Physics as a Calling, Science for Society

Studies in Honour of A.J. Kox

Edited by

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Cover illustration: Albert Einstein and Hendrik Antoon Lorentz, photographed by Paul Ehrenfest in front of his home in Leiden in 1921. Source: Museum Boerhaave, Leiden.

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Pim Huijnen

Characterizing the pharmacologist and physician Evert Cornelis van Leersum in his otherwise glorifying obituary, his eulogist, F.M.G. De Feyter, ranked him quite atypically with medical scientists like G.J. Loncq, S. Talma and C.A. Pekelharing.[1] This is somewhat mystifying, because Van Leersum died in 1938 at the age of 76, whereas the careers of the scientists he was being compared to all date back to the last decades of the nineteenth century. Van Leersum was not granted tenure as a Professor until 1904. Moreover, the first scientist on the list had died half a century prior to Van Leersum and the last one fifteen years earlier. Still, the author of the obituary, Van Leersum's former assistant De Feyter, considered the death of his old professor the end of an era – an era in which scholars tended to practice science in a 'philosophical and historical sense'.[2]

Although Van Leersum was, among many things, Professor in the History of the Medical Sciences at the University of Leiden, it is highly doubtful, considering the course of his career, that he would have approved of this characterization. De Feyter apparently presupposes a dichotomy in the Dutch scholarly tradition. He evokes an image of an ivory tower-like 'old era-science', in which scholars limited themselves to theorizing, in contrast to 'modern science', which was supposedly much more aware of its social responsibility. Even if this contradiction had in reality existed, Van Leersum would not have felt very comfortable in the company of his nineteenth century colleagues, as is clear from Van Leersum's own argumentation:

> There are scholars who presumptuously lock themselves in their laboratories, believing that serving science for its own sake is of a higher order. If they are born geniuses we must, naturally, leave them be. However, the 'stock' of these prodigies isn't very large [...]. The majority of us do better at aiming a little

> lower. Incidentally, a discovery of practical usefulness or a large organization demands no less sophistication than the unravelling of an abstract problem.[3]

This article aims to unravel the apparent paradox between De Feyter's characterization of Van Leersum and the way he viewed himself.[4] This does not mean that I intend to reiterate the debate about the characterization of Dutch science in the nineteenth and early twentieth century in terms of 'fundamental' versus 'applied' research, or of 'science for science's sake' versus 'the practical usefulness of science'. Various excellent publications on this discussion have already shown convincingly that the dichotomy that De Feyter presents only had a limited basis in reality.[5] In this article, I would prefer to present Van Leersum's career as an illustration of how scientists around the turn of the twentieth century coped with the rapidly changing circumstances in their profession and in society as a whole. The fact remains, after all, that the increased availability of funds and other means for academic science at the end of the nineteenth century led to specialization and created good conditions for fundamental research. At the same time, industrialization and social questions urged scientists to dedicate themselves more to applied research.

In the end, the extent to which scholars allowed either the fundamental or the practical aspects of their research to prevail was also an individual choice. Anne Kox, for examples, has argued that the eminent Hendrik A. Lorentz felt most comfortable doing fundamental research. Kox further argues that this scientific attitude is not in contradiction with Lorentz' dedicated commitment to applied work during the Great War.[6] The focus in this article on Van Leersum's *Werdegang* can help create a better understanding of how this combination might work. Just as it was for Lorentz, World War One was also a turning point for Van Leersum, his colleague in Leiden. As specialized as Van Leersum was in nutrition research, the shortages and the poor public health he observed around him made him decide to give up his university chair to dedicate himself to the establishment of a private institute for nutrition research and education. For Van Leersum, nutrition research – which the newly discovered vitamins at the time had catapulted into the modern age – carried with it a special social responsibility. As he continued in the argument quoted earlier:

> One must also realize that humanity has its needs. These have to be met very urgently. They have no time to wait until the moment that science appears, all finished and ready, like Athena out of Jupiter's head, before us. Most of all, our stomachs can't wait that long.[7]

Interestingly, the movement towards research on the interface between academy and industry, which was the ambition of Van Leersum's institute, led to a strong focus on the United States. Consequently, Van Leersum developed a

Fig. 1 – Dr. Evert Cornelis van Leersum (1862-1938) in 1920. Source: Archive NIVV, Voedingscentrum Den Haag

great preference for American science, as this article will also elucidate. Although Van Leersum's American experience was limited to a seven-month journey across the United States, I believe that his focus on the new continent resembles, in a way, the career of Anne Kox, to whom this volume is a tribute. Of course, much more than Van Leersum has ever done, Anne Kox has succeeded in positioning himself firmly with one foot in the Dutch and the other foot in the American history of science community. For both these scientific communities, I hope that, after his retirement, he will continue to straddle the Atlantic in this way for a long time to come.

