

Project Bizarre Weapons Implications: Are Psychiatric Diagnosis, and Microwave Exposure Standards Presumptive?

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Abstract

Reviewed are Freedom of Information Act disclosures for Project Bizarre, a monkey microwave exposure investigation prompted by Soviet irradiation of the American Embassy in Moscow, and further microwave exposure literature corroborating timed response or task sequencing disruption. Literature authenticating microwave hearing voice transmission development is also covered as well as schizophrenia time estimation and sequencing performance deficit reports similar to microwave exposure findings. Current medical practice is presumptive in being without knowledge or investigation of technological development relevant to patient complaints and those correspondences compared. Present radio frequency exposure standards are indicated inadequate regarding the parameters considered.

Introduction

The microwave irradiation of the American Embassy in Moscow received little publicity until the winter of 1976 instillation of protective screening, but irradiation was known since 1953. [1]

The irradiation was directional from nearby buildings with pulsation detected. Complaint to the Soviets had little avail, but the signals disappeared in January 1979 “reportedly as a result of a fire in one or more of the buildings,” [2] though there was recurrence in 1988. [3] Psychiatric cases occurred during the exposure period, but no epidemiologic relationship was revealed with fully a quarter of the medical records unavailable, and comparison with other Soviet Bloc posts. 2 Although significant results matched the Soviet recognized neurotic syndrome, [4] these were dismissed as subjective symptoms. Professional publications further detail some of these flaws, [5] along with charges of government cover-up, particularly respecting cancer cases. [6] The Central Intelligence Agency had Dr. Milton Zaret review Soviet medical microwave literature to determine the purpose of the irradiation. He concluded the Russians “believed the beam would modify the behavior of the personnel.” [7] In 1976 the post was declared unhealthy and pay raised 20%. [8]

The Soviet irradiation of the American Embassy prompted a 1965 White House directive to investigate radio frequency biological effects particularly in the microwave region, that resulted in a major classified project code named Pandora. [9] Project Pandora became a number of subprojects, one of which was a rhesus monkey investigation dubbed Project Bizarre [10] [11] [12] that was conducted by Dr. J. C. Sharp and H. M. Grove who later are noted to have developed a method for remotely transmitting intelligible words by modulations of the microwave hearing effect. Here reviewed are Project Bizarre microwave exposure results as know from previously classified Freedom of Information Act (FOIA) releases along with corroborating journal studies observing the same or similar deficits. Since radio frequency voice transmission implemented to simulate hallucination would involve analogous microwave exposures, those extant references to such development are as well covered with corresponding deficits observed in schizophrenia, which is the most well studied

diagnosis containing numerous remote voice transmission complainants.

Project Bizarre

Project Bizarre involved designing a facility capable of uniformly irradiating primates [13] that required an operational manual. [14] Preliminary results indicating an effect on the monkeys' ability to perform operant tasks were reported to the Advanced Research Projects Agency Director, 10 which were confirmed and yielded Director Memo stating: "The potential of exerting a degree of control on human behavior by low level selectively modulated microwave radiation should be investigated for potential weapons applications." 12 By 1969, an Institute for Defense Analysis panel unanimously found degradation in monkey performance at 1 mW/cm² up to 4.6 mW/cm² on more than 10 days of 10 hours per day exposure. [15] The Bizarre Project exposures simulated a signal of particular concern occurring at the American Embassy in Moscow that was in the "S" band centered about 3 GHz, but "L" band frequency also had occurrence, and onsite radiation levels inside the embassy in 1965 was "measured at values in excess of 1 mW/cm²" 10 [a] The 'Moscow Signal' simulation was quite complex, but significant to later literature is that the frequencies investigated were centered about 3 GHz, and there were two superimposed signals each effectively pulsed at 440 times per second. [16]

Then or presently, such results below US exposure standards question substantial military [17] and commercial [18] investment. The administration changed in 1969, and as of 1967 radiation levels measured at the Embassy had considerably decreased in power to "always below 50 microwatts/cm²." 12 By 1970, a Bizarre Project advisory committee member analyzed monkey performance data for microwave exposure duration

without unexposed comparison that could not show behavioral differences and a report resulted examining the issues. [19] [20] In letter to the Advanced Sensors Director, conclusion emphasis was that “no evidence of any permanent, deleterious effects are to be expected,” as no monkey performance degradation after exposure recovery was detectable. [21] In July 1970 the project was relegated to the Walter Reed Army Institute of Research where the facilities were installed. [22] [23]

