Abstracts of Aeromedical Literature

ACCELERATION PHYSIOLOGY

1. Relationship of Sodium Deprivation to +Gz Acceleration Tolerance. S.J.Shubrooks Jr. *Aerospace Med.* Vol. 43, Sept 1972, P. 954-956. 7 refs.

+ Gz acceleration tolerance was studied for 16 normal volunteer subjects both during a normal uncontrolled diet and during a period of negative sodium and water balance produced by dietary restriction. Four subjects were studied on each of 4 different levels of sodium intake-10, 50, 100 and 150 mEq sodium/24 hr.; water intake was limited to 2000 cc/24 hr. for all. With the dietary restriction changes in plasma volume ranged from undetectable to a 23% reduction and +Gz tolerance decreased for all subjects ($P < 0.001$). Decreases during rapid onset (1 G/ sec.) runs ranged from 0.2 to 0.7G and during gradual onset (1 G/15 Sec.) runs from 0.2 to 1.35G. The effect on + Gz tolerance of these relatively small negative salt and water balances is particularly significant in view of the much greater deficits experienced by flying personnel in tropical environments. (Author)

2. Physiological Responses to Short Duration Gz. G.H. Kydd *Aerospace Med.* Vol. 43, Sept. 1972, P. 1014-1019. 15 refs

Subjects have been subjected to Gz (positive) haversine accelerations of short duration, high magnitude on the centrifuge and their responses to peripheral lights have been recorded. Whereas most subjects lost the peripheral lights during the 6-second haversine, only one did so during the 4-second run. Since the acceleration is maximum at $\frac{1}{2}\tau$ for the haversine, this means that a rise time of 6 Gz in 3 seconds caused P. L. L. whereas 10Gz in 2 did not. The data thus indicate that the time for no response to a rapidly rising acceleration is greater than 2 seconds (no response to a 4-second haversine) and less than 3 seconds (P. L. L. to a 6 second haversine). The characteristic of the haversine in evaluating centrifuge response are discussed. (Author)

3. Semicircular Canals as a Primary Etiological factor in Motion Sickness. R. F. Miller II and A. Graybiel, *Aerospace Med.* Vol. 43, Oct 1072, P 1065-1074. 36 refs

Data are presented which support the view that the semicircular canals of humans can act as the essential factor for the production of motion sickness and the evocation of symptoms characteristic of this malady in the absence of "motion". Quantitative grading of acute symptoms demonstrated that motion sickness can be evoked by stimuli which are adequately provocative and unique for the canals. These results are compared with those of two provocative rotational tests that introduce Coriolis (cross-coupled angular acceleration) forces or generate a rotating linear acceleration vector. Wide interindividual differences but only slight intraindividual differences among the six provocative test conditions are revealed indicating that individuals usually possess an overall susceptibility to motion which is relatively independent of its type. The pattern of symptoms manifested by the group of 10 subjects at the test endpoint, moderate malaise, is also similar among these tests.

The fact that typical symptoms of motion sickness (M IIA endpoint) were produced also by bithermal irrigation of several subjects who represented a wide range of susceptibility adds to the evidence that semicircular canals can act as the primary etiological factor in this malady. (Author)

4. Changes in Cardiac Rhythm During Sustained High Levels of Positive (+Gz) Acceleration. S. J. Shubrooks Jr. *Aerospace Med.* Vol. 43, Nov 1972, P. 1200—1206, 12 refs.

Electrocardiograms were recorded during 45 sec. exposures to +6.5 to +9.0 Gz of 14 human subjects on the USAF School of Aerospace Medicine human centrifuge. Maximum heart rate (HR) reached by each subject ranged from 155 to 205 beats/min. Four subjects developed a slowing of HR at 16 to 38 seconds into the run due to slowing of the sinus pacemaker, sometimes the escape of an A—V junctional or ventricular pacemaker. Similar escape rhythms also occurred during the sinus slowing with deceleration. Ventricular premature beats (V P Bs) occurred frequently in 7 subjects, occasionally in 6, and not at all in one. When frequent, the number increased markedly in the latter part of the 45-secs runs. These V P B's were frequently multiform and occasionally occurred in runs of 2 or 3 with a few runs of 4 to 7. In no case did any serious arrhythmia persist after deceleration, nor did G tolerance appear to be affected. The etiology and significance of these arrhythmias remain unclear (Author)

5. Effect of Hydrochlorothiazide on + Gz Tolerance in Normotensives. J. R. PFAFF & P. B. NEWBERRY. *Aerospace Med.* Vol. 43, Nov 1972, P 1225-1229. 11 refs.

Following an episode of incapacitating tetany in a pilot on diuretic therapy for hypertension, we decided to investigate the effect of Hydrodiuril on tolerance to flight stresses.