World War One and vitamins

One of the first ways in which Van Leersum put his efforts for nutrition education into practice after his retirement from Leiden University was a series of articles he wrote for the daily newspaper *Algemeen Handelsblad*, in 1919 and 1920. In these contributions he reported on his journey across the United States to learn from best practices what a scientific institute on nutrition research should look like. His initial ideas on nutrition education must have had something to do with stimulating people's appetite. His first report about his journey, published in *Algemeen Handelsblad*, starts with a summary of several paragraphs of the dishes served during the boat trip from Holland to the United States – for all three classes on board. Perhaps this mouth-watering summary was meant as an inspiration to people to cook in an equally healthy way. In any case, the food that was served on

the steamer greatly excited Van Leersum, who emphasized that even the third class 'has nothing to complain about':

> Their breakfast is composed of coffee with sugar and milk, bread with butter and cheese, or salted or marinated herring, or kipper, or apple butter, or cold cuts, or salted meat, or sausage. The Sunday Dinner is made of fresh meat soup with rice and vegetables, a fresh piece of beef with potatoes and pudding with plum sauce. On Mondays they are offered bean soup, smoked bacon, potatoes and sauerkraut; on Tuesdays green pea soup, Australian meat, potatoes, string beans and pickles. [...][8] After this follows, at 3 p.m., coffee with bread or hardtack and in the evening at 6 p.m. lobscouse[9] or Irish stew, or rice with milk, or pearl barley porridge with plums, or hash or goulash with potatoes, tea with sugar and bread with butter.[10]

Apart from the fact that the summary expresses the Professor's seemingly limitless fascination with food, its real value was a point Van Leersum made rather casually: 'Many of the third class passengers consume more calories here on board in a single day than they do at home during a whole week.'[11]

Van Leersum's focus on calories seemed to stem from the traditional, nineteenth century views on nutrition that centred on the consumption of sufficient amounts of proteins, carbohydrates and fat. However, a much as Van Leersum was devoted to the well-being of the people, which had driven him to take on this enterprise in the first place, the reason why he went to the US was to observe the 'newer knowledge of nutrition'.[12] The American approach – a qualitative, rather than a quantitative focus on nutrition – had evolved from the discovery of vitamins and was being put into practice in facilities for research and education all over the United States. Based on rapidly advancing international vitamin research, as well as on his rather disappointing attempts to communicate its results to the Dutch public during World War One, Van Leersum felt a genuine urge to seriously inform the public on the truths and myths of healthy nutrition.

Although The Netherlands had successfully managed to uphold its neutrality during 1914-1918, the Great War did not go unnoticed. In particular, the inadequate national food supply ended up being a source of social upheaval. Food shortages caused riots and uprisings in several Dutch cities, starting as early as 1916.

The Minister of Agriculture, Industry and Trade, Folkert Evert Posthuma, bore the brunt of the people's dissatisfaction, for instance, when he dared to prohibit the production of white bread in April 1916, to cope with the shrinking grain supplies. Obviously, grain is used far less efficiently in the production of white bread than it is in wholewheat bread. However, white bread was considered an important symbol of welfare and people were unwilling to give it up right away in exchange for the 'proletarian' wholewheat loaves. Attestations by scientific ex-

perts that the nutritional value of wholewheat exceeded that of the more luxurious white bread, for example in terms of vitamins, were unable to persuade the public.[13] In this respect, the continuing export of white bread to German and Belgian border communities also did not help. Eventually, Posthuma gave in and called off the prohibition.

However, this did not stop the public bashing of Posthuma. During the war, he grew into the most disliked government official, owing to the increasing number of state measures restricting the food supply. The Government started controlling the sale of foodstuffs in February 1917: butter, cheese, eggs, flour and bread were all rationed. Apart from railing at Posthuma, it became a national sport to find creative ways to face the worsening living conditions. Women's magazines, like the popular *De Vrouw en haar Huis* (The Woman and her Home)[14] helped, for example, with advice for healthy living. Women were advised to start their own vegetable gardens and were particularly encouraged to grow legumes, because of their 'high protein levels and easy digestibility'.[15] Famous writer of cookbooks and nutrition expert, Martine Wittop-Koning, advised in the same magazine not to disregard 'the so-called 'coarse' vegetables, like cabbages, carrots and onions, because of the indispensable 'life particles' (vitamins)'[16] they contained, in contrast to many pickled or salted vegetables. This was a surprisingly early reference to the newly discovered vitamins in *De Vrouw en haar Huis*, a publication whose main focus tended to be on the old doctrine of consuming sufficient amounts of proteins, carbohydrates and fat.

Even if it did not do so for the wider public, for scientists World War One inevitably proved that the traditional, 'quantitative' perspective on nutrition was outdated. This was a consequence of the extraordinary rise of nutrition research during the war. Maintaining the national food supply became part of the warring nations' war strategies. After all, the war efforts depended as much on well-nourished armed forces, as the war economies depended on well-nourished workers. Scientific research did its part by determining the nutritional values of foodstuffs and by looking for alternatives for nutrients that had grown scarce. In the United Kingdom, the Food War Committee of the Royal Society headed food research. With pioneering vitamin researchers like Frederick Gowland Hopkins among its members, the Committee's work was an important stimulant for British vitamin research, also in the post-war years. [17]

Additionally, the war provided case studies showing the deficiencies of the traditional views on nutrition. Numerous outbreaks of deficiency diseases could not be explained by using nineteenth century knowledge of food standards. Denmark, for example, witnessed a serious outbreak of the eye condition Xerophtalmia, or 'dry eyