the personnel in charge of the Aviation Corps, as is evidenced by the exhaustive and thorough eye examination to which every applicant of the Flying Corps is now and always has been subjected.

Summing up, the status of the Bárány tests from the standpoint of the aviator amounts to this: The internal ear and its intracranial pathways have for their sole function equilibration and orientation; therefore, this mechanism is a most important unit in the entire "equilibrium complex" of an individual. Since perfect equilibratory function is so important to the aviator, common prudence would suggest that each one of the mechanisms concerned in this function be carefully examined. The internal ear mechanism receives particular attention since it is peculiarly adapted for sensing motion and secondarily, position. It is examined in the turning chair, in which different portions of the mechanism are tested. We start with the assumption that a normal mechanism will produce normal responses. These normal responses are (1) nystagmus of a certain type and duration, and (2) vertigo of a certain duration which is made manifest to the examiner objectively by past-pointing and falling. When turning in the chair fails to produce normal nystagmus, vertigo, past-pointing and falling, it is assumed that there must be a definite reason for it. It is not considered that "it just happened so," but is looked on as due to an impairment of the inner ear or of its intracranial pathways. Such a person would therefore start with a handicap and is disqualified.

The otologists of this country have rendered our government a distinct service by pointing out the importance of the vestibular apparatus in aviation. The ability to simplify and standardize the tests, so that large numbers of applicants can be easily examined, added largely to the feasibility of such an examination and should redound to their credit. It is to be regretted, therefore, that doubt and mistrust should be sown throughout the profession at large solely because of a lack of a thorough understanding of the subject.

LEWIS FISHER, M.D., Philadelphia.

To the Editor:—In his article on "Visual Factors in Equilibration, Especially Aviation" (THE JOURNAL, April 6, 1918, p. 991), it is apparent that Dr. Fridenberg has been under a misapprehension as to the character and scope of the physical examination of applicants for flying service. Let me first recommend that he secure Blank 609, A. G. O., which is the physical examination blank for these applicants. He will at once be struck by the fact that of the thirty-two items of this examination, the first twelve are solely concerned with a complete examination of the eye. On the other hand, he will be equally struck with the fact that only one item (No. 20) deals in any way with the internal ear balance mechanism. This, I think, will give him a different attitude toward the ideas of those concerned in the examination of applicants for this service, and will go far to reshape the impulse which prompted him to say, "It has generally been assumed that a normal labyrinth is the sine qua non and the only essential for equilibration."

It will also assure him that as far as concerns his views expressed immediately following this quotation, they are entirely in accord with the views of the Chief Surgeon of the Aviation Section, namely, "this would be a very one-sided point of view, and that there exist other important factors of equilibrium which should not be overlooked." His statement that the "visual factors particularly have been overlooked" is only indicative of his having been misinformed as to the scope of the examination. The same comment applies to the sentence immediately following, in which he warns against neglecting "other factors in balance and vertigo," etc.

In stating that the "labyrinthine tests refer, naturally, to rotational vertigo alone," and then proceeding to call attention to the fallacy of the "view that all vertigo is rotational and therefore labyrinthine," he evidences a most unfortunate misapprehension of the otologic concept underlying the vestibular test. This is so simple that its soundness seems difficult to question. It is conceived that the individual selected to undergo special training as an aviator should be determined to possess normal physical equipment; his bones and

muscles, cardiovascular, respiratory and gastro-intestinal apparatus should be normal; his intracranial and special sense equipment should be normal. One of the special senses to be subjected to scrutiny in this examination is the vestibular sense, the sole special function of which is perception of motion. We are in possession of information concerning the normal responses to tests of this special sense, and exactly so far as we are able to conduct such tests should we see to it that this special sense of motion perception should show as nearly a normal acuity as the special sense of light perception, which is required to show 20/20 visual acuity.

One of the means of ascertaining that normal acuity of vestibular perception is present is the rotating chair. In subjecting this motion-perceiving special sense to its normal stimulus, namely, motion, it was determined to be most practical to apply this stimulus by means of a rotating chair, as the application of motion in a linear direction, for the period of time and in the intensity necessary to elicit certain responses to a standard stimulus, would necessitate apparatus entirely too bulky to be susceptible of practical application under ordinary conditions of office examination. By making use of a rotational motion stimulus instead of a linear motion stimulus, it was possible to work out a standard means of applying a motion stimulus in certain definite quality and quantity in a manner, and by means of an apparatus, easily handled in an office. For this reason, the subject of the tests of the vestibular apparatus is made to experience rotational vertigo. The definition of this vertigo is "the sensing of motion not in accord with fact." In other words, stimulation of the end-organ of this apparatus is set up, and lasts for a certain standard length of time in the normal; during the continuation of the stimulus, if the sensing apparatus is intact, the subjective appreciation of the stimulus continues; since the subjective appreciation in the normal is both quantitative and qualitative, and since the form of stimulus has been rotation, the consequent subjective perception is a rotational motion, or is rotational vertigo.