Six healthy, normotensive males were given a familiarisation G—tolerance test to grey-out (GTTG) on the human accelerator, followed by a control GTTG and a four minute exposure to +2.5 Gz during which heart rate, blood pressure, and forearm blood flow were recorded (BP and Q at +2.5 Gz). They were then given 50 mg of Hydro-diuril twice daily, and the GTTG, BP, and Q at +2.5Gz were repeated after 2 and 4 weeks on the drug.

Control G—tolerance was 3.9±0.2 S. D. and decreased to 3.1 ± 0.4 S. D, and 3.0 ± 0.4 S. D, after 2 and 4 weeks on Hydrodiuril ($p<0.01$), respectively. The mean control BP at +2.5 Gz was 69±10 S. D. mm Hg and decreased to 56 ± 5 S. D. Hg and 58 ± 6 S. D. mm Hg at 2 and 4 weeks ($p<0.02$) respectively. Resting BP did not change with treatment.

It is concluded that tolerance to +Gz acceleration is reduced by Hydro-diuril in normotensive adult male subjects. Since this drug is used to treat some active aircrew, it is urgent that its effect on G— tolerance be determined in hypertensives (Author).

AIRCREW MEDICAL EVALUATION

6. Aircraft Accidents/Incidents among Aircrewmen Flying with Medical Waiver. RUSSEL B. RAYMAN *Aerospace Med.* Vol. 43, Nov 1972, P. 1265-1269.

During past years thousands of United States Air Force (USAF) airmen have been granted medical waivers for a great variety of conditions in order that they could continue flying. Although these waivers have been granted with reasonable assurance that flying safety has not been compromised, there may still be an element of doubt in some cases. In order to eliminate this doubt (or if possible to confirm it) the author reviewed the final reports of all USAF aircraft accidents/incidents which occurred during the period 1 January 1962 — 31 December 1970 in which the pilot or navigator was flying with a medical waiver. The purpose of this study was to determine whether or not the medical condition for which the waiver was originally granted contributed in any way to the accident/incident. Only 33 such cases were identified in which the pilot or navigator was flying with a waiver for an ophthalmologic (17), neurologic (8), cardiopulmonary (5), psychiatric (2) or otolaryngologic (1) disorder which could have been a contributing cause. Perhaps this is an indication that the USAF waiver policy through the years has been prudent and consistent with flying safety. The aforementioned 33 cases were individually analyzed and appropriate generalizations were deduced. (Author)

AVIATION PATHOLOGY

7. Microscopic Identification of Bird Blood Following Inflight Collusion with Aircraft. D.G.RICHEY & J.E. PRINCE. *Aerospace Med.* Vol. 43, Sept. 1972, P. 968-970.

A reliable and simple microscope method based on the nucleated red blood cells of

birds is described which permits identification of dried blood. The practicability of applying this method to birdstrike accident/incident investigation is shown; the fact that the avian red blood cell was recognizable after exposure to air turbulences on the surface of an aircraft in flight suggests using this method in bird species identification. (Author)

8. Intoxicating Liquor and the General Aviation Pilot in 1971. L. C. RYAN and S. R. MOHLER. *Aerospace Med.* Vol. 43, Sept. 1972, P. 1024-1026.

Alcoholic beverages continue to be associated with general aviation accidents. In 1963, 43% of the fatal aircraft accidents involved alcohol. However, since 1963 the percent of alcohol involvement has decreased from the 43% to 20% in 1968. Since 1968 the percent of alcohol involvement has remained fairly stable at about 20%. In 1971 the 8-hour "bottle-to throttle" abstinence rule was in effect. From an analysis of the fatal accident data it appears the new rule had a beneficial effect. One of the remaining problems appears to be the heavily drinking, chronic alcoholic. (Author)

ENVIRONMENTAL PHYSIOLOGY

9. Time Zone Entrainment and Flight Stressors as Interactants. R. B. HALE, B. O. HARIMAN, D. A. HARRIS, E. W. WILLIAMS, R. E. MIRANDA and J. M. HOSENFELD. *Aerospace Med.* Vol. 43, Oct. 1972, P 1089—1094. 24 refs.

