

The psychopathologic syndrome which we have described in the body of this declaration is found in other settings besides isolation in civil prisons. Some of these settings involve small group, rather than solitary isolation, and the studies have demonstrated that isolated groups comprising two individuals may be the most pathogenic of all. These studies also suggest that those individuals with below average intelligence and poor psychosocial adjustment prior to isolation developed more severe psychiatric difficulties during isolation in some studies, such disturbances persisted in one year follow-up after reentry.

#### **Aviation**

Bennett (1961) described psychiatric disturbances among pilots of the British Royal Air Force who had been exposed in-flight to periods of restricted auditory and visual stimulation. All of the groups he described became significantly anxious--many suffering full-blown panic attacks--and many experienced unusual sensations which they were very reluctant to describe. The most severely disturbed groups refused to expose themselves further to the isolation conditions of these flights; at all levels of impairment, however, anxiety was common (both panic and free-floating anxiety). Pilots reported anxiety symptoms such as feeling "hot and tense and powerless" (Bennett, p. 162) and "nervous and afraid" (ibid, p. 164). Feelings of derealization, feelings of detachment from reality, and perceptual distortions were described. Some of these perceptual distortions were dangerous (e.g., having the impression that the aircraft was turning when it was not) and resulted in serious errors in judgment (e.g., making the aircraft spiral dangerously downward after attempting to "correct" for what was incorrectly perceived as a turning aircraft). Clark & Graybiel (1957) described strikingly similar symptoms among United States Navy pilots exposed to periods of in-flight isolation. Among pilots who flew alone, at high altitude, (i.e., in a situation of monotonous visual and sensory stimulation) and flying with a minimum of pilot activity, over one third experienced frightening feelings of unreality and became severely anxious.

#### **Small Group Confinement**

Many studies--both anecdotal and experimental--have been made of individuals confined together in small groups; groups thus described have ranged in size from two to approximately sixty individuals, the larger groups include reports of men isolated on a Pacific island, submarine inhabitants, Antarctic explorers, etc. (see Zubek, 1969). The most consistent finding was of dramatically increased levels of hostility, interpersonal conflict and paranoia (Zubek, p. 377). Individuals exposed to such conditions also tend to become irrationally territorial, staking out "areas of exclusive or special use, [and] acting with hostility to trespasses by others." (Zubek, p. 380)

Confined groups comprising just two individuals may be the most pathogenic of all, associated with especially high rates of mutual paranoia and violent hostility. Admiral Byrd believed it to be extremely unsafe to staff an Antarctic base unit with just two men:

"It doesn't take two men long to find each other out... the time comes ... when even his [campmate's] unformed thoughts can be anticipated, his pet ideas become a meaningless drool, and the way he blows out a pressure lamp or drops his boots on the floor or eats his food becomes a rasping annoyance.... Men who have lived in the Canadian bush know well what happens to trappers paired off this way ... During my first winter at Little America I walked for hours with a man who was on the verge of murder or suicide over imaginary persecutions by another man who had been his devoted friend" (Zubek, 1969, p.381).

Many men confined in Antarctic stations have experienced near psychotic states, creating a danger to all inhabitants of the work station (Zubek, 1969). The pathogenicity of such dyadic groups was confirmed in

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an experimental study involving volunteer sailors living and working together in dyadic pairs, socially isolated from the world for a period of ten days. Under such conditions, the sailors developed evidence of subjective distress, inability to concentrate, a breakdown of inner controls on behavior, hostility, and increasing schizoid withdrawal from social contact (Cole, J.D., 1967).

#### **Polar Habitation**

Psychiatric disturbances have been described in Arctic and Antarctic inhabitants (explorers, researchers and their support staff), spending varying periods in winter isolation. In these regions, winters last for up to nine months with weather conditions so cold (-100F) that leaving the confines of the indoors is dangerous. Typically, teams of work groups have fewer than 50 members who spend up to two years working in small quarters. Small group isolation conditions at these stations have been compared to life in prisons by at least one researcher: "... the isolation imposed by the harsh environment [of the Antarctic] is rarely experienced outside penal conditions" (Biersner & Hogan, 1984, p. 491).