Dr. Yandell Henderson, professor of physiology at Yale University, described to me a similar test of his vestibular apparatus which he underwent unexpectedly during an inspection trip in a deep mine in Yorkshire, England, in company with Professor Haldane and some others. They were subjected to a very rapid ascent, in an elevator, vertically upward for a considerable period of time, after which he experienced a disquietingly convincing sensation of falling vertically downward; whereas in reality his vertically upward trip was continuing, but at a markedly slower rate of speed, as he learned afterward to his relief. This is exactly the kind of test to which a man is subjected in the rotating chairs, except that the character of motion stimulating the vestibular end-organs was in this instance linear motion rather than rotational motion. Just as following the rotation to the right, during the period of the consequent stimulus of the vestibular apparatus, the subject experiences the sensation of motion of the same character, namely, rotational, but in the reverse direction, or to the left, so Dr. Henderson experienced, after an intense stimulus of linear motion in a vertical direction upward, the natural reactionary sensation of linear motion rather than rotational, and in the opposite direction, or downward. I hope I have made it clear that the only object of testing a man in a rotating chair is to determine the degree of accuracy of his perception of motion, both qualitative and quantitative, and that the matter of inducing rotational vertigo is purely incidental to the use of the rotating chair, as it constitutes the most practical and convenient form of motion-producing apparatus for tests of this kind.

In referring to labyrinthine diseases, Dr. Fridenberg gives evidence of having failed to take into account that type of disease which is far more common and of more practical importance in connection with the subject in hand than the suppurative or infectious type of labyrinthitis, namely, the toxic type. I need only to refer, in this connection, to a few of the case reports which we have of applicants determined to possess normal vestibular acuity of motion perception at the time of their admission into the service, and who later on developed mumps, with secondary specific eighth nerve

involvement, after the subsidence of which they showed a marked impairment of their acuity of motion perception.

I do not understand exactly how Dr. Fridenberg feels so certain that the possessors of dead labyrinths are not apt to try to fly, unless it be on the *a priori* grounds that the function abrogated in them is of considerable importance in flying. If I am correct in conceiving that he senses this importance of this function, it only goes to show that we, after all, are in accord in regard to the matter of appreciating the importance of the vestibular function to the aviator. I feel, indeed, that we are, because of what he proceeds to say, "In the first place, such defective labyrinths would have been detected in the course of instruction over the aviation field, or, at least, during the first trial flights." This statement could not have been made by a man who was not thoroughly in accord with the belief that the labyrinthine function is of great importance to the flier.

It is gratifying to note that his ideas concerning the possibility of explaining falls in flying machines coincide with those of the Chief Surgeon's Staff, as proved by his mention of other factors, such as the "effects of altitude and temperature on normal but susceptible organisms . . . and including, besides, cardiac syncope, embarrassed respiration or circulation, and panic fear." So much importance is laid on the possibility of these factors impairing the efficiency of the aviator in flying, that special cardiovascular, psychologic and physiologic departments have been established in the Medical Research Laboratory for the study of conditions which may constitute underlying factors in the development of these forms of danger to the flier.

In further mentioning the details of conditions which may give rise to vertigo and consequent loss of control solely attributable to visual perception—"viewing objects in rapid or irregular motion, such as storm driven clouds, waves, masses of water tumbling over a fall or pouring through a flume . . . irregular illumination and motion of objects alone . . . the common or field variety of 'movie' headache and dizziness . . . a swinging mirror," he again evidences being in complete accord with the views of the chief surgeon and his staff in perceiving the possibility of the aviator suffering disaster attributable to misinformation from visual illusions or unusual stimulations. In this connection, he has laid himself open to the charge of being inconsistent, however, since his article intones the importance and reliability of visual information concerning orientation of oneself in the air without sounding a note of warning against the ever present possibility of being brought to disaster by visual illusion or misinformation, and in the same article he states that "normal labyrinths merely supply the possibility of vertigo and false sensations of direction and space." It is equally true of all the special senses that sensory illusion and misinformation are always possibilities, and cognizance of the conditions apt to result in such illusions and misinformations should be very carefully taken in the effort to safeguard the aviator as fully as possible. It is manifestly as absurd to say "normal labyrinths merely supply the possibility of vertigo [which is only the sensing of motion not in accord with fact] and false sensations of direction and space," and that "one might even venture the paradox that the safest aviators would be those with dead labyrinths," as it would be to call attention to what he has just mentioned previous to this statement of the possibility of normal eyes being the medium of bringing to their possessor illusions or misinformation only, and to proceed with the observation that therefore the safest aviators would be those lacking eyes. It is unnecessary for him to assure me that this is not his thought, and I beg him to forgive me for even alluding to it; but I felt that it was worthy of mention in passing, since he had opened the subject, as quoted.

