

SPECIAL ARTICLE

GERHARD HENRICH ARMAUER HANSEN

ADDRESS DELIVERED AT INAUGURATION OF THE ARMAUER HANSEN
MEMORIAL ROOM, FEBRUARY 18, 1962^{1,2}

PROFESSOR INGVALD ROKSTAD

Bergen, Norway

Gerhard Henrich Armauer Hansen was born in Bergen, Norway, on July 29, 1841, the eighth of a family of fifteen children. He matriculated in 1859 and qualified as a doctor in the autumn of 1866.

While still a student he acted for a period of one year as prosector at the Institute of Anatomy. After qualifying, he spent twelve months at the Rikshospital in Christiania (now Oslo) as an intern, this being followed by a season as medical officer to the Lofoten fishing fleet.

In January 1868 he took up an appointment as physician at the Pleiestiftelsen for Spedalske No. 1 (Nursing Home for Lepers No. 1). In August of the same year he accepted the post of assistant physician at the Lungegård Hospital, and later that of physician at the St. Jørgens Hospital. As a consequence, Armauer Hansen early became associated with Daniel Cornelius Danielssen, a renowned leprosy researcher of the time and a man destined to become his father-in-law, as in 1873—the very year he discovered the leprosy bacillus—Armauer Hansen married Fanny Danielssen.

When Armauer Hansen joined the staffs of the leprosy hospitals in Bergen, this disease was much to the fore as an object of research in Norway, and Bergen was a center of leprosy research. Leprosy was very widespread in Norway at that time, particularly in certain areas of the west, and Danielssen and Boeck (the latter a dermatologist) were active in studying the disease. Their research proved of considerable scientific value, and culminated in the publication in Christiania in 1847 and in Paris in 1848 of their famous work *Om Spedalskhed* ("A Study of Leprosy"). The Académie Française awarded these two scientists a prize of 2000 francs, the money being employed to set up a fund (the Boeck and Danielssen Foundation). A grant from this fund was made for the first time in 1882, the recipient being none other than Armauer Hansen, who was honored for his work on leprosy and the leprosy bacillus.

¹This address was supplied by Dr. Ernest Glück, chief pathologist, Gade's Institute, University of Bergen. Excerpts from it were used in the November-December 1962 issue of *The Star*, Carville, La., in a two-page layout of light photographs supplied by Dr. Glück for its exclusive use.

²The Memorial Room, Dr. Glück writes, is identical in all respects with the one actually used by Hansen as a laboratory, but it is one located on the second floor since the ground-floor room is now used for other purposes.—EDITOR.

At the time when Armauer Hansen began to devote himself to the study of leprosy, opinions varied widely as to the cause of this disease. Some scientists believed it to be hereditary, while others maintained that it was contagious. Danielssen and many of his contemporaries were convinced that leprosy was hereditary; Armauer Hansen, on the other hand, asserted that it was contagious. According to an anecdote that appeared in 1912 in the Christiania daily *Aftenposten*, this divergence of views between master and pupil was very soon brought to a head by the latter. It was in 1868, when Armauer Hansen—outspoken and courageous, and brimming over with assurance and faith in his own destiny—was twenty-seven years of age. Danielssen was then at the height of his fame, his name internationally known as a result of his work in leprosy research. Armauer Hansen was paying a duty call on his illustrious superior and, so the story goes, had been there only a few minutes when, unable to contain himself any longer, he burst out: “. . . and I may as well tell you that in my opinion your views on leprosy are altogether wrong. You think the disease is hereditary and not contagious, whereas the truth is that it is contagious and not hereditary.”

This candid statement brought the visit to an abrupt conclusion, as the older man flew into a huff and showed his caller the door. The following day, however, Armauer Hansen was summoned to Danielssen, who wished to inform him that he had been thinking over their exchange of the day before and that, although the young man was wrong in his assumption, he (Danielssen) realized that his junior had a bee in his bonnet and could promise him all the assistance he might require.

