frequency of 7 Hz caused "epileptic fits" and the subsequent death of rats at some distance from the lab in which the generator was located. There is a newspaper article claiming that during experiments with a frequency of 7 Hz, all dogs in a nearby apartment building "went completely insane with fear".

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Man has just begun to research the areas of odor and olfactory phenomena. An easing amount of evidence implicates olfactory mechanisms in communication between the sexes in prosimians and also in their social organization, but to date there is only scant information that olfaction plays a similar role in higher primates.

Do pheromones operate also in people? There is no evidence that they do not, and some evidence that they do. Many psychiatrists have believed that odor is among the "cues" which operate in the transference situation, while schizophrenic patients, who are receptive to unorthodox ideas and have their sensory gain-control turned right up, claim to smell hostility. Some psychiatrists themselves have long claimed to be able to "smell" schizophrenia--the substance involved has now been identified as trans-3-methylhexanoic acid. Olfactory sensitivity varies greatly in humans-- a perfumer can smell the differences between skin and hair colors, and many unskilled observers have noted the unique, pleasant skin odor of redheaded women.

Pheromones control ant behavior and much insect mating. An artificial pheromone (gypsure lure) can be synthesized to attract gypsy moth males into an insecticidal trap. They are also wide spread in mammals. Some mammalian odors, like the n-butylmercaptan of the skunk, or the labeling of territory with urine, are straight forward signals. These influence behavior in the same way as a display of threat, dominance or attraction. The action of a true pheromone is more direct; it is a signal, but its action is more like that of a hormone--the distinction is not total, but it is perceptible, in that many pheromonal odors, at least in mammals, have a chemical shape rather like that of a steroid molecule, and might have been derived from one.

Insects take advantage of their keen, specialized olfactory organs (usually the

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antennae) to guide them to food, the opposite sex, or mark the place to lay eggs. Sense of smell is particularly important to the social insects, which manufacture a variety of scents to coordinate the activities of their colonies; they employ odors to warn their kind of impending danger, to recognize intruders, to mark trails leading to food, to move their nests, and to enlist the help of other colony members. Because of this phenomenon, man may be able to control insects through the use of different chemical attractants. It may some day be possible for men to control other men by using pheromones.

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**Hypnopedia**

The subject of hypnopedia or sleep-learning has been openly discussed in the Soviet literature for the past decade. One of the most thorough Soviet reports has been prepared by Bliznichenko in 1966. Dodge and Lamont have published a report that covers the field of hypnopedia in the Soviet Union through 1968. Further elucidation of this subject in this report, with the exception of a discussion of possible trends in this area since 1969, is believed to be redundant and unnecessary.

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