SOME RESULTS OF COLCHICINE INJECTIONS

INJECTIONS (Peter Gray method) of 0.02 cc of a 0.0001 per cent. solution of colchicine used on developing 24-hour chick embryos have shown the following results: (1) four of 20 injected eggs hatched, two males and two females; the hatched chicks have now reached the age of 9½ months, except for one hen which has been sacrificed for histological studies. (2) The combs and wattles in both sexes are abnormally large, approximately of twice the size of normal chickens. (3) Two of the tail fathers of the roosters have become greatly elongated. (4) The hen kept in the cage with one of the roosters lays non-hatching eggs at the rate of one every two or three days.

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SCIENTIFIC BOOKS

AVIATION MEDICINE

Principles and Practice of Aviation Medicine. By HARRY G. ARMSTRONG, B.S., M.D., Captain, Medical Corps, U. S. Army, and director, The Aeromedical Research Laboratory. 496 pp. Baltimore: Williams and Wilkins Company. 1939. $6.50.

AVIATION is becoming one of the major factors in history. Gunpowder overthrew the feudal system. Steam created the modern industrial civilization. Electricity and the petroleum motor have profoundly altered the conditions of modern life. But not one of these factors has ever, within so brief a period, exhibited a greater power to influence the course of history than has aviation. Even as these words are written, sea power, long the dominant force in international affairs, is challenged by power in the air.

For efficiency and safety in the use of any great discovery or invention two factors are required: perfection of matériel and selection and training of personnel—the machine and the mechanic—the gun and the man behind it. The railroad and the steamboat in their early days caused numerous fatalities, but these means of travel have gradually been improved until now a railroad train and a steamship are almost havens of safety. Modern industry has involved many new health hazards—chiefly those of industrial poisoning—which medical science is now striving to control. In these illustrations the requirements of safety apply more to improvements in the machines and industrial methods than to the human element. Careful selection of personnel is rarely needed. In aviation, however, the balance is the other way. Even when the machines of flight were in their crude beginnings, the crashes and fatalities due to the human element were many times more frequent than those due to mechanical defects and failures. And, as experience has accumulated, the advances in aerial engineering have greatly diminished the hazards of the matériel of flight, while the hazards involved in the personnel—those inherent in the nature of the aviator—have been relatively far less effectively counteracted. Hence the need for the new science of aviation medicine—the physiology of man in the air.

Man is not naturally an aerial animal. In his construction there are, indeed, finely designed instruments, notably the vestibular apparatus and semicircular canals of the ear, which serve his cousins the monkeys admirably in controlling the muscular coordination of long swings and leaps from the limbs of one tree to another. But in the monkey, as in the tumbler of the gymnasium and the trapeze performer of the circus, the individual himself makes the initial movement, which the organ of equilibrium enables him an instant later to meet with a counteracting movement. Not so the aviator. If a movement of the airplane, in which he is passive, swings him in one direction, the stimulus to the inner ear, instead of inducing a righting reaction, may induce a so-called "forced movement," which, instead of leading to recovery of equilibrium, may hurl the plane and himself to destruction.

In the book here under review the chapters (XIV and XV) dealing with "aerial equilibration and orientation" and with "air sickness" have on this account the greatest general interest. It is clearly shown that the two functions of the ear—equilibrium and hearing—are entirely distinct. "Man on the ground maintains himself and orients himself in relation to his environment by means of sensory impressions from his eyes, vestibular apparatus, deep sensibility (muscle, joint and tendon sense), viscera and skin." In the air even vision, the most important of the senses, becomes inaccurate. As the height above the ground increases, the tilt of the plane becomes increasingly difficult to judge. In "blind flight" and at great altitude the pilot must adjust the level of his plane by an artificial horizon—a gyroscope; and must often act directly against what his sensations dictate. The senses of equilibrium and sight are both misleading, and "the messages sent to the brain are false." More reliable, perhaps, are the somatic senses which enable the pilot to "fly by the seat of his pants."

"Airsickness" is essentially the same disorder as seasickness. Persons susceptible to one are susceptible to