In a review of the literature on the psychological adjustment to Antarctic living, Rothblum (1990) described a staff wintering over at a British Antarctic station; those of the staff who adjusted best tended to be socially mature, intelligent, reserved and trusting individuals. Similarly, French, United States and Australian studies revealed that intelligence and previous social adjustment predicted a decreased risk for psychiatric disturbance among workers at Antarctic stations. On the other hand, lack of respect for

authority and aggression were important markers for poor isolation adjustment (Mullin & Connery, 1959). Similarly, Wright, Chylinski, Sisler and Quarrington (1967) correlated outcome measures with psychological testing obtained prior to work station assignment. They found specifically that persons with antisocial and psychotic tendencies were poor risks for efficient functioning in conditions of isolation. As a result of these disturbing findings among Antarctic workers, systematic efforts have been made to provide psychological screening of potential station employees and to ameliorate the isolation conditions prevailing in such stations (Cochrane & Freeman, 1989). Despite these efforts, significant psychiatric disturbances have continued to be observed (Natini & Shurley, 1974). The fact that these individuals were confined in small groups rather than alone was not found to prevent these disturbances; indeed, one of the central pathogenic factors cited in this literature has been the interpersonal tension and hostility generated by small group confinement (Biersner & Hogan, 1984).

Strange & Klein (1974) and Rothblum (1990) described a "winter-over syndrome" including progressively worsening depression, hostility, sleep disturbance, impaired cognitive functioning and paranoia during small group winter confinement in the Antarctic. Strikingly similar findings were reported by the United States Navy Medical Neuropsychiatric Research Unit, which found high incidences of sleep disturbance, depression, anxiety, aggression, somatic complaints, and a progressive impoverishment of social relationships as the winter progressed (Gunderson, 1963; Gunderson & Nelson, 1963). Psychiatric problems worsened as the length of time in this confinement increased; in one study of a group of Japanese winter-stationed in the Antarctic periodic psychological testing revealed increasing levels of anxiety and depression as the winter progressed (Rothblum, 1990). Similar findings have been described among a group of Americans stationed in the Antarctic (Gunderson & Nelson, 1963).

In a review of the literature on the psychological adjustment to Arctic life, Cochrane and Freeman (1989) describe a syndrome which parallels the Antarctic literature: sleep disturbances, apathy, irritability, cognitive dysfunction, hallucinations, depression and anxiety were widely reported as a result of the small group isolation endured by inhabitants. They also reported "depression, irritability, easily provoked anger which may escalate into dramatic and florid acting out and, not surprisingly, a breakdown in relationships with other members of the group . . . insomnia, pallor, loss of interest, psychomotor retardation, paranoid ideation, non-specific hallucinations of light flashes and sudden movements" (p. 887) Many individuals became intolerant of social contact, and fearful of reentering society. Even when Arctic

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workers were adequately preselected by psychological screening, trained and supported, sleep difficulties, apathy and irritability persisted.

Studies on reintegration into the home environment after Antarctic living even one year after reintegration, found persisting problems and symptoms, including sleep disturbances, cognitive slowing, emotional withdrawal, resentment of authority, indecisiveness and poor communication (Rothblum, 1990).

Biersner & Hogan (1984) summarized the findings related to personality variables in the Arctic and Antarctic workers:

Individuals with high needs for novelty and new sensations ... who are emotionally unstable, or who are unconcerned with social approval seem unsuited for ... such environments. The opposite [traits are found in] those who adjust well (p.495)

#### Explorers: Solo Voyages

Anecdotal reports of shipwrecked sailors and individuals accomplishing long solo sea voyages have generally described "disturbances in attention and in organization of thought, labile and extreme affect, hallucinations and delusions" (Zubek, 1969, p. 7). Dramatic anecdotal reports have appeared from time to time. Some of these were summarized in a review article by Dr. Philip Solomon, one of the lead scientists in the Harvard Medical School/Boston City Hospital group:

"Christine Ritter in her very sensitive document 'A Woman in the Polar Night,' reported that at times she saw a monster ... [and] experienced depersonalization to the extent that she thought she and her companions were dissolving in moonlight 'as though it were eating us up' ... The Spitzbergen hunters use the term ran (strangeness) to describe these experiences ..."

Tales of the sea have provided many accounts of hallucinatory phenomena. John Slocum sailed alone around the world . . . [In the South Atlantic] he suddenly saw a man, who at first he thought to be a pirate, take over the tiller . . . .

Walter Gibson, a soldier in the British Indian Army, was on a ship torpedoed in the Indian Ocean by the Japanese in World War II .... [The shipwrecked survivors] reported that "all of us at various stages in that first week became a prey to hallucinations"... [As the weeks passed] the feeling of comradeship disappeared and the men began to find themselves "watching our fellows covertly and suspiciously." Murder, suicide and cannibalism followed as social controls dissolved.