Physiologic responsiveness to flying was studied using the members of a double-crew of a C-141 aircraft during six flights, each of which lasted 54 hours and involved bi-or tri-directional transmeridian flying. Responsiveness was quantified by means of endocrine-metabolic indices (urinary epinephrine, norepinephrine, 17-hydroxycorticosteroids, urea, sodium und potassium), using urine specimens which were collected at 4-hour intervals during the flights. Physiologic entrainment was shown to be a factor contributing to responsiveness, for there was rhythmic variability which related to time of day at the crews' home base. The waveforms, amplitudes, time relations and overall levels, however, did not agree with those of unstressed persons. Preflight factors had carry-over influence, acting as intensifiers of flight induced elevations at first, but gradually becoming less influential. As judged by epinephrine, norepinephrine and 17-OHCS, refractoriness toward flight stressors consistently developed at 2200 hours (Eastern Standard Time), even after the crew had crossed many time zones (flying either eastward or westward). These hormones indicated hyperresponsiveness regularly at 0600 hours EST; at other times responsiveness was shown (by these same indices) to be moderate in grade. Potassium, on the first day, indicated low responsiveness at 2200 hours and transient hyper-responsiveness at 0200 hours. On the second day, in association with sustained subjective fatigue of moderate degree, potassium indicated persistent noncyclic hyper-responsiveness. At the same time 17-OHCS indicated persistent hyper-responsiveness, although the factor of entrainment had modifying influence. Urinary sodium indicated cyclic change in responsiveness to flight, as did urea, but these two metabolic indices were out of phase with the hormones and potassium. (Author)

ERGONOMICS

10. Analysis of Pilot Assessment of Workload. W. J. KRZANOWSKI and A. N. NICHOLSON. *Aerospace Med.* Vol 43, Sept. 1972, P 993-997. 2 refs.

In a previous study on the activity of the nervous system during the let-down, approach and landing of a transport aircraft the workload was assessed by the pilot. Correlations were established between overall workload of the let-down and individual factors which influence the workload pattern and physiological change in the pilot. In the present paper assessments of workload over a four-year period have been examined to determine the technique used by

pilot to evaluate work load from the various factors of the let-down and to assess the consistency of his technique. (Author)

11. Influence of Workload on the Neurological State of a Pilot During the Approach and Landing. A. N. Nicholson, L. E. Hill, R. G. Borland and W. J. Krzanowski. *Aerospace Med.* Vol. 43, Feb. 1973, P.146-152. 4 refs.

The workload of a pilot during the let down of a Boeing 707 was modified by coupling the aircraft to the I. L. S. localiser and glide slope path (coupled approach) or by increasing the participation of the copilot in the handling of the aircraft (shared approach). The electrocardiogram of the pilot was recorded during the letdown and finger tremor was recorded after landing. The mean rr intervals around touch down of the coupled approaches, which were all of low workload, were increased compared with let downs of equal difficulty handled throughout by the pilot (manual let down). In the shared approaches to 1,000 ft the relation between the mean rr interval around touch down and workload was similar to that foar manual let downs but shared approaches to 500 ft increased the mean rr interval around touch down over let downs of a wide range of difficulty. The appearance of finger tremor was not affected directly by the modified workload approaches. It is concluded that flight deck workload patterns during the initial part of the approach influence the neurological state of the pilot around touch down. The operational significance of these studies is discussed. (Author)

HIGH ALTITUDE PHYSIOLOGY

12, Interactions Between Gas Bubbles and Components of the Blood: Implications in Decompression Sickness. R. B. Philip, M. J. Inwood and B. A. Warren. *Aerospace Med.* Vol. 43, Sept. 1972, P. 946-953. 38 refs.

Light and electron microscopy was done on the vasculature of stage- or explosively-decompressed rats using techniques which preserved the conformation of intravascular bubbles. Observed were (1) deposition of an electron-dense layer, approximately 200 Å thick, at the blood-gas interface, (2) adherence of numerous platelets to this layer with formation of pseudopodia, (3) platelet aggregation at the interface and in the interstices between coalesced bubbles, (4) the occurrence of lipid-like masses at the gas interface in some sections, (5) a significant increase in the number of free, circulating endothelial cells and (6) adherence of leukocytes to the bubble or its coating. A review of the literature pertaining to interactions between blood and foreign surfaces including gas bubbles indicated the occurrence of similar phenomena and suggested to us that intravascular bubbles act as foreign surfaces to cause denaturation of plasma proteins, platelet adhesion and aggregation, and coalescence and adhesion of plasma lipids. The observations offer an explanation for the post-decompression thrombocytopenia which has been observed in experimental animals and in man. (Author)

13. Decompression Sickness in USAF Operational Flying 1968-1971. S. T. Lewis. *Aerospace Med.* Vol. 43, Nov. 1972, P. 12 1-1264. 3 refs.

Some United States Air Force operations require crew members to fly at high altitudes protected by pressurized cabins, oxygen equipment or pressurizing garments-either singly or in combinations. Evolved gas decompression sickness can occur when the primary protective equipment or systems fail or are inadequate to protect the individual.

Cases of decompression sickness occurring in flying operations and reported to the Life Sciences Division on Air Force Form 711gA were analyzed to determine causative factors and severity. As might be expected, the primary cause was inadequate aircraft pressurization coupled with inadequate crew denitrogenation. Most cases were bends-type decompression sickness, although six cases had central nervous system involvement. Of these six cases, two required treatment in a hyperbaric chamber.

