

## History of Pilot Physicians in Germany

Viktor Harsch

In December 2021 the German Society of Aviation and Space Medicine (DGLRM) celebrated its 60<sup>th</sup> anniversary. The first President, Heinz von Diringshofen (**Fig. 1**), was a flight surgeon and a pilot physician during World War II.<sup>9</sup> Just before World War I, the Austrian aviation physiologist, Hermann von Schroetter, wrote the credo of the flight surgeons and pilot physicians: "In order to understand the environmental conditions on board high altitude balloons, it is necessary that the medical observer himself be exposed to the zone of ice-clouds."<sup>10</sup>

In 1783, the first manned flight took place when Jean Francois Pilâtre de Rozier and François Laurent, Marquis d'Arlandes, undertook an ascent with a balloon built by the renowned Montgolfier brothers. Only 2 years later, de Rozier became the first victim of an aviation accident. The same year, 1785, the Frenchman Jean Pierre François Blanchard and the American physician John Jeffries crossed the British Channel in a balloon, carrying out meteorological experiments, and reported physiological changes.<sup>11,12</sup>

The development of the hydrogen balloon by the French physicist Jacques Alexandre César Charles allowed greater altitudes to be reached, which raised serious medical problems: during his first ascent on December 1, 1783, Charles reached a height of over 8200 ft (2700 m) and, in doing so, experienced ear pain caused by the pressure change, hypothermia, and the symptoms of mild hypoxia. On September 5, 1862, James Glaisher and Henry Tracey Coxwell ascended to an altitude of over 26,800 ft (8800 m), where they fainted. At a height of 17,200 ft (5640 m) they had already noticed tachycardia, difficulties in breathing, and palpitation. Their lips and hands became cyanotic and they experienced difficulties in reading their instruments.<sup>11</sup>

Applied scientific research in the field of high altitude physiology now gained importance. In his laboratory, the French physiologist Paul Bert undertook a comprehensive investigation of the physiological effects of air pressure, using himself as a subject. His experiments laid the foundation for modern altitude physiology and explained the causes of altitude and decompression sickness.<sup>4</sup> Bert used an altitude chamber in order to study the physiological effects of pressure changes and oxygen deficiency by collecting experimental results up to an altitude of 28,870 ft (8800 m). This chamber was also used by balloonists such as Joseph E. Crocé Spinelli



**Fig. 1.** Heinz von Diringshofen in a Siemens-made Udet-Flamingo in Wuezburg, Bavaria, in the early 1930s.

and H. Theodore Sivel for preparation of their altitude ascents, the first physiological training for airmen.<sup>13</sup>

On July 31, 1901, in Berlin, the meteorologists Arthur Berson and Reinhard Suering were entering the stratosphere by ascending to 32,000 ft (10,500 m) with their balloon "Preussen." While Suering lost consciousness at this altitude, Berson was still able to start the lifesaving descent. After the landing, both scientists reported that after using extra oxygen, the difficulties in breathing and the feeling of fear ceased. However, a leaden fatigue, exhaustion, a weakness to the stomach, and a mild headache continued. Oxygen had been provided through a glass-tube mouthpiece.<sup>3</sup> The physiologist Hermann von Schrötter recommended the use of face-fitting breathing masks to reach greater heights, but also the employment of a hermetically sealed cabin.<sup>10</sup> In physiological flight tests he was also assisted by the physiologist Nathan Zuntz.<sup>8</sup>

In 1912, severe mishaps occurred in 0.5% of all balloon ascents.<sup>5</sup> One of the first documented examples of a pilot physician was an Italian medical officer, Lieutenant Luigi Falchi, who served during 1911 in air operations over Libya. He described pilots "fainting in the air."<sup>7</sup> The importance of "human factors" contributing to flight accidents was recognized and technical improvements and

From Neubrandenburg, Germany.

This feature is coordinated and edited by Mark Campbell, M.D. It is not peer-reviewed. The AsMA History and Archives Committee sponsors the Focus as a forum to introduce and discuss a variety of topics involving all aspects of aerospace medicine history. Please send your submissions and comments via email to: [mcamp@1starnet.com](mailto:mcamp@1starnet.com).