#### Medical Conditions

##### 1. Eye Patched Patients

Restricted environmental stimulation conditions also occur post-operatively and in certain medical



conditions: in a study of 100 American patients with macular degeneration of the retina (Holroyd, Rabins, Finkelstein, Nicholson, Chase & Wisniewski, 1992), a high percentage of such patients experienced disturbing visual hallucinations. Those patients who were relatively cognitively limited, those who were socially isolated and those with simultaneous sensory impairment in another modality (e.g., hearingimpaired patients) fared worst. But other factors, including the presence of concomitant medical illness, did not appear to affect the incidence of hallucinations.

In an especially relevant study of eye patched patients, Klein & Moses (1974) determined that psychologically well-adjusted patients (as assessed prior to surgery) tended not to develop visual hallucinations during the period when their eyes were patched, whereas those suffering preexisting personality disturbances did tend to develop such hallucinations. Among those patients who did develop

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hallucinations, almost half developed complex hallucinations involving human figures and with a content suggesting serious preoccupations with themes of depression and anxiety. Moreover, among those patients who had both preexisting personality disturbances and difficulty with their premorbid psychosocial adjustment, eye patching produced severe psychiatric symptomatology, including: paranoid thoughts about being poisoned, physically harmed or attacked; psychomotor agitation; interpersonal aggressiveness; inability to comply with staff directives; fearful visual hallucinations, and incapacitating anxiety. In this most disturbed group, symptoms had not remitted when observed one week after their eye patches were removed.

Other studies have also found patients to suffer from perceptual distortions, thinking disturbances and mood changes following the visual deprivation that is part of postoperative recovery in eye surgery (Ziskind, 1958; Ziskind, Jones, Filante & Goldberg, 1960). Furthermore, Ziskind et. al., (1960) noted that: "In patients with . . . brain damage, there were also deliriod symptoms, e.g., confusion, disorientation, memory impairment, vivid hallucinations [and disorganized] hyperkinetic activity" (p. 894). Finally, in Jackson's (1969) extensive literature review of hospitalized eye patched patients, psychiatric disturbance was commonly found. These patients suffered from unusual emotional, cognitive and sensory-perceptual disturbances, similar to those previously described.

#### 2. Poliomyelitis

Polio patients confined to tank-type respirators have become psychotic as a direct result of such confinement; moreover, they became more ill, with more florid hallucinations and delusions, at night when sensory input was diminished. The same florid hallucinatory, delusional psychosis has been found in other patients similarly confined in tank respirators (Liederman, et. al., 1958).

#### 3. Cardiac Patients

Patients with decompensated heart disease are at times placed on very strict bed rest; some of these patients have developed acute confusional, paranoid, hallucinatory psychoses, especially at night during periods of decreased sensory input (Liederman, et. al., 1958).

Studies of postoperative open heart surgery patients who were bed confined--their visual stimulation restricted to looking up at a white-tiled hospital room ceiling--revealed a high rate of disordered thinking, visual and auditory hallucinations and disorientation (Egerton & Kay, 1964; Kornfeld, Zimberg & Maim, 1965; Lazarus & Hagens, 1968; Wilson, 1972). There is an extremely disturbing incidence of psychosis following open heart surgery, ranging in various studies from 14 to 30 percent (Lee & Ball, 1975). Upon recovery these patients described their postoperative environment as a major pathogenic factor in producing their psychiatric illness (Kornfeld et. al., 1965). Perceptual disturbances and emotional liability, as well as paranoia, depression and obsessive-compulsive reactions to the restrictive postoperative environment have been documented in other studies as well (Ellis, 1972; Goldstein, 1976; Lee & Ball, 1975; Thomson, 1973).

#### 4. Hearing Impaired Individuals

Another condition of restricted environmental stimulation leading to psychiatric disturbance involves the hearing impaired. Studies of the deaf (Altshuler, 1971; Houston & Royse, 1954) consistently find significantly higher rates of paranoia in these individuals. High rates of paranoia have been reported in both the developmentally hearing impaired as well as those who became deaf in later life (Zimbardo, Andersen & Kabat, 1981). Experimentally induced deafness in psychiatrically unimpaired adults also produced paranoia (Zimbardo, et. al., 1981).

#### 5. Other Medical Patients

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Disorientation and delusional psychoses have also been reported among immobilized orthopedic patients and in patients postsurgically bed-confined (Liederman, et. al., 1958). Nursing researchers (Downs, 1974) have studied this phenomenon and have concluded that frightening hallucinatory experiences "are probably far more widespread than has been reported" (Downs p. 434).