It would appear that serious decompression sickness cases are occurring in operational flying. Flight surgeons should be alert to detect those cases which will require hyperbaric therapy and be familiar with procedures necessary to obtain such therapy. (Author)

HUMAN ENGINEERING

14. Human Factors Evaluation of Labelled Radar Displays. R. A. Edendo ough. *Aerospace. Med.* Vol. 43, Nov 1972, P 1090-1193.

Earlier studies indicated that much of the work load of Air Traffic Controllers derives from R/T communications concerning standard information. Four experiments examined the value of showing this information automatically as an alphanumeric label accompanying the aircraft radar response. It was envisaged that R/T, and hence work load, would be reduced. Experiment 1 compared no labels labels giving identity only and labels giving identity and flight level. Experiment 2 examined visual characteristics of labels. In Experiment 3 mixtures of labelled and unlabelled tracks were shown, representing interim stages in the introduction of labelling. Experiment 4 compared direct display of call signs with a code display requiring translation into call signs. The predicted reductions in R/T work load with degree of labelling occurred but were usually unaccompanied by corresponding indications from other measures. The implications of the findings for the measurement and of reduction of A. T. C. work load are discussed. (Author)

15. Proposed New Test for Aptitude Screening of Air Traffic Cotroller Applicants. B. B. Cobb and J. J. Mathews. *Aerospace Med.* Vol. 44, Feb 1973, P. 184-189. 6 refs.

A novel aptitude test, referred to as "Directional Headings" (or DHT), was developed and evaluated for the selection of Air Traffic Control Specialists (ATCS) trainees. The instrument was administered on an experimental basis to several hundred subjects as they entered basic ATCS training at the FAA Academy. The vast majority of the subjects had been selected for training on the basis of competitive ratings from among candidates who met exceptionally high qualifying standards in terms of operational aptitude test screening scores and/or evaluations of pre FAA ATC related experience. Despite these prescreening effects, the DHT scores correlated 0.41 with an overall measure of training performance. Moreover, over 44% of the 115 examinees who failed their training course scored no higher than 29 on the DHT, whereas over 85% of the graduates scored 30 or higher. (Author)

16. Combined Effects of Noise and Vibration on Human Tracking Performance and Response Time. H. C. Sommer and C. S. Harris. *Aerospace Med.* Vol. 44, March 1973, P. 276-280. 5 refs.

In our laboratory vibration has been shown to be the primary cause of performance impairment in studies of the combined effects of noise and vibration on human tracking performance. Noise has had little consistent effect when presented alone, and has added little or not at all to the impairment produced by vibration. In two studies with heat included as a third stressor, vibration presented alone had a slightly more adverse effect on tracking performance than combined heat, noise and vibration. In the present experiment, 12 subjects were exposed to lower noise and vibration levels for a longer period of time than used previously. Subjects were tested under the following conditions: (1) no vibration–60 dB (dB re 20 $\mu N/m^2$) noise; (2) no vibration - 100 dB noise; (3) 6 Hz vibration at 0.10 gz (peak) – 60 dB noise; and (4) 6 Hz vibration at 0.10gz - 100 dB noise. Noise had no significant effects on tracking performance, while vibration adversely affected both dimensions of the tracking task. On both horizontal and vertical tracking, vibration combined with 60 dB noise produced greater impairment than vibration combined with 100 dB noise. These results parallel previous findings from studies of combined noise, heat and vibration, and give support to a subtractive interaction interpretation of the combined effects of noise and vibration on human tracking performance. (Author)

HYPERBARIC MEDICINE

17. Hyperoxygenation: A Central Nervous System Activator? E. A. JACOBS, H. J. ALVIS and S. M. SMALL. *J. Geriatric Psychiatry*. Vol. 5, 1972, P 107-136.

Experiments demonstrating that intermittent hyperoxygenation can increase cognitive functioning in aged individuals with organic brain syndrome associated with generalised and cerebral arteriosclerosis have been conducted with 52 elderly patients (51 men, 1 woman). These patients were divided into four groups of 13: patients in Group I were given their psychological test evaluation 24 hours after their final (thirtieth) exposure to the hyperbaric chamber, patients in Group II were tested 72 hours later, Group III patients 1 week later, and Group IV patients 10 days after their final hyperbaric exposure. The mean age of the 52 subjects was 70 years

Each patient was given two 90-minute treatments daily for 15 consecutive days at 2.5 atmospheres absolute in a hyperbaric chamber. Subjects breathed 99 to 100 per cent oxygen from a cryogenic source. The chamber was pressurized with compressed air, and the inspired oxygenwas delivered by an oronasal mask which operated by a demand valve.