Reprint & Copyright © by the Aerospace Medical Association, Alexandria, VA.  
DOI: <https://doi.org/10.3357/AMHP.6134.2022>

standards for the medical fitness of pilots were established. Ernst Koschel from the Medical Committee of the Scientific Society for Aviation Technology presented extensive guidelines for pilot selection in Germany in 1913. Full implementation into the aviation community in Germany was limited by the war, as the need for student pilots led to the implementation of lower medical standards. In 1916, the Chief of the German Army Field Flight Corps (Chef des Feldflugwesens) created a department of aviation medicine, for which he put Koschel in charge, and introduced a multistaged medical examination of the applicants before the training began.<sup>13</sup>

The first U.S. flight surgeons graduated from the Medical Research Laboratory and School for Flight Surgeons in Hazelhurst, NY, USA, in May 1918.<sup>11</sup> In 1919 the U.S. Army General requested flight surgeons to also undergo flight training.<sup>7</sup> The aim was for the flight surgeon to practice his profession directly within the same environment as the aviators and to possess actual flying experience himself. The flight surgeon Louis Hopewell Bauer released the first civil medical selection criteria in the United States in December 1926. In 1929, the Aeromedical Association was founded and Bauer was elected as its first president.<sup>12</sup>

In 1928, the physiologist Hubertus Strughold held the first aviation medical lecture at Wuerzburg University. It was complemented by experimental flights with several interested students.<sup>3</sup> Heinz von Diringshofen, at the time a medical officer, started his acceleration research in flight tests there.<sup>14</sup> He was the first head of the Luftwaffe's Aeromedical Research Laboratory in Berlin in 1934 and was succeeded by Strughold in 1935. Pilot physician von Diringshofen continued with in-flight research in Jueterbog just south of Berlin.<sup>15</sup> The Flight Test center in Rechlin (Theodor Benzinger) and the German Civil Aviation Association Aeromedical Institute in Berlin-Aslershof (Siegfried Ruff) were also busy with in-flight tests and research led by their directors, who all were pilot physicians.<sup>16,17</sup> In several Aeromedical Evacuation units, pilot physicians were on active duty as commanding flight surgeons. One of these was Erwin A. Lauschner—a future President of the DGLRM.<sup>9,18</sup>

Aviation Medical Examiners of the German Civil Aviation Association were usually also experienced pilots. In 1939 the pilot physician von Diringshofen published a Luftwaffe's Medical Guide for Pilots, which was also translated by the allies for distribution to their flying wings. From 1940 on the Luftwaffe filled their flying squadrons with experienced flight surgeons, many of whom were also pilot physicians.<sup>15</sup>

U.S. flight surgeons who trained as combat pilots in WWII had to resign from the medical corps and became

line officers. After the war, U.S. Air Force (USAF) Surgeon General Harry G. Armstrong advocated returning physicians to the cockpits in order to fully appreciate the associated physiological risks and problems of flight. The official USAF Pilot Physician Program started in 1954 with 25 positions, partly with experienced WWII pilots who had continued in medical studies postwar.<sup>7</sup> In Germany, there were also some pilot physicians in the postwar Armed Forces (Bundeswehr).<sup>12</sup>

Heinz von Diringshofen, the first president of the German Aeromedical Association, was an experienced military pilot. His next successors as President of the Association were also experienced aviators (Emil H. Graul, Erwin A. Lauschner, Heinz S. Fuchs, and Bruno Müller).<sup>19</sup>

Due to their own flight expertise, they all dealt with questions of suitability and their adaptation to the rapidly increasing world air traffic in the jet age. The first two working groups of the DGLRM e.V., "Flying Doctors" (E. H. Graul and G. Mutke) and "Flight Safety", therefore also dealt with specific questions of the stay of humans in the third dimension.<sup>9,19</sup>

The relatively low number of Aeromedical Examiners (AME) who were trained in Germany postwar became a problem with the advent of growing commercial air travel. A civilian training facility did not exist until the 1980s, and training positions in the German Air Force were only available to a very limited extent. They were also too time-consuming for most medical doctors who wanted to be trained as an AME. With the founding of the German Academy of Aviation Medicine in 1991, a training center of international importance was finally available whose courses were easier to participate in for physicians.<sup>18</sup> In the United States, residency programs were established, both in the military and in the civilian sectors. However, a Pilot Physician Program was not organized.

The efforts of the DGLRM to improve the training situation began when it tried to introduce the specialty of "flight medicine" in 1974. Beside academic training, a pilot license was mandatory to qualify and work as an AME. If the pilot license could not be kept valid in the long term, which was partly due to medical unfitness during the professional aviation doctor's activity, proof of appropriate practical experience in flight operations had to be provided. Until the introduction of the European EASA regulations, being an pilot physician was mandatory for an AME designation in Germany.<sup>9</sup>

EASA regulations eased the need for a pilot license. Pilot physicians were still on duty as AMEs in Germany, but it was not mandatory anymore. Nevertheless, flying

was retained as a training equivalent in the EASA regulations. In Germany, the Federal Aviation Office now considers 20 flight hours as sufficient for consideration as “Refreshing Training in Aviation Medicine”. Both cockpit flight experience in commercial air traffic (flight deck/jump seat and simulator experience) and one's own flight practice (aircraft piloting) are counted. In the United States, AMEs have never been required to have a current pilot license. However, the FAA recommend their flight medical doctors to fly up to 50 h/yr in order to keep their familiarity up to date. Why the European AME flight experience requirements are far less than in the United States remains questionable.<sup>6,9</sup>

The goal in Germany from the very beginning was to provide medical care and certification to pilots only by pilot physicians. A knowledge of the specific requirements for aviators (3-dimensional spatial orientation, psycho-mental factors such as multitasking/crew resource management, and human factor engineering) is just as important for the aviation medical expert as professional medical expertise. The aviation doctor thus still has a nontransferable responsibility for pilots, cabin crew, and passengers. Not every flight physician can or should be a pilot, but the changed framework conditions should not lead to flying that is only a “private pleasure” for the pilot physician. The “smell of the farm” should be familiar to the farmer as well as an AME, who should not perform only by flying his desk.

## REFERENCES

1. Bauer LH. Aviation medicine. Baltimore: The Williams & Wilkins Company; 1926:1.
2. Benford RJ, Thomas CC. Doctors in the Sky. The Story of the Aero Medical Association. Springfield (IL): Charles C. Thomas; 1955.
3. Campbell M, Mohler SR, Harsch V, Baisden D. Hubertus Strughold: the “Father of Space Medicine”. *Aviat Space Environ Med.* 2007; 78(7):716–719.
4. De Hart RL, editor. Fundamentals of aerospace medicine. Philadelphia: Lea & Febiger; 1985:4.
5. European Aviation Safety Agency. GM1 MED.D.030. Refreshing training in aviation medicine. In: EASA: acceptable means of compliance and guidance material to Part-MED (No. 1178/2011); Dec. 15, 2011. Annex to ED Decision 2011/015/R p. 61. Cologne (Germany): EASA; 2011.
6. Flemming S. The physician in the balloon. In: Broeckelmann K, editor. *We the aviators*. Berlin-Wien (Germany): Ullstein & Co.; 1909:172–187 [in German].
7. Flottman J. The USAF Pilot Physician Program. [Accessed July 15, 2022]. Available from <https://goflightmedicine.com/usaf-pilot-physician-program/>.
8. Gunga HC, Kirsch KA. Nathan Zuntz (1847–1920) — A German pioneer in high altitude physiology and aviation medicine, part I: biography. *Aviat Space Environ Med.* 1995; 66(2):168–171.
9. Harsch V. [The flying doctor: a look back at a professional self-image.] *Flug- u Reisemed.* 2021; 28(06):274–276 [in German].
10. Harsch V. Hermann von Schroetter (1870–1928): inventor of the sealed cabin. *Aerosp Med Hum Perform.* 2015; 86(6):581.
11. Harsch V. The history and development of aviation medicine. In: Curdt-Christiansen C, Draeger J, Kriebel J. *Principles and practice of aviation medicine*. Singapur: World Scientific Publ.; 2008:3–28.
12. Harsch V. History of aviation medicine. In: Draeger J, Kriebel J, editors. *Praktische Flugmedizin*. [Practical aspects of aviation medicine]. Landsberg am Lech (Germany): Ecomed; 2002:25–32.
13. Harsch V. Aerospace medicine in Germany: from the very beginnings. *Aviat Space Environ Med.* 2000; 71(4):447–450.
14. Harsch V. German acceleration research from the very beginnings. *Aviat Space Environ Med.* 2000; 71(8):854–856.
15. Harsch V. Heinz von Diringshofen: aeromedical pioneer. *Aerosp Med Hum Perform.* 2019; 90(5):501–503.
16. Harsch V. Theodor Benzinger, German pioneer in high altitude physiology research and altitude protection. *Aviat Space Environ Med.* 2007; 78(9):906–908.
17. Harsch V. Early ejection seats in Germany. *Aerosp Med Hum Perform.* 2017; 88(8):801.
18. Harsch V. Aeromedical evacuation in the “Luftwaffe” from its origins until 1945. *Aviat Space Environ Med.* 2006; 77(1):73–76.
19. Harsch V, Pippig N. 60 Jahre Deutsche Gesellschaft für Luft- und Raumfahrtmedizin (DGLRM e. V.) [60 years German Society of Aviation and Space Medicine (DGLRM) and its 19 presidents]. *Flug-u Reisemed.* 2021; 28(6):259–266 [in German].