He asks the question, "Just how much of a handicap is a dead labyrinth for accurate and delicate balancing?"

I am fortunately in position to answer that question in this way: A series of examinations of the functional activities of the labyrinths of whirling dancers, head balancers, equilibrists, tight and slack wire performers, and various other circus and vaudeville stunt performers has

been made by numerous observers, and findings in these examinations are on record in the Medical Research Laboratory. In each case, these artists were found to be possessed of full normal vestibular acuity. It seems unnecessary to attempt to adduce arguments in favor of the desirability of the aviator, the whirling dancer, the equilibrist, and the like, possessing at least approximately normal sense organ equipment of the four special senses cooperating to furnish man with information concerning motion. It is difficult to decide which, if any, could be dispensed with without leaving him less adequately equipped to indulge in such delicate and accurate motor coordinations as are necessary to the successful execution of flying, balancing stunts and whirling dances.

I feel very strongly that Dr. Fridenberg's statement that "the body position is brought into correspondence with a *visually* sensed standard, in this case a vertical line," and that "if the standard chosen is false, if the line is not exactly vertical, error will be manifested," is not entirely correct. It is my profound conviction, and I find that it is also the conviction of others with whom I have discussed this point, that the correlation of all incoming information in the sensory and psychic sensoria of normal man would result in the discovery that the vertical visual sense standard was false, through the intermediation of deep sensibility sensing the direction of the pull of gravity, which would result in the normal individual being made aware of the falsity of the visually selected vertical standard by reason of its failure to be in accord with the deep sensibility information as to the direction of the pull of gravity, which is always vertically downward; and that subconscious correction would be made and error thus not be manifested, but avoided.

Among the subjects occupying the special attention of the Medical Research Board, in connection with the study of the physical welfare of the flier, is the special sense of deep sensibility, and the associated voluntary and involuntary motor coordinations and control of the body in accord with afferent impulses from this tract. Recognition was accorded long ago to the fact that this sense plays an important part in the execution of body movements and controls incidental to maintaining balance. In observing that "these factors . . . have been almost entirely neglected in favor of a one sided and exclusive attribution to the labyrinth of balance control functions," it is again apparent that we are in accord concerning our conception of the importance of things in general, and that Dr. Fridenberg is again the victim of unfortunate misinformation as to the scope of the work of the medical examiner of the Aviation Service (compare Tests 19 and 21, Blank 609, A. G. O.).

Particularly apropos is his quotation of the letter from an American aviator in France, describing his own sensations in flight when unable to see, and dependent on his labyrinthine balance sense:

While in the air at about 700 meters, some low hanging clouds blew down, enveloping me completely, and likewise losing me completely. For a half hour I wandered around vainly trying to get my bearings. . . . When you get into very thick clouds, it is impossible to tell whether you are in *ligne de vol*, that is, flying level, for there is no horizon visible to gaze by. Frequently, an aviator will come out into clear space and find himself on the verge of a wing slip.

I cannot conceive any more convincing proof of the practical value of the service of the labyrinth and deep sensibility tracts than that contained in this quotation. This man was certainly deprived of any useful information coming along his visual tract during the time that he was utterly unable to see anything on account of the cloud. Yet, for half an hour he was able to wander around without meeting disaster, during which period he was thrown solely on the guidance of his balance senses. He certainly could not see, taste, smell or hear, or by touch feel where he was or in what position with relation to the pull of gravity he was, yet for half an hour some special sense succeeded in guiding him so safely that he avoided disaster. This seems to be eloquent testimony as to the practical value of normal balance senses.

Once more I find that Dr. Fridenberg and I are in accord concerning ideas as to visual requirements in his last paragraph. The question of hypersensitiveness to bright light,

sharpness of the sense of motion, especially at the periphery of the retina, photometric variations within normal limits, and a variety of other special examinations of the visual function are in process of study, and standards for the aviation service are being developed at the Medical Research Laboratory.