The psychological measures used to determine the pre- and post-treatment levels of cognitive functioning showed a post-hyperoxygenation improvement which persisted significantly beyond the levels expected merely as the result of increased arterial oxygen tension levels. They also showed the predicted fall-off curve in the post-test means of the four groups, which were tested at increasing intervals of time following the cessation of hyperbaric exposures. The psychological tests employed were the Wechsler Memory Scale, Bender—Gestalt Memory Phase and Tien's Organic Integrity Test. The Stockton Geriatric Rating Scales, completed by nursing personnel, showed lessening physical disability, apathy, communication failure and socially irritating behaviour. An analysis of cerebral spinal fluid for pre and post-treatment measures of PO2, PCO2, lactate and pyruvate showing a general pre to post-treatment rise in all measures, with lactate showing the strongest increase. There was a trend toward a decrease in total serum copper levels in the blood in response to hyperoxygenation. Blood gas analysis of successive arterial samples under hyperbaric conditions showed a marked increase in arterial PO_2 levels in a wide patient population. However, the 52 organic brain syndrome patients did not reach their mean peak of increase until they had been breathing 100% oxygen for 60 to 80 minutes, whereas 20 other patients with non-organic syndromes reached this peak within the first 30 minutes.

Nineteen of 23 patients whose pre-treatment EEGs were characterized as abnormal because of slow diffuse waves showed improved post-treatment EEGs. The records of four patients were judged to have deteriorated, but these patients shared a history of chronic alcoholism in addition to their cerebral arteriosclerosis. These findings will hopefully stimulate investigation of the possible range of effectiveness and probable limitations of the technique of hyperoxygenation.

18. Sensitivity of the Brain to Repeated Exposures of Hyperbaric Oxygen. S. LAVY, H. SHOHAM and D. HAREL. *Aerospace Med.* Vol. 44, March 1973, P. 254-255. 14 refs.

A preliminary study investigating the susceptibility of rats to repetitive daily exposures to HOP was carried out. When the first electrical discharge is used as an early sign of oxygen toxicity, the latency of its appearance remains unchanged and it can be assumed that the animals suffered no permanent brain damage. This finding does not support the previous reports that repetitive exposures increase susceptibility to oxygen poisoning. (Author)

MEDICINE

19. Discriminant Value of Thyroid Function Tests. D. B. BARNETT et al. *British Medical Journal* 1973, 2, P. 144-147.

Different thyroid function tests permitted a final classification of 204 consecutive patients with suspected thyroid disorders into three populations (thyrotoxic, euthyroid and hypothyroid). Linear discriminant analysis was applied to all test results (10 variates) on adjacent population pairs. Two in vitro tests (serum protein bound iodine (P.B.I.) and tri-iodothyronine (T-3) uptake values) gave good separation of thyrotoxic from euthyroid patients and fairly good distinction of hypothyroid patients. If a ^{131}I uptake figure was then added to the in-vitro results most patients (95.5%) including the initially classified as equivocal, were correctly diagnosed. Other tests, including clinical questionnaires, were poor discriminants.

Two new techniques of utilizing the test data were devised. Firstly, the data from the two in-vitro tests were also displayed graphically, and oblique boundary lines derived from the discriminant functions gave better separation of patients than previously used limits or mathematical expressions of "free thyroxine". Secondly, a nomogram incorporating the best four discriminants was designed as a diagnostic aid and proved to be the best means of interpreting the tests.

Discriminant analysis of this kind can be used in the interpretation of diagnostic tests in any branch of medicine, and it allows the best use to be made of the available data. (Author).

20. Role of the Sympathetic Nervous System in Supporting Cardiac Function in Essential Arterial Hypertension. M. Guazzi, F. Magrini, C. Fiorentini and A. Polese. *British Heart Journal*. Vol. 35, 1973, P. 55—64.

Treatment of hypertension with sympathetic blocking agents may convert latent cardiac failure into overt failure. Detection of early cardiac insufficiency is desirable.

Thirty patients with essential hypertension without history or symptoms of circulatory decompensation were investigated. According to the changes induced by digitalis on the left ventricular mean rates of systolic ejection and isovolumic pressure development, they were divided into 2 groups: group I (non-responders), and group II (responders to digitalis). Seventeen (11 randomly selected from group I, and 6 from group II) had treatment with reserpine and guanethidine. Despite the hypotensive response, all from group II developed, in about two weeks, obvious clinical and haemodynamic signs of left ventricular impairment, while the 11 from group I maintained unchanged cardiac performance. Some of the patients were treated with a diuretic as well as the antihypertensives.

The response of mean systolic ejection rates and isovolumic pressure development to digitalis seems a reliable test in estimating the degree of cardiac reserve and in predicting whether the antiadrenergic therapy is liable to induce decompensation.

No signs of failure appeared in the patients (11 from group I and 2 from group II) who were treated with the diuretic combined with antiadrenergic drugs. This combination restored to pretreatment levels the parameters of myocardial function which were disturbed by the administration of the antiadrenergic drugs alone.