True or not, this story provides a striking picture of Danielssen. In his memoirs Armauer Hansen relates that although Danielssen was opposed to his views, no one was more enthusiastic than his superior in encouraging him—inciting him, in fact—to work in order to substantiate his theory. When, after many years of research, Armauer Hansen was finally convinced that he had identified the leprosy bacillus, Danielssen gave a dinner to celebrate his erstwhile pupil's momentous discovery, a discovery which sounded the death-knell of his own theories.

Armauer Hansen's first scientific work was compiled as an answer to a prize-question. Entitled “A Contribution to the Normal and Pathological Anatomy of the Lymphatic Glands,” it was submitted in 1869 and published in 1871. For this treatise he was awarded the Schjelderup Gold Medal by the University of Christiania.

The material he so closely examined and reported on in this work included lymphatic nodules obtained from leprosy sufferers, and in these nodules his discerning eye was arrested by yellowish matter which he described as “brown lumps or balls.” Subsequently he ob-

served similar changes in other leprosy tissues and organs (skin, liver, and spleen). In these changes, which he also referred to as "brown elements," he claimed to have discovered a feature that was specific to leprosy, deriving support for this belief from the discovery by Hjalmar Heiberg of similar elements in leprosy nodules on eyes.

These brown elements, which are also known as "leprosy globules" and in which Armauer Hansen was at a later date able to demonstrate the presence of the leprosy bacillus, had earlier been noted by Danielssen. Danielssen had likewise considered them to be peculiar to leprosy tissue and had shown his specimens to Rudolf Virchow when the latter visited Bergen in 1859 to study leprosy. Virchow, however, misconstrued Danielssen's discovery and came to the conclusion that the phenomenon was attributable to fatty degeneration and had nothing to do with leprosy. Danielssen bowed to Virchow's authority—to his subsequent chagrin.

In 1870 Armauer Hansen spent a year in Bonn and Vienna, where he applied himself to the study of pathological anatomy and microscopy. On his return, in 1871, he received a grant from the Doctor Egeberg Foundation to enable him to enquire into the causes of leprosy. He spent two summers in the western part of Norway, concentrating on areas with a high incidence of leprosy, and continued between times with his research and experiments at the Lungegård Hospital and the No. 1 Nursing Home for Lepers. He summarized the results of these investigations in a paper which he submitted in 1873 to the Norwegian Medical Association in Christiania, the body by which he had been awarded his research scholarship. This work, which he entitled "A Report to the Norwegian Medical Association in Christiania on a Journey undertaken with the Backing of the Association to investigate the Causes of Leprosy," was printed in 1874, at the Association's expense, as a supplement to *Norsk Magazin for Lægevidenskapen* (*The Norwegian Journal of Medical Science*).

This paper, which is looked upon as Armauer Hansen's *magnum opus*, contains the first description—brief, it is true, but nonetheless adequate and to the point—of the causative agent of leprosy, the leprosy bacillus. Armauer Hansen refers to the bacilli as being "rod-like bodies" piled together in a distinctive fashion. To quote Armauer Hansen himself, "... sometimes the rods are found criss-crossed in bundles at very acute angles."

Armauer Hansen's discovery of the leprosy bacillus in 1873 is recognized as marking an epoch. He made his discovery in the very infancy of bacteriology, at a time when the concept of bacteria as a cause of disease was still at the embryonic stage and bacteriological techniques were primitive in the extreme. In this connection I may add that it was not until 1882 that the tubercle bacillus was identified, to be followed in rapid succession by identification of the typhoid

bacillus in 1883, the diphtheria bacillus and cholera vibrio in 1884, the tetanus bacillus in 1886, and so on.