Microwave exposure produced monkey operant behavior changes of decreased ability to delay response for 50 seconds during an inter-response time (IRT) portion of a food reward schedule. 10 20 The Bizarre Project primary investigator suggested the results be independently replicated, and would survive what most scientists consider invalid analysis. Scientists often of some military laboratory affiliation have produced very similar performance degradations to those found for Project Bizarre over 5 rat investigations at 3 different laboratories without any complex microwave signal modulation. [24] [25] [26] [27] A cell phone study indicates alteration of time perception in humans. [28] Project Bizarre also found decreased ability in sequential tasks later covered before confirming journal literature review.

Microwave Exposure Inter-Response Time and Time Perception Studies

Thomas et al. 1975 24 conditioned the behavior of 4 rats to a food reward schedule with a response sequence for reward that only occurred on lever press 18-24 seconds after a prior lever press. A time out period when any response continuously delayed the reward schedule was also included. These animals were exposed to microwaves at 2.86 or 9.8 GHz [b] pulsed at a rate of 500 per second in 1 μ sec. width, and continuous waves at 2.45 GHz with all exposures for 30 minutes prior to behavioral

performance assessment. Both pulsed frequencies increased inappropriate response at or above 10 mW/cm² power density, while 5 mW/cm² increased inappropriate response for pulsed 9.8 GHz. During the time out period, 9.8 GHz pulsed and continuous wave frequencies increased inappropriate response.

Thomas et al. 1982 25 conditioned 4 rats to obtain food reinforcement occurring only for lever press 8-12 seconds after two prior such responses separated by between 1-2 seconds. After stable acquisition of the behavior, the rats were microwave exposed at 2.8 GHz in continuous waves or as 500 pulses per second in 2 μ sec. width for 30 minutes. Pulsed power densities of 10 and 15 mW/cm² consistently decreased behavior producing reward, while continuous waves had a less consistent effect. Both 1975 and 1982 Thomas et al. articles originated from the Naval Medical Research Institute.

Raslear et al. 1993 26 conditioned 8 rats to food reward contingent upon a light being on for durations of both 0.5 or 5.0 seconds followed by a lever press. These rewarded stimuli were randomly interspersed with unrewarded light illuminated durations of 0.74, 1.1, 1.62, 2.4, or 3.52 seconds. No lever press within 10 seconds counted as a null response. These behaviorally conditioned rats were sham exposed or actually exposed to a TEMPO transmitter of 3.0 GHz producing pulses at 700 Watts peak power [c] in 80 nanosecond width every 7.5 seconds [d] for 200 pulses lasting in time for 25 minutes. Even with quite high peak pulses the full power average whole body exposure was 0.072 W/kg, and exposures also included decrements of full power. Actual exposure compared to sham exposure increased long responses, time to completion of total trials, null responses, and altered discriminability. This report originated from Walter Reed Army Institute of Research.

D'Andrea et al. 1986a 27 exposed 7 rats to 2.45 GHz continuous waves at 2.5 mW/cm² for 7 hours per day over 14 weeks. Performance after exposure was compared to control animals for training with reward schedules that progressively increased the inter-response time (IRT) interval until food reward response was required 12-18 seconds after a prior lever press. Microwave exposure increased the total number of responses, decreased food rewards earned, and the efficiency of gaining reward.

D'Andrea et al. 1986b [29] utilized the same procedure as the previous report except that exposure was at 0.5 mW/cm² power density for 90 days. The lower power level increased the total number of responses, but had no effect on rewards earned or efficiency. DeWitt et al. [30] repeated the previous study finding significant differences between control and exposed animals during training in extension of the IRT interval, but without consistent pattern, finally suggesting that the threshold for effect was above 0.5 mW/cm². Though these last 3 reports originated at the University of Utah with Environmental Protection Agency support, Om P. Gandhi is senior author on each, and is co-author on a 1974 microwave hearing report originating from Walter Reed Army Institute of Research with Joseph C. Sharp, [31] who was the primary investigator of Project Bizarre. By the time of publication, D'Andrea was at the Naval Aerospace Medical Laboratory.