The different effects of chronic and acute administration of antiadrenergic agents on the function of the failing hypertensive heart, and the favourable action of the diuretic, are discussed. (Author)

21. Prevalence of Three Cardinal Risk Factors in a Random Sample of Men and in Patients with Ischaemic Heart Disease. T. B. S. Dick and M. C. Stone. *British Heart Journal*. Vol. 35, 1973, P. 381-385.

A 1 in 2 Sample taken from a general practice of 2,800 was studied to ascertain the prevalence of hyperlipidaemia, hypertension, and smoking, all shown by prospective studies to be risk factors in coronary disease. A lipoprotein analysis by membrane filtration and nephelometry was performed on all subjects. The male subjects of this sample from the age group 30 to 69 years have been compared with a group of patients with known ischaemic

heart disease, matched for age and sex and investigated in an identical way. The prevalance of all three factors was greater in the ischaemic heart disease group but was statistically significant for hyperlipidaemia and smoking only. The prevalence of risk factors taken in isolation or in combination when uninfluenced by the factors is shown. The prevalence of the combination of hyperlipoproteinaemia and hypertension when they are uninfluenced by smoking shows no correlation with ischaemic heart disease. When smoking is added to either hypertension or hyperlipoproteinaemia there is a significant relation with ischaemic heart disease. Smoking appears to be an important factor for its additive or synergistic effect. (Author)

22. Chlorthalidone in the Treatment of Angina Pectoris. C. B. FLOYD and J. G. DOMENET. *The Practitioner* Vol. 210, Apr 1973.

A patient of Angina Pectoris had dyspnoea of cardiac origin for which chlorthalidone was given. It was interesting to know that he was relieved of anginal symptoms also. Therefore, a study was undertaken with double blind trial conducted on nine patients, who were having regular 3 attacks a day minimum. The dose of chlorthalidone given was 50 mgm daily and patients were not allowed to take any anti-anginal medication except for therapeutic nitroglycerine.

It appears that chlorthalidone is effective in reducing the frequency of anginal attacks and the consumption of nitroglycerine tablets, the evidence presented does not suggest that this effect is due either to its hypotensive action or to the removal of subclinical amounts of oedema of sufficient magnitude to be detected by changes in body weight. Study did not indicate the possible mechanism. The paradoxical result noted in one case of nocturnal angina might provide a lead, this was the only patient who showed significantly worst results while on chlorthalidone, but he was also receiving Beta receptor blocking agents. In seven cases out of nine, this therapy showed significant improvement.

NEUROPSYCHIATRY

23. Psychiatric Sequelae of Minor Head injury. H. MERSKEY and J. M. WOODFORDE. *Brain* Vol. 95, 1972, P. 521-528.

The results are reported of a follow-up of 27 Psychiatric patients whose illnesses followed a minor head injury. In 10 cases (5 men and 5 women) no financial compensation had been sought and in 17 cases (13 men and 4 women) a claim for damages had been settled. At the time of follow-up symptoms had lasted for a median period of four years from the accident with a range of six months to fourteen years. After settlement in those with a claim, symptoms had persisted for a median period of one year to the time of follow-up.

At follow-up 10 of the whole series showed little or no improvement, 8 were moderately improved and 9 were much improved or recovered. The proportions improved or otherwise were similar in both groups. Despite the award of damages patients tended to be poorer as a result of their accident. After the accident 5 patients became unemployed and 6 were lower in their occupational status.

In accordance with neuropathological evidence in the literature it is considered that in many instances the post-concussional syndrome may have an organic basis without neurological signs or psychometric changes. It is suggested that the depression associated with it may also, in part, have a basis in brain damage. (Author)

24. Drug Abuse in Viet Nam. J. CHAR. *American Journal of Psychiatry*. Vol. 129 (4), Oct 1972, P. 463.

The author studied patterns of drug abuse in Viet Nam among three groups of enlisted men-those finishing a 12 month tour, those who had been psychiatric outpatients, and new arrivals. Among those in the first two groups using hard drugs and/or marijuana, a majority used hard drugs. Of the men using drugs in the first two groups, 34 percent began doing so in Viet Nam, while 58 percent of the men using drugs in all three groups began as civilians before

entering the military. The implications of these findings are discussed in terms of the military and of society.

25. Drug Flashbacks : Reported Frequency in a Military Population. M. D. STANTON and A. BANDORI, *The American Journal of Psychiatry*. Vol. 129 (6), Dec. 1972, P. 751.

An anonymous drug questionnaire was administered to 2,256 men enlisted in the Army who were either entering or leaving Viet Nam The percentage of respondents who reported flash backs arising from the use of "acid" (LSD and STP) was 23 percent: amphitamines, five percent: and marijuana, one percent. The majority of men attributing flashbacks to drugs other than acid had also used acid. No relationship was found between reports of flashbacks and frequency of acid use, exposure to a combat zone, or birth order.