EUGENE R. LEWIS, M.D., Mineola, L. I., N. Y.
Major, M. R. C., U. S. Army.

UNFAVORABLE SALVARSAN REPORTS—VERBOTEN

To the Editor:—I sub tend a copy of a letter received day before yesterday. The letter is written on the stationery of O'Gorman, Battle & Vandiver, Attorneys and Counselors at Law, 37 Wall St., New York City:

May 22, 1918.

James C. Sargent, M.D.
Room 838, Wells Bldg.,
Milwaukee, Wis.

Sir:—We represent Mr. Herman A. Metz, President of the Farbwerke-Hoechst Co., distributors, under Federal License, of Salvarsan,

Mr. Metz directs us to call your attention to an article published over your signature in THE JOURNAL of the American Medical Association in its issue of March 30, 1918.

Mr. Metz directs us to inform you that the publication of this article and the statements therein were seriously damaging to the Farbwerke-Hoechst Co., and directs us to say further to you that he and the Corporation will hold you personally responsible for any repetition, oral or written, of the same or similar statements to the same effect.

He directs us to say further to you that the lot of Salvarsan received by you from the Farbwerke-Hoechst Company was tested before being sent you by Prof. Gies, by the United States Public Health Service and clinically in a New York hospital, and after the publication of your article ampules from the same lot were re-tested by the same parties and reported satisfactory, and that practically every physician who received some from the same lot made no adverse reports thereon.

Very truly yours,
(Signed) O'GORMAN, BATTLE & VANDIVER.

This I take to be a rather peculiar attempt at the solution of a scientific problem.

JAMES C. SARGENT, M.D., Milwaukee, Wis.

[EDITORIAL COMMENT:—A brief scientific article appeared in THE JOURNAL of March 30, 1918, by Dr. J. C. Sargent entitled "Toxicity of the American-made Arsphenamin (Salvarsan)." The article recorded untoward results following the injection of some Salvarsan made in New York by the former representative of the Farbwerke-Hoechst Co. of Germany. Dr. Sargent now receives the letter reproduced above. This attempt on the part of the Farbwerke-Hoechst Co. to control a scientific discussion of pharmacologic facts by intimidating physicians who would report facts that happen to be unfavorable to the product in which that concern has a proprietary interest will, doubtless, be appraised by American physicians at its face value. Possibly the Farbwerke-Hoechst Co. hold the Teutonic opinion that "Yankees" are "idiotic." They will find, however, that American physicians cannot be bulldozed into silence regarding the untoward effects of a proprietary remedy, even if that remedy did originate in Germany.]

Alcohol and Work.—Alcohol gives a sham sensation of added force and in reality decreases the ability to do work. Alcohol is the greatest cause of misery in the world, and as Cushny has put it, if alcohol had been a new synthetic drug introduced from Germany, its importation would long since have been forbidden. On the other hand, good beer makes poor food taste well. It also frequently leads to overeating. The cure for bad food is to have our daughters taught how to cook a decent meal. After that we can talk about prohibition. —Lusk, Food in War Time.