The previous reports are of animal inter-response time effects, but one human study indicates a change in time perception in the millisecond range. Maier et al. 2004 28 determined the order threshold of inter-stimulus interval for discriminating the ear of first click presentation for 11 volunteers. Each volunteer's threshold for determining the shortest time between clicks was also determined after 50 minutes rest or GSM cell phone exposure (902 MHz = 0.9 GHz, pulsed at 217 Hz) for the same duration. Rest increased discrimination of click separation, while

cell phone exposure for the same period decreased discrimination of click separation by as much as 40 milliseconds. [e]

Microwave Hearing Voice Transmission Development

Dr. Joseph C. Sharp was the primary investigator of Project Bizarre with H. M. Grove having equipment responsibility, [32] each of whom are co-authors on a microwave hearing study 31 [f] submitted about the time that Dr. Sharp made personal communication disclosure of successful voice transmission by microwave hearing in 1973. [33] Microwave hearing is a well established phenomenon to review. [34] [35] [36] [37] [38] [39] [40] Microwave hearing voice transmission development has numerous further references.

A Defense Intelligence Agency review of Soviet literature acknowledges microwave hearing and the possibility for word transmission with potential for “disorientating or disrupting” personnel behavior pattern. [41] “By proper choice of pulse characteristics, intelligible speech may be created” by microwave hearing for “camouflage, decoy, and deception operations” quotes an underlying rationale for an Army Mobility Equipment Research and Development Command report on cerebral blood flow microwave effects. [42] A US Army Intelligence and Security Command Freedom of Information Act (FOIA) release considers development of microwave hearing voice transmission feasible with adaptability to existing radar units stating: “Application of the microwave hearing technology could facilitate a private message transmission. . . . it could be psychologically devastating if one suddenly heard ‘voices within one’s head.’” [43]

Microwave hearing voice transmission by parabolic antenna has two patents. [44] [45] Though microwave hearing is the most

published terminology, the phenomenon occurs below the 300 MHz microwave definition cutoff, 44 with hearing effect at frequency as low as 2.4 MHz from magnetic resonance imaging coils, [46] thus confirming radio frequency hearing as appropriate terminology. Non-remote radio frequency voice transmission devices [47] [48] have peer reviewed appraisal of operation. [49] [50]

Respected scientists note obvious applications of remote voice transmission as “not limited to therapeutic medicine,” [51] and to have covert uses to “drive a target crazy with voices or deliver undetectable instructions to a programmed assassin.” [52] Nexus Magazine reports manufactured microwave voice transmission device demonstration by Lockheed-Sanders at a 1993 classified conference with the process termed “voice synthesis” or “synthetic telepathy.” [53]

Freedom of Information Act disclosure relating to a contract entitled “Communicating Via the Microwave Auditory Effect” [54] was denied on grounds of “damage to national security” by the Air Force, [55] who in their New World Vistas report elaborates the on “the possibility of covert suggestion and psychological direction” by microwave hearing voice transmission, enabling a capacity “to ‘talk’ to selected adversaries in a fashion that would be most disturbing to them.” [56] [57] This Air Force discussion framed as ‘possibility’ was published the same year as patent application disclosing methods to implement such capability [58] by Air Force employees [59] [60] with rights assigned to the Air Force. Freedom of Information Act releases related to the patent list a psychological warfare communication tool under government use, [61] state that intelligible speech transmission was experimentally demonstrated in a letter to the Judge Advocate handling the patent process, [62] and provide some description of initial experiments, [63] however further experimental detail was denied. [64] The initial patent was followed by another related

patent. [65] Available patent related disclosures evidence no knowledge of previous development, and the patents do not cite the obviously related Brunkan patent. 44 For years microwave hearing voice transmission non-lethal weapon capacity was acknowledged in a 'voice to skull devices' weapons thesaurus entry on the Center for Army Lessons Learned official .mil website, [66] but after request for congressional investigation of such implementation or misuse, [67] the entry was excluded. [68] Microwave hearing voice transmission when coupled to target tracking [69] has clear correspondence to complaints by some individuals who on medical consultation often receive various delusional or psychotic presumptive diagnoses, particularly with disability schizophrenia. This diagnosis can be attributed to people who hear voices without apparent source commenting on behavior or conversing, and have social or occupational disability for 6 months. [70] Direct complaints of voice transmission by technology have had little investigation, but besides such complaints, schizophrenia patients exhibit time estimation and perception deficits very similar to those evidenced under microwave exposure. Next reviewed are these studies.