#### Occupational Situations

McFarland and Moore (1957) reported in the New England Journal of Medicine on a study of fifty longdistance truck drivers; of these, thirty experienced vivid visual hallucinations; some became disoriented, "as in a dream."

#### **Animal Studies**

As noted in the body of this declaration, many prisoners confined in solitary report become intolerant of normal levels of environmental--especially social--stimulation. These reports receive experimental confirmation in laboratory research on animals. Such research demonstrates that sensory deprivation produces an intolerance to normal levels of environmental stimulation; animals exposed to sensory deprivation conditions became overly aroused--"hyperexcitable"--when exposed to normal levels of environmental stimulation, often resulting in severe behavioral disturbances (Riestin, 1961). Other studies have demonstrated that such animals often display diffuse, frenzied, random activity, and social withdrawal, and are prone to psychophysiologic illnesses (e.g., peptic ulcers) when exposed to environmental stress (Zubek, 1969).

Barnes (1959) produced agitation in mice and rats after a few days of isolation, a report which corroborated previous studies with rats. Others (Matsumoto, Cai, Satoh, Ohta & Watanabe, 1991) have also found that isolation induced aggressive behavior in mice (e.g., biting attacks). Further, social isolation has been demonstrated to produce profound and lasting psychological effects in primates. Washburn and Rumbaugh (1991) note that over 400 published investigations of the effects of social isolation on primates show such deleterious effects as self-mutilation and disturbances in perception and learning. They found that in adult rhesus monkeys even brief periods of social isolation produce compromised cognitive processing. McKinney, Suomi and Harlow (1971) produced symptoms of depression in rhesus monkeys by confining them for 30 days. They concluded that solitary "confinement produced greater destructive behavioral effects in less time and with fewer individual differences among subjects than did total social isolation, previously [demonstrated to be] the most powerful technique for producing psychopathological behavior among monkey subjects" (p. 1317). Induced depression through confinement has been reported in both young and mature monkeys (Harlow & Suomi, 1974). Finally, isolation-produced fear in dogs has been clearly demonstrated (Thompson & Melzack, 1956).

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#### **THE NINETEENTH CENTURY GERMAN EXPERIENCE WITH SOLITARY CONFINEMENT**

Between 1854 and 1909, thirty-seven articles appeared in the German medical literature on the subject of psychotic disturbances among prisoners, summarizing years of work and many hundreds of cases. A major review of this literature was published in 1912 (Nitsche, 1912) Solitary confinement was the single most important factor identified in the etiology of these psychotic illnesses.

Indeed, the first report on the subject of prison psychoses was that of Delbruck (1854), Chief Physician at the Prison at Halle, in which "the frequency of mental disturbances was at last so great that it attracted the attention of the authorities." (Nitsche, p.1). Delbruck's report concluded that:

Prolonged absolute isolation has a very injurious effect on the body and mind and that it seems to predispose to hallucinations . . . He advised the immediate termination of solitary confinement. (Nitsche, p. 2).

In 1863, Gutsch reported on 84 cases of "The Psychosis of Solitary Confinement" and described vivid hallucinations and persecutory delusions, apprehensiveness, psychomotor excitation, sudden onset of the syndrome, and rapid recovery upon termination of solitary confinement. Many of these individuals developed "suicidal and maniacal outbursts." (Nitsche, p. 8)

In 1871, in a report on 15 cases of acute reactive psychoses, some of which apparently occurred within hours of incarceration in solitary, Reich described, in addition to hallucinosis and persecutory delusions, severe anxiety leading to "motor excitement . . . The patient becomes noisy, screams, runs aimlessly about, destroys and ruins everything that comes in his way." He also described an acute confusional state accompanying these symptoms, sudden cessation of symptoms, recovery, and subsequent amnesia for the events of the psychosis:

"The gaze is staring, vacant, indefinite. . . consciousness becomes more and more clouded . . . and later there is amnesia for all events during this time . . . He frequently awakens as from a dream . . ." (Nitsche, pp. 32-33)

In a statistical summary, Knecht reported in 1881 on the diagnostic assessment of 186 inmates at the "insane department" of the prison at Waldheim, and concluded that over half the total were reactive manifestations to solitary confinement. The majority of these inmates fell insane within two years of confinement in solitary. (Nitsche, p. 17)