Medical Education and State Boards of Registration

COMING EXAMINATIONS

ALABAMA: Montgomery, July 9. Chairman, Dr. S. W. Welch, State Capital, Montgomery.
ARIZONA: Phoenix, July 2. Sec., Dr. Allen H. Williams, 219 Goodrich Bldg., Phoenix.
CALIFORNIA: San Francisco, June 25. Sec., Dr. C. B. Pinkham, State Capitol, Sacramento.
COLORADO: Denver, July 2. Sec., Dr. D. A. Strickler, 612 Empire Bldg., Denver.
CONNECTICUT: New Haven, July 9-10. Sec. Regular Bd., Dr. Chas. A. Tuttle, 196 York St., New Haven; Sec. Eclectic Bd., Dr. J. E. Hair, 728 State St., Bridgeport; Sec. Homeo. Bd., Dr. E. C. M. Hall, 82 Grand Ave., New Haven.
DELAWARE: Wilmington, June 18-20. Sec., Dr. H. W. Briggs, Wilmington, Del.
DISTRICT OF COLUMBIA: Washington, July 9-11. Sec., Dr. E. P. Copeland, The Rockingham, Washington.
FLORIDA: (E): Jacksonville, June 10-11. Sec., Dr. G. A. Munch, Tampa.
FLORIDA (Regular): Jacksonville, June 17-18. Sec., Dr. W. M. Rowlett, 812 Citizens Bk. Bldg., Tampa.
GEORGIA: Atlanta and Augusta, June 4, 5. Sec., Dr. C. T. Nolan, Marietta.
ILLINOIS: Chicago, June 3-7. Mr. F. C. Dodds, Supt. of Registration, Capitol Bldg., Springfield.
INDIANA: Indianapolis, June 13-15. Sec., Dr. W. T. Gott, 84 State House, Indianapolis.
IOWA: Iowa City, June 6-8. Sec., Dr. G. H. Sumner, Capitol Bldg., Des Moines.
KANSAS: Topeka, June 18-19. Sec., Dr. H. A. Dykes, Lebanon.
LOUISIANA: New Orleans, June 6-8. Sec., Dr. E. W. Mahler, 730 Audubon Bldg., New Orleans.
MAINE: Augusta, July 2-3. Sec., Dr. Frank N. Searle, 776 Congress St., Portland.
MARYLAND: Baltimore, June 18-22. Sec., Dr. J. McP. Scott, Hagers-town.
MICHIGAN: Ann Arbor, June 11-13. Sec., Dr. B. D. Harrison, 504 Washington Arcade, Detroit.
MINNESOTA: Minneapolis, June 4-6. Sec., Dr. T. S. McDavitt, 741 Lowry Bldg., St. Paul.
MISSOURI: St. Louis, June 17-19. Sec., Dr. George H. Jones, State House, Jefferson City.
NEBRASKA: Lincoln, June 3-5. Sec., Dr. J. J. Hompes, 612 Sec. Mut. Bldg., Lincoln.
NEW HAMPSHIRE: Concord, June 24-25. Sec., Dr. W. T. Crosby, Manchester.
NEW JERSEY: Trenton, June 18-19. Sec., Dr. Alex. MacAlister, Trenton.
NORTH CAROLINA: Raleigh, June 24-28. Sec., Dr. H. A. Royster, 423 Fayetteville St., Raleigh.
NORTH DAKOTA: Grand Forks, July 2. Sec., Dr. G. M. Williamson, Grand Forks.
OHIO: Columbus, June 4-7. Sec., Dr. H. M. Platter, State House, Columbus.
OKLAHOMA: Oklahoma City, July 9-10. Sec., Dr. J. J. Williams, Weatherford, Okla.
OREGON: Portland, July 2. Sec., Dr. Herbert S. Nichols, 802 Corbett Bldg., Portland.
PENNSYLVANIA: Philadelphia and Pittsburgh, July 9-13. Sec., Dr. N. C. Schaeffer, State Capital, Harrisburg.
RHODE ISLAND: Providence, July 11. Sec., Dr. B. U. Richards, State House, Providence.
SOUTH CAROLINA: Columbia, June 11. Sec., Dr. A. Earle Boozer, 1806 Hampton St., Columbia.
SOUTH DAKOTA: Deadwood, July 9. Sec., Dr. P. B. Jenkins, Waubay.
TENNESSEE: Knoxville, Memphis and Nashville, June 14-15. Sec., Dr. A. B. DeLoach, Exchange Bldg., Memphis.
TEXAS: Austin, June 18-20. Sec., Dr. M. F. Bettencourt, Mart.
UTAH: Salt Lake City, July 1-2. Sec., Dr. G. F. Harding, 407 Templeton Bldg., Salt Lake City.
VERMONT: Burlington, June 10-12. Sec., Dr. W. Scott Nay, Underhill.
VIRGINIA: Richmond, June 18-21. Sec., Dr. J. W. Preston, Roanoke.
WASHINGTON: Tacoma, July 2. Sec., Dr. C. N. Suttner, 415 Old Nat'l Bldg., Spokane.
WEST VIRGINIA: Wheeling, July 9. Health Com., Dr. S. L. Jepson, Masonic Bldg., Charleston.
WISCONSIN: Milwaukee, June 25-27. Sec., Dr. J. M. Dodd, Ashland.

Wyoming February Examination

Dr. H. E. McCollum, secretary of the Wyoming State Board of Medical Examiners, reports the written examination held at Laramie, Feb. 6-8, 1918. The examination covered 10 subjects and included 100 questions. An average of 75 per cent. was required to pass. Of the 5 candidates examined, 4 passed and 1 failed. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent.
Bennett Medical College		(1911)	75.9
University of Nebraska		(1904)	88.5
Ohio State University College of Medicine		(1917)	85.9
Vanderbilt University		(1887)	83.9
Starling Medical College		(1881)	*
* No grade given.			