26. Patterns of Drug Abuse Among Military Inductees. J. P. CALLAN and C. D. PATTERSON. *The American Journal of Psychiatry*. Vol. 135 (3), March 1973, P. 260.

A questionnaire concerning drug abuse was administered to 19,948 new military inductees over a six-month period. Almost one-third of the subjects had used drugs, but most were casual users. Marijuana and hashish were most frequently used. There were higher rates of use among college dropouts and men from unstable families, urban areas, and families with high incomes. There was little racial difference in overall drug use. However, non-whites used amphitamines, barbiturates, and heroin twice as much as whites while whites tended to use marijuana, hashish, and hallucinogens.

27. Use of Alcohol by Addict and Nonaddict Populations. B. S. BROWN, N. J. KOZEL, M. B. MEYERS and R. L. DUPONT. *The American Journal of Psychiatry*, Vol. 130 (5), May 1973, P. 599.

The authors studied the use of alcohol by a sample of narcotics addicts (N=140) and by a sample of nonaddict nonalcoholics (N=100) They found that the addicts' use of alcohol prior to their use of heroin significantly exceeded that of the normal sample. However, the addicts' use of alcohol decreased as they became involved with heroin and did not increase during treatment.

OPHTHALMOLOGY

28. Solar Retinopathy from Sun Gazing Under Influence of LSD. H. SCHARTZ and F. MENDELBLATT. *British Journal of Ophthalmology*. Vol. 57 (4), April 1973.

Solar retinopathy is a condition that results from focussing the eyes on Sun and usually follows independent viewing of solar eclipse. It is common in anti-aircraft lookouts and sunbathers, and now-a-days in patients under influence of L.S.D It may also follow indirect or reflected sunlight injury, from water or desert sand. The usual complaints are decreased or foggy vision, central scotoma, metamorphopsia, chromatopsia and headache.

Initial ophthalmoscopic picture varies from no change to marked macular oedema In 1-2 weeks period oedema is replaced by pigmentation, of mottled pattern, and/or small, red, depressed lesion of the fovea (hole in the retina). Later eccentric fixation and small minute scotomas may remain even after few months.

The lesion results from thermal effect of long visible and infra Red rays of the sun. Less than a minute of direct focus of the sunrays on macula, is all that is required to produce the lesion. Longer duration of exposure leads to severe effects as said earlier. No devices—such as sunglasses, filters, dark photographic films etc. are available that can adequately protect the retina LSD produces heightened degree of awareness of usual imagery which makes the LSD users to be attracted to bright and colourful objects, with the sense of added appreciation of what is perceived and LSD dilates the pupils which results in higher concentration of light energy being delivered to macula.

OTOLARYNGOLOGY

29. Aeromedical Considerations in the Management of Paranasal Sinus Barotrauma.

J. P. Smith and D. E. Furry. *Aerospace Med.* Vol. 43, Sept 1972, P. 1031—1033. 10 refs.

In a retrospective study of the occurrence of sinus barotrauma in personnel undergoing training in altitude chambers over a 10-year period, the overall incidence rate was found to be 1.16%. Of these 1.21% occurred at simulated altitudes of 30,000 feet and 1 14% at 43,000 feet, Clinical findings on 29 persons found to suffer sinus barotrauma during a recent 6-month study at the Naval Aerospace Medical Institute are presented. Radiological studies on 18 of the 29 showed significant pathological changes. Symptoms of frontal sinusitis were seen in 25 and of maxillary sinusitis in 4.

Radiographic evaluation facilitates the diagnosis, and the use of hypobaric test procedures is of value in determining the time-course for restoration to full flight status in patients with paranasal sinus pathology.

39. Frontal Sinus Hematomas in Aerospace Medicine. R. S. Green and B. Weissman. *Aerospace Med.* Vol. 44, Feb 1973, P. 205—209

Aerosinusitis and frontal sinus hematomas in aviators continue to be a cause of lost flying time and should be of medical concern among flight surgeons and otolaryngology consultants to flying programs. The frontal sinuses are most frequently involved in aerosinusitis and hematoma formation due to their anatomical course and the many factors which can block their opening into the nasal cavity. The clinical picture of sudden acute frontal pain when descending from lesser to greater barometric pressure with a frontal sinus opacity on x-ray is a hematoma until proven otherwise. Suggested regimen of therapy is antibiotics, decongestants, rest for two to three weeks. No improvement in symptoms or x-ray evidence of increasing sinus disease is a situation which calls for surgical consideration. An altitude chamber flight should follow any therapeutic regimen before returning flier to flying status. The frontal sinus trephine procedure has little morbidity and in most cases is sufficient to remove the obstructing material and allow the nasofrontal ducts to again drain naturally the frontal sinuses. Series of 12 aviators who had come to surgery with frontal sinus heamatomas were studied. Most has pre-existing upper respiratory tract infections of allergies, and all flew high performance jet aircraft in an area of similar environment. (Author)

31. An Unusual Form of Alerting Mechanism In Electronystagmography. J. D. Smith· B. F. Mc Cabe and R. F. Ulrich. *The Annals of Otology, Rhinology and Laryngology.* Vol. 81, 1973, P. 49—52.