Schizophrenia Time Estimation and Perception Studies

Schizophrenics estimate 5-30 [71] or 7-40 [72] second periods to be significantly longer than actual time or as judged by healthy subjects. Schizophrenic patients compared with controls over estimated an interval such that actual elapsed time was less than patient assessment, when adjusting a metronome to a one beat per second, or estimating longer time interval passage up to 30 seconds [73] without diagnostic subtype difference. [74] [75] Schizophrenics are deficient in comparison with individuals in health for ability to differentiate seven tones ranging in duration from one third of a second to two and one third seconds. [76]

Reports of time processing long enough in duration for operation of cognitive processes are classed as time estimation studies.

Other reports of schizophrenia temporal processing deficits in the millisecond (ms) range are regarded to be of time perception.

The threshold duration for 75% correct detection of the difference between a tone lasting one second from another tone extended in duration by milliseconds in schizophrenics is 122 milliseconds longer than controls, [77] with alteration of the patients' temporal bisection point. [78] Deficit for recognizing a standard interval between stimuli from other such interval durations in the millisecond range exists in schizophrenics compared to controls for visual [79] and auditory stimuli. [80] The 70.7 correct response threshold for detecting an interval between clicks is 71.8 ms for schizophrenics, and 16.0 ms for healthy subjects. [81] The size of a temporal irregularity between tone onsets detectable by schizophrenics is reported as 6.64% compared to 3.78% for normal subjects (at 70-90% correct detection). [82]

Mismatch negativity (MMN) is an electrophysiologic auditory Event Related Potential (ERP) generated in the brain when sounds deviate from a pattern in the recent auditory past that is automatic, and generally regarded as a pre-attentive process. Numerous studies show schizophrenia MMN decreased amplitudes particularly for the durations between or of sounds. [83] Schizophrenia MMN deficit indicates an early phase abnormality within 250 ms [84] of the window for temporal integration. [85] Patients symptomatic for hallucination have significantly lower MMN amplitudes for tone [86] or phoneme [87] duration deviates than non-hallucinating patients or healthy controls. Schizophrenia MMN amplitude can be normal in response to large duration difference while abnormal to shorter difference, [88] and significantly abnormal right ear hearing threshold increases for short sound intervals is reported highest for patients symptomatic for hallucination. [89] [90] The interval

duration MMN for schizophrenia has a left mastoid electrode phase reversal in the elicited ERP response that correlates with a patients' increased threshold for duration detection.[91] Simple counting of deviant duration tones to assess detection by schizophrenics is reported to correlate with the N2b amplitude of the MMN ERP waveform. [92]

Task Sequencing Performance

Project Bizarre required a sequence of monkey behaviors each associated with a different signal. One tone frequency signaled a time out period where any response to gain food within ten minutes reset another 10 minute delay requiring non-response. When a red light came on food was available by lever pressing where each subsequent food pellet required a geometric increased number of lever responses. Subsequently another time out period was tone signaled, where on successful non-response, a different tone frequency signaled food availability only by the 50 second delayed response previously discussed. The daily food ration required by each animal's weight was portioned out among such alternating reward schedules to approximate the Embassy work day. Monkey work slow downs, and work stoppages even involving sleep were observed under radiation compared to non-exposure. 10 20 Microwave exposure also induces deficits in rat behavior requiring task sequence completion for reward, [93] [94] [95] [96] which next has review. Detailing of schizophrenia temporal order and procedural performance reports then follow.

Microwave Exposure Sequencing Performance Studies

Schrot et al. 1980 93 conditioned 3 rats to obtain food by pressing different lever locations each associated with distinct auditory stimuli for the correct lever response. The food reward

sequence had one lever signaled twice, thus requiring 4 responses. In addition though auditory stimuli uniquely indicated a lever position, the correct sequence required for food reward was changed from session to session. Error in rat response was signaled by a unique tone with lights off, and a three second time out period when responses had no effect. After stable behavior acquisition on this regimen, these rats were exposed to 2.8 GHz pulsed 500 times a second in 2 μ sec. width for 30 minutes. Ten mW/cm², and to a lesser degree 5 mW/cm² microwave exposure increased responding after error signal, decreased successful sequence completion rates, and altered behavioral pattern acquisition. Periods of pausing or the cessation of responding were observed. Schrot et al. 1980 originated at the US Naval Medical Research Institute.