In 1884, Sommer reported on 111 cases describing an acute, reactive, hallucinatory, anxious, confusional state associated with solitary confinement, emphasizing the "excited outbursts" and "vicious assaults" of these patients. His patients' illness began with difficulty in concentration, and hyperresponsivity to minor "inexplicable" external stimuli. These "elementary disturbances of the sensorium (i.e., the five senses)" were seen as leading to "elementary hallucinations" which became more numerous, eventually including



auditory, visual and olfactory hallucinations, and eventually becoming incorporated with fearful persecutory delusions. (Nitsche, pp. 12-16)

In 1889, Kirm described 129 cases of psychosis among the inmates at the county jail at Freiburg, concluding that in 50 of those cases, "solitary confinement can be definitely considered as the etiological factor, (and these) show a certain characteristic stamp" (Nitsche, p. 21) including persecutory delusions and hallucinations in multiple spheres (auditory, visual olfactory, tactile). He also noted that these symptoms often precipitated at night:

"The patient is suddenly surprised at night by hallucinatory experiences which bring on an anxious excitement. These manifestations become constant from now on, in many

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cases occurring only at night, in others also in the daytime. Attentive patients not infrequently hear at first a humming and buzzing in their ears, unpleasant noises and inarticulate sounds which they cannot understand until finally they hear well differentiated sounds and distinct words and sentences . . . . The visual hallucinations are very vivid." (Nitsche, p. 24)

In 1888, Moeli contributed a description of Vorbereiden -- "the symptom of approximate answers"<sup>1</sup>. Ten years later Ganzer contributed to the literature the elucidation of a syndrome which included Moeli's symptom. (Ganser, 1898) As Arieti points out, Ganser's Syndrome became well-known -- indeed, almost a codification of the whole body of literature on the prison psychoses. Ganser provided a comprehensive and well-elucidated synthesis of symptoms, most of which had been previously described elsewhere. The syndrome he described included, (in addition to Vorbereiden), vivid visual and auditory hallucinations, a distinct clouding of consciousness, sudden cessation of symptoms, "as from a dream" and "a more or less complete amnesia for the events during the period of clouded consciousness." Ganser's most original description was of "hysterical stigmata" within the syndrome, including conversion symptoms -- especially, total analgesia. (Arieti, 1974, Vol. II, pp. 710-712)

Some of the German authors failed to note whether the inmates they were describing were housed in solitary confinement and, unfortunately, Ganser was one of these, stating only that his were "prisoners awaiting trial." However, Langard, in 1901, also reporting on observations of accused prisoners awaiting trial, described an acute violent hallucinatory confusion with persecutory delusions, and specifically stated that this syndrome occurred exclusively among those who awaited trial in solitary confinement. (Nitsche, p. 32)

Also in 1901, Raecke similarly reported on prisoners awaiting trial and described the full syndrome of Ganser, including Vorbereiden; he specifically condemned solitary confinement as responsible for the syndrome (Nitsche, p. 34). He described his cases as beginning with apathy, progressing to "inability to concentrate, a feeling of incapacity to think," and even catatonic features, including negativism, stupor, and mutism. (Nitsche, pp. 33-35)

In another report written the same year, Sklar reported on 60 case histories of which he identified 21 as acute prison psychoses caused by solitary confinement. While Vorbereiden was not noted, most of the other symptoms described by Ganser and Raecke were noted, including: massive anxiety, fearful auditory and visual hallucinations -- in severe cases, hallucinations of smell, taste, and "general sensation" as well -- persecutory delusions, senseless agitation and violence, confusion and disorientation. The psychosis developed rapidly -- at times within hours of incarceration in solitary confinement. Catatonic symptomatology was also noted (Nitsche, pp. 35-36).

The German literature reported only on prisoners who suffered gross psychotic symptomatology, some of whom were observed in hospitals or "insane departments" of prisons; thus, these reports generally described only syndromal expressions that rose to the level of overt psychosis. The German reports do, however, powerfully demonstrate the existence of a particular, clinically distinguishable psychiatric syndrome associated with solitary confinement. These multiple reports described a syndrome which included:

1. Massive free-floating anxiety
2. "Disturbances of the Sensorium", including --
  - a. Hyperresponsivity to external stimuli

<sup>1</sup> Vorbereiden is a rather remarkable symptom of deranged and confused thought processes in which the individual's response to a question suggests that he grasped the gist of the question, and his answer is clearly relevant to the question, and related to the obvious correct answer, yet it still oddly manages to be incorrect. An example would be: Q: "How many colors are there in the flag of the United States" A: "Four". Q: "What are they?" A: "Yellow"

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b. Vivid hallucinations in multiple spheres (including auditory, visual, olfactory, gustatory and tactile modalities); in some reports, these began