Electronystagmography (ENG) has become a useful clinical tool in the diagnosis of vestibular problems. The interpretation of the ENG record must be done carefully as it may be easily over or under interpreted.

A case of perilabyrinthitis with an unusual form of nystagmus alerting mechanism is presented. No nystagmus was recorded on the ENG with ice water Caloric or positional tests until light pressure was applied to the globes When pressure was applied the patient had latent nystagmus and normal nystagmus from ice water calorics.

Patients who are found to have a decreased or absent response to caloric or positional testing with the usual alerting mechanism may, of global digital compression, manifest nystagmus as recorded by ENG. This form of alerting is one which has not been previously described and should be kept in mind when evaluating patients with vestibular problems. (Editor)

32. Sudden Deafness and Labyrinthine Window Ruptures. Victor Goodhill et al. *The Annals of Otology, Rhinology and Laryngology.* Vol. 82, 1973, P. 2—12.

Twenty-one cases of sudden profound cochlear deafness cases were studied. The oldest patient was sixtytwo years and the youngest 11 years of age. Differential audiological studies showed profound losses in all cases. Almost every case was studied by pure tone AC, BC and

speech audiometry, Bekesy and impedance tests. Vestibular function was studied by E.N.G. A total of twentyone cases has been surgically explored so far. In fifteen instances fistulae of round, oval or both windows were encountered and repaired. In 10 out of 15 there were definite history of sudden exertion or trauma prior to onset. The oval window alone was ruptured in nine patients, the round window alone in one, and both windows ruptured in five patients. Surgical repair of ruptured window membranes were followed by improvement in some cases. As such sudden deafnesses are reported in trained naval divers. It is felt that rupture of oval window annular ligament or rupture of a round window membrane should be kept in mind in cases where a diver or a person in H.B.O therapy chamber develops sudden perceptive hearing loss.

33. Patients with Bilateral Loss of Caloric Response. F. B. SIMMONS. *The Annals of Otology, Rhinology and Laryngology.* Vol. 82, 1973, P. 175—178.

Forty three of 2500 consecutive E. N. G. monitored caloric induced nystagmus examinations gave no response to 5 c c of ice water in either ear. Among these nine had CNS neoplasms, of which six were in the midline posterior fossa, six had autoimmune or collagen disease, six were caused by infections (meningitis, otitis, syphilis), five were congenital involving only the ear, five were drug induced, four had combined visual and eight nerve hereditary disorders. Infection excepted, hearing losses were an irregular associated finding in roughly 50% and were less common in the CNS and systemic disease categories. Neither clinical symptoms nor other E N G findings were good predictors for finding no response to caloric tests. (Author)

34. Arterial Baroreceptor Fibers in the Recurrent Laryngeal Nerve. S. G. STRAUSS, H. FUKUDA and J. A. KIRCHNER. *The Annals of Otology, Rhinology and Laryngology.* Vol. 82, 1973, P. 228—234.

Stimulation of the larynx, as during intubation, can produce significant cardiac arrhythmias. Investigation of the cause of these arrhythmias has led us to believe that they are in part due to stimulation of a baroreceptor reflex pathway which passes through the larynx rather than to initiation of a simple reflex in the larynx itself. Pressure sensors (baroreceptors) in the aortic arch form part of a system which monitors systemic blood pressure. Stimulation of these baroreceptors produces, via a medullary reflex arc, a slowing of the heart rate a, decrease in sympathetic vascular tone, and as a result a drop in blood pressure. The pathway from the aortic arch baroreceptors has heretofore been thought to run directly through the vagus nerve. We have shown, however, that in the rat a significant number of fibers from aortic arch baroreceptors run in the left recurrent laryngeal nerve (RLN), through the larynx into the left superior laryngeal nerve (SLN), and only then into the vagus. Blocking or cutting the left RLN produces a significant drop in overall baroreceptor reflex activity, and furthermore, nerve fibers have been isolated in the left RLN which show exactly the same patterns of discharge and those from arterial baroreceptors elsewhere. It is our belief that at least some of the arrhythmias produced during laryngeal manipulation can be explained on the basis of mechanical compression producing stimulation of the baroreceptor fibers as they pass along the thyroid cartilage through the ramus communicans between the RLN and SLN. Further work needs to be done to show that compression does in fact stimulate the baroreceptor pathway, but there is now little doubt that, in experimental animals, such a pathway exists. (Editor)