Thomas et al. 1976 94 conditioned 4 rats to obtain food by a sequence of a left lever press after at least eight right lever presses. Any left lever press prior to at least 8 right lever presses was unrewarded, and reinstated the required reward sequence. After achieving stable behavior to the sequence regimen, the rats were exposed at 2.45 GHz pulsed 500 times per second in 1 μ sec. width for 30 minutes at 5, 10, or 15 mW/cm² power density. All exposures decreased ability to earn reward with the greatest decrement at 15 mW/cm², primarily decreasing the average number of consecutive responses on the multiple response lever. One week after exposure recovery, however, no performance changes were detectable. Thomas et al. 1976 originated from the US Naval Medical Research Institute.

Gage 1979 95 [97] [g] conditioned 8 rats to obtain food by alternatively pressing two levers either 11 or 33 times. Performance on the alternation regimen was assessed after 2.45 GHz continuous wave exposures for 15 hours. Behavior in terms of alternation rate decreased at and above 10 mW/cm². Performance returned to pre-exposure levels the day after

exposure. Gage 1979 originated from the US Environmental Protection Agency.

Mitchell et al. 1977 96 trained 10 rats to obtain food by 5 lever presses during light illumination with no reward provided when the light was off. Five of these rats were exposed to 2.45 GHz continuous waves at 2.3 W/kg [h] for 5 hours, 5 days a week over 22 weeks. Performance on the behavioral regimen was tested at 54 regularly spaced times over the 22 weeks. Compared to control animals, the irradiation disrupted the rats' food reward response to discriminate the light illumination from the light off condition with an increased response rate during light off periods. Mitchell et al. 1979 originates from the South West Research Institute in San Antonio, where Air Force radio frequency research facilities are also located with this institute having prepared/published an Air Force report mentioning radio frequency "forced disruptive effects." [98]

Schizophrenia Temporal Order and Procedural Learning Performance

Memory in schizophrenia is impaired by greater than a standard deviation, which represents a deficit relative to more than 84% of a normal population with some significant correlation to negative symptoms according to meta-analytic review. [99] Numerous studies examine memory for temporal or serial order. Deficit for recalling previously presented item position in a sequence is demonstrated by n-back remembrance for geometric shapes in drug-naïve, [100] and in unmedicated patients for letters [101] or numbers. [102] This deficit extends to words or faces, [103] and both the temporal or tempo-spatial sequence of squares changing color. [104] Recognition memory does not account for schizophrenia deficits relative to normal subjects in ordering lists,

[105] or in identifying recently presented words. [106] Healthy subjects exhibit primacy and recency effects in whom both initial and latter items in a sequence are best remembered; [107] yet temporal order accuracy for schizophrenic remembrance of auditory presented words, [108] or single position probed recall [109] is disproportionately poor for the earliest sequence portion. However, poor recall for those items held longest in memory may be a better conceptualization of the deficit, 109 since whole sequence reproduction by schizophrenics of visually presented letters [110] or in tempo-spatial sequences [111] produces more errors than controls in the latter series portion. Tests for the temporary form of memory that guides ongoing performance known as working memory significantly correlates to temporal order memory in schizophrenia. [112] A meta-analytic review of schizophrenia working memory studies finds the deficit is independent of auditory or visual modality, while suggesting that memory encoding and/or the early part of maintenance is problematic. [113] Other studies examine temporal context memory over longer intervals. Though schizophrenia deficits are greater over intervals corresponding to working memory, there is also impairment for longer intervals, [114] and patients with auditory hallucination have the greatest deficit in memory for temporal context. [115] [116] [117]

Schizophrenia patients exhibit deficits for procedural learning for several tasks having a large motor component where the knowledge learned is implicit, involving little or no explicit awareness. Procedural learning disturbance relative to healthy subjects is present in drug-naïve patients for the Mirror Drawing Test (MDT) where figure drawing is preformed by viewing progress only by a mirror's reverse image. [118] Though there is agreement that treatment by the typical neuroleptic haloperidol shows MDT learning deficit, MDT performance normalization compared to healthy subjects is reported for 3 months treatment by the atypical agents of clozapine and risperidone, [119] whereas

for studies describing included patients as having at least 3 months neuroleptic treatment, there are MDT performance deficits for both the latter agents relative to controls, [120] or just clozapine relative to drug-naïve patients. [121]

Schizophrenia deficits are also present in other tasks similar to the MDT. Learning to touch targets by prism distorted viewing does not differ between medicated or unmedicated patients, but both patient groups are deficient compared to healthy subjects. [122] Deficiency in schizophrenia patients is also reported for hand and arm movement sequencing tasks. [123] Schizophrenia rotary pursuit learning that involves holding a stylus on a rotating turntable target is deficient relative to normal controls in a larger study with greater statistical power [124] than previous studies without difference. [125]

Even more studies have utilized the Serial Reaction Time Test (SRTT) where decreased response reaction time demonstrates the learning of repeated sequences. Though schizophrenia patients exhibit some learning in the SRTT, their performance is less than healthy subjects. [126] The schizophrenia deficit occurs in SRTT procedures having random sequences between repeated sequences so that no subject has explicit notice of any presented order, which verifies the learning is truly implicit. [127] Accuracy on the SRTT is reported to correlate with passive or apathetic social withdrawal, and learning correlates for somatic concern of the general psychopathology subscale, [i] [128] though another study correlates learning with disorganized symptoms. [j] [129]

Discussion

Though no journal microwave inter-response time (IRT) study exactly repeated the Project Bizarre 10 hr/day exposures, the results are strikingly consistent even with much shorter

exposures. IRT behavioral deficits similar to those in the Bizarre Project occurred at similar power levels with rat high peak power pulsed exposures 26 [k] or at lesser peak pulse power, 24 just comparably above (5 mW/cm² vs. 4.6 mW/cm²) Project Bizarre power density after only about 30 minutes exposure. A virtually identical journal study to the latter report, though with one half the peak pulse power because the same power density was applied over 2 μsec. instead of the previous study's 1 μsec., could only observe inappropriate IRT responses at 10 mW/cm² and above. 25 Yet since exposure was only for 30 minutes this study could also be considered supportive of considerably longer Bizarre Project exposures. Project Bizarre was unable to observe performance decrement with unmodulated microwaves, however D'Andrea et al. 1986a found rat inter-response performance degradation with continuous wave exposure of almost ten times the duration of those in Bizarre (though for lesser per day period) at 2.5 mW/cm². 27 An explanation for the emergence of effects for Project Bizarre at a time considerably intermediate to the pulsed and continuous wave major effect studies based on the findings is that there was less peak power of pulses in having power density spread out over almost twice the number of pulses and other modulations.

Pulsed microwave exposure also disrupts rat ability to perform sequential tasks at all examined power levels after only 30 minutes exposure in two reports, 93 94 both of which found sequencing performance degradations at 5 mW/cm² comparable to the 4.6 mW/cm² Project Bizarre sequential task disruption. Decreased responding on microwave exposure similar to Project Bizarre observations occurred in several studies, and the cessation of responding is confirmed in one report. 93 Unmodulated microwave exposures (continuous waves) take longer to disrupt rat performance on simpler sequential tasks with 15 hours acute exposure at 10 mW/cm², or after some 5.5

months intermittent 5 hr/day chronic exposure at 2.3 W/kg that approximates 2 W/kg allowed for mobile phones.

Even though many of these studies involved small groups of animals, behavioral studies generate considerable data to determine individual performance, and results replicating over small populations are generally considered robust findings. The Project Bizarre weapons implications at low power microwave exposures must be considered to be confirmed. Microwave exposure inter-response time and sequential task performance reports herein totaled 10 studies, fully half of which originated from military laboratories who solely conducted the pulsed investigations showing the greatest performance deterioration, while the continuous wave studies showing lesser effect, and more towards thresholds relative to exposure duration tended to be conducted by civilian agencies.

The findings that pulsing power most readily produces deficits in timed responses and sequencing performance are significant to schizophrenia reports because of the fact that radio frequency voice transmission requires pulsation. Schizophrenia deficits in time estimation are so strikingly similar to animal timed response studies under microwave exposure as to be indistinguishable based on the information available from each field of study. The inability to withhold response over the proper interval for rats under microwave exposure directly corresponds to schizophrenia study findings of time estimation as longer than actual. The difference for time perception between schizophrenics and control subjects of 55 milliseconds 81 for the most comparable psychophysical study [1] is also very comparable to 40 millisecond 28 difference for mobile phone exposure compared to non-exposure. Mismatch negativity response amplitude decreases for duration deviates of tones 86 or phonemes, 87 and right ear elevated thresholds for detecting very short sound durations 89 90 are directly related to hallucination.

Deficits observed in schizophrenia in memory for temporal order, and procedural learning are very analogous to the rat deficits in sequential performance observed under microwave exposure. The abundantly documented schizophrenia deficits in memory for temporal order would certainly impair procedural ability, particularly as extended to the more limited animal cognitive ability. Memory for temporal context is directly related to hallucination symptoms by several studies. 115 116 117 Deficits for procedural learning, which are observed in drug-naïve and unmedicated patients, must also be considered analogous to microwave disruption of learned behavior in more limited cognitive species. The fact of authentic documentation of development for methods of simulating hallucination considered with the correlations here, which are among many others reviewed, [130] seriously poses the question of whether the weapons implications of Project Bizarre are evident throughout hallucination related disorder medical findings.

Though human experimentation is not detailed in the Bizarre Project disclosures, an Institute for Defense Analysis meeting having apparently redacted final minutes considered human subject research to be required, while noting security needs in conflict with ethical 'procedures,' 19 and there was some preliminary planning of human subject experimentation to "be given high priority." 15 Serious ethical disregard for proximate behavioral influence methods is well documented [131] for MKUltra, which was a project contemporaneous to Projects Pandora/Bizarre. Believing that unrecognized, and difficult to detect technology would remain unutilized is to ignore documented human nature. Many groups believe [132] [133] [134] [135] that remote behavioral influence capacities when coupled to target tracking technology 69 have been and currently are being applied to individuals.

Orthodox wisdom in deference to expected knowledge of relevant medical specialties lacks appreciation of the development herein covered. Neither psychology nor psychiatry have evaluated relevant technological development, and frequently complainants of any such technology misuse are presumptively diagnosed with delusional or psychotic disorders resulting in disenfranchisement of any human rights for genuine redress or relief. Many complainants steadfastly assert that their symptoms result from technological assault with those most afflicted, and so disabled often being presumptively diagnosed with schizophrenia particularly the paranoid subtype. Human rights issues relevant to direct complaint of behavioral influence technology use have not even received preliminary appropriate investigation or development of differential diagnostic methods by medical literature.

Besides authentic documentation of simulated hallucination methods of expected effect correlating to clinical hallucination disorder deficits 86 87 89 90 115 116 117 here covered, other brain response studies of hallucinating schizophrenics implicate activation of the initial auditory pathway supporting a simulated hallucination differential diagnosis. [136] Actually reported is increased radio frequency level near the head of a patient with Dissociative Identity Disorder (DID), [137] a condition for which hallucination incidence is 30-64%. [138] Relevant to such an observation is intelligence agency interest in and use of DID cases. 131 Many microphones contain components of design similar to responsive conditions for, or known responsive to the thermoacoustic effect that produces microwave hearing, while pre-distortion of voice for intelligibility within the head is inherent to two radio frequency speech transmission patents, 58 65 so that basis exists for sworn recordings of distorted sound similar to words understood by a complainant. [139] Though hallucination has other causes than by simulation, either an endogenous etiology produces similar deficits, or enough patients studied have

legitimate remote radio frequency voice transmission complaint to affect results in schizophrenia investigations,¹³⁰ which often consist of small subject numbers. Besides the two deficits compared in detail, such complaints have circumstantial support from so many correspondent deficits for microwave bioeffects compared with schizophrenia that congruence is an applicable descriptive term, ¹³⁰ and without published delineation are many other correlations for medical literature findings.

Academic and organized psychiatry are apparently unable to consult appropriate expertise to examine the substantiation for technologic development not only for non-disclosure agreements by knowledgeable personnel. Present presumptive diagnoses are of livelihood benefit, and the incurability of some complainants represents a verifiable herd of public assistance cash cows. Perhaps an implication that supposed Hippocratic Oath subscribers serve actually as repressive minions for some patients provokes offense too contrary for amending obvious dogmatic ignorance to enable rational investigation. Of relevance are previous unethical programs that extended through many major universities propelling careers into administrative position ¹³¹ with a legacy of influence on academic views, and reinforcing trepidation for professional repercussions from implicating official misconduct.