To begin with, Armauer Hansen either studied his preparations in the uncolored state or with 1 per cent osmic acid added, which made the "rod-like bodies" easier to observe. Later, with the development by Weigert and Koch of a new and better method of staining bacteria, Armauer Hansen adopted their procedure in his experiments. He was engaged in this work when he received a visit from Albert Neisser, who made his way to Bergen in 1879 to study leprosy. Neisser, who had identified the gonococcus, was a pupil of Koch, and Armauer Hansen hoped that he, Neisser, would be able to aid him in his attempts to stain the leprosy bacillus. However, nothing came of their joint efforts while Neisser was in Bergen.

When Neisser left he took with him a selection of Armauer Hansen's specimens, and on returning to Breslau he stained the leprosy bacillus. Immediately afterwards he published an imposing work on leprosy in which the bacilli were distinctly colored by the new method. This explains why, at one time, the bacillus was known as the Hansen-Neisser bacillus. In the meantime Armauer Hansen had also succeeded in staining the bacillus by the new procedure. He had already, six years previously, discovered the bacillus itself, and at the International Leprosy Conference, held in Berlin in 1897 and presided over by Virchow, not a dissentient vote was raised when Armauer Hansen was declared to be the discoverer of the leprosy bacillus and the bacillus the cause of leprosy. The bacillus is nowadays generally referred to as Hansen's bacillus and the disease is known as Hansen's disease.

Armauer Hansen's thesis was based on the conviction that "in the leprous products bacteria were to be found," and that "these bacteria constituted the actual toxin which, when introduced into the organism, gave rise to the disease." He succeeded in identifying the bacterium, but refused to allow matters to rest there. Instead, he experimented without pause in an endeavor to prove that the bacterium he had discovered was also really the cause of leprosy. To this end he carried out a series of experimental inoculations on animals, combined with attempts at cultivation on artificial media, but to no avail: the results of both the inoculations and the cultures proved negative. In this connection it may be of interest to note that Danielssen, too, had once experimented with inoculation, both of animals and of human beings, but the results achieved had likewise been negative.

Towards the close of the 1870's Armauer Hansen experimentally inoculated himself, and at the same time a female patient who was suffering from leprosy of the maculoanesthetic type. The inoculation was performed on the conjunctiva with a couching-needle which had previously been inserted into a leprous nodule, but again the results

were completely negative. The patient suffered no ill-effects whatsoever; but, nonetheless, when she realized that she had been operated on by way of experiment and without her prior consent, she complained to the authorities. The upshot was that on May 31, 1880 Armauer Hansen was dismissed from his post as senior physician at the No. 1 Nursing Home for Lepers. However, he was allowed to continue as chief medical officer for leprosy in Norway, an appointment in which he had succeeded Løberg in 1875, when the latter was made director of the Rikshospital in Christiania.

As senior medical officer Armauer Hansen became the driving force behind the commission which was charged with the task of safeguarding public health against leprosy. In 1877 an Act was passed providing for "the relief of indigent lepers, etc." This was amended in 1885, when an Act was passed which provided for "segregation and admission to public nursing homes or sanatoria of lepers." This Act was largely the work of Armauer Hansen. It laid down that leprosy patients who were in receipt of poor relief were subject to compulsory hospitalization and that patients not in receipt of such relief *could* be sent to hospital if they neglected to observe the Board of Health regulations. Provision was made for hospitalization with police assistance, should other means of persuasion fail. There was, however, no clause in the Act under which married couples desirous of remaining together could be separated: by law married persons cannot be parted from one another until the local sheriff and clergyman have been consulted.

At the outset this Act, which has long since outlived its usefulness, met with strong opposition even in medical circles, and was alleged to be callous and inhumane. When it was discussed at a meeting of the Norwegian Medical Association in Christiania, Lockmann is reported to have declared his intention to protest in the name of humanity against what he referred to as the last bitter drop in the leper's cup of sorrow.

Despite this, the antagonism that was aroused gradually died away, partly because the Act was practised with the greatest consideration, and partly because subsequent events proved Armauer Hansen to have been right. The truth of this latter statement is readily apparent from the charts that adorn the walls of the Memorial Room: the graphs representing the incidence of leprosy in Norway show a sharp decline from the high figures of a century or so ago to practically nil at the present time.

Today there are only seven leprosy patients in Norway. Three of these are comparatively young people who have received the benefits of modern treatment with sulfone drugs and who have resumed their normal working lives. The remaining four are old, burnt-out cases of

long standing; two of them are still living here at the Rehabilitation Center, in the tiny leprosy ward.

The medical Year Book for 1961-62 contains a most interesting article by Møller-Christensen on the history of leprosy. The author concludes the chapter entitled "Leprosy in Norway" with the following words: "With this a fascinating chapter in the history of leprosy in Europe was brought to a close. When in 1856 Norway embarked upon a nationwide campaign to combat leprosy, there were 2,858 known cases in the country. Since then 5,361 new leprosy patients have received attention, so that in the course of the last one hundred years a total of 8,219 patients have been treated and cared for, at the same time as the community as a whole has been safeguarded against infection. The success achieved in stamping out leprosy in Norway is largely attributable to Armauer Hansen's discovery of the nature and cause of the disease, and to the untiring and purposeful work he and his co-workers performed in studying and combating it—work which for more than a century made Norway the leading country in Europe in the fight against leprosy. The example of Norway has now passed into history. And just as Norway set out upon her campaign against leprosy by learning from history, other countries are now able to learn from Norway 'how to eradicate the scourge of leprosy within their own frontiers'."

In his capacity as chief medical officer for leprosy Armauer Hansen travelled far and wide, visiting remote rural areas and spreading the gospel of cleanliness and hygiene. It was on one such journey, to Florø, undertaken in the course of duty, that he died on February 12, 1912. The urn containing his ashes rests beneath a memorial stone in the Museum garden in Bergen.

Many were the honors bestowed upon Armauer Hansen during his lifetime. In 1901, on his sixtieth birthday, a bust of him was unveiled in the garden of the Bergen Museum. The work of Jo Visdal, this bust was a gift from friends and colleagues in many countries, and Rudolf Virchow himself acted as chairman of the subscription committee. Armauer Hansen was an honorary doctor of Copenhagen University, and an honorary or corresponding member of many scientific societies.

The Medical Association in Bergen now regularly honors his memory through the medium of an Armauer Hansen Memorial Lecture, which is held annually at the first meeting of the Association in October. The Armauer Hansen Lectures are given by prominent researchers, who are invited to speak on subjects of their own choosing in their own particular fields of medicine. In 1957 the lecture was given by the Swedish Nobel prize-winning Professor Hugo Theorell. I should like to quote from memory what Professor Theorell said on that occasion, when, in his introductory remarks, he paid tribute to

Armauer Hansen: “. . . Armauer Hansen,” he declared, “is one of the few who through his research has had the good fortune to make himself redundant as a doctor.”

With the Armauer Hansen Memorial Room, which has been fitted out here in what was at one time the No. 1 Nursing Home for Lepers, we will now, on what is, so to speak, the very battlefield on which his fight against leprosy took place, further honor Armauer Hansen's memory. This Memorial Room is the result of warm-hearted interest and great kindness in many quarters, viz.:

Armauer Hansen's relatives; the Central Administration; the University of Bergen; the State Rehabilitation Center in Bergen; colleagues in Norway and abroad; and, last but not least, my very closest collaborators: Mrs. Schetlein Johannesen, M.A., Librarian Skauge, and Chief Pathologist Glück.

I thank all those who in their various ways have helped to make this Memorial Room possible, and I should like to express particular gratitude to my three colleagues. What has been created here in all modesty may perhaps provide the foundation of something yet greater—of a museum of medical history in Bergen.

The Armauer Hansen Memorial Room, which will be under the direct control of the University of Bergen, is hereby declared open.