Issues of directed microwave misuse, however, pale in comparison to other low intensity microwave bioeffect “ramifications,” which was a final expression on stonewalling the press when the Moscow American Embassy irradiation became publicized. ¹ A main reason for obfuscating weapons implications is that acknowledging biological performance degradations at and below Western radio frequency exposure standards threatens considerable military and commercial investment, as then or presently. All of the microwave exposure studies produced effects either just above or actually below exposure standards.

[140] The 2.3 W/kg chronic intermittent continuous wave exposure of Mitchell et al. 1977 96 is the highest, but 2 W/kg is allowed for the cell phone head and trunk exposure situation, though experimental exposures were of animal whole body. Depending on frequency, the corresponding occupational exposure standards range from 8.2 to 9.5 mW/cm² for the experiments demonstrating effects at 10 mW/cm², a power density little above stated regulation. Effects at 5 mW/cm² are below occupational standards, and only represent 2.6 – 3 times the general population standard depending on frequency, while the D'Andrea et al. 1986a 27 continuous wave experiment of deleterious effect is 1.5 times the population standard. Exposures in Raslear et al. 26 are below the population standard, and though these results were at high peak pulse level, there are no official limits regarding pulse power. Besides such considerations, extended exposure durations are not well studied. The prudence of exposure standards is not particularly precautionary regarding those effects herein reviewed or as elsewhere. 130 These standards were developed by the Institute of Electrical and Electronic Engineers (IEEE) apparently with more regard for military and commercial benefit than biological welfare. The existing standards are so weakly written as to be found unenforceable by the Occupational Safety and Health Administration at administrative law. 1 Until actual syndromes are firmly established enough in literature for lawyers to reap benefits like for asbestos or tobacco, a laissez faire policy will continue even condoning criminal misuse.

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References

[a] This power density is highly discrepant to previous treatments. The Senate American Embassy in Moscow irradiation report indicates the radiation from 1963-1975 remained about 5 microwatts/cm², with an 18 microwatt/cm² value measured later in 1975. 2 One milliwatt/cm² is 200 times a 5 microwatt/cm² value. Steneck pg. 94 1 in comment relative to a May 13, 1965 memo states that "At the time government sources erroneously estimated that the intensity of the signal was about 0.5-1 mW/cm²," so there is some indication that such measurements were impugned. The FOIA releases here reviewed were released in 1989, but not covered are previous FOIA releases relative to the Moscow American Embassy irradiation referenced in Steneck, and much still remains classified.

[b] Article frequencies are converted to gigahertz (GHz) from megahertz (MHz) for comparison to the Bizarre figures. 1000 MHz = 1 GHz

[c] Peak pulse power in previous articles would vary with power density.

[d] Converted value from 0.125 pulses per second. 3000 MHz is also converted to 3.0 GHz.

[e] Maier et al. 2004, Figure 3, graph B2.

[f] Sharp et al. 1974 concerns microwave hearing physical mechanism, but in forward statement refer to ongoing work that heavily implies human experimentation.

[g] This last reference contains apparently a summary of the same study also reported as part of a collaborative project with the Soviets, which is here included because publications of microwave studies can have limited availability.

[h] Converted from 2.3 mW/gm for comparison to the International Commission on Non-Ionizing Radiation Protection (ICNIRP) standards, which are comparable to US standards.

[i] PANSS ratings.

[j] SANS/SAPS ratings.

[k]. Raslear et al. exposures are stated at 0.072 W/kg. The ICNIRP population standard is 0.08 W/kg. The ICNIRP standards are comparable to those of the US, where the US population exposure standard at this frequency calculates out to be 2 mW/cm².

[l] Rammsayer et al. 1990 utilized 3 μ sec. clicks whereas Maier et al. 2004 utilized 1 μ sec. clicks, which are comparable psychophysical parameters. Other psychophysical values are by Todd et al. 2003 with tones demarking the interval duration were 50 ms for Todd et al. 2003 who find the 70.7 correct response threshold for detecting an interval duration between tones to be 15.30 ms for a control group and 25.20 ms for a schizophrenia group. Bourdet et al. also utilized 50 ms tones at standard intervals of 500 ms from which there were irregularities, but only expressed differences in percent.

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http://www.dod.mil/pubs/foi/reading_room/175.pdf , pdf 94-102 Appendix I, CALIBRATED MICROWAVE FACILITY AT WALTER REED ANECHOIC CHAMBER, Irradiated Test Section 4' X 2' X 1 1/2'. Accessed 8 Nov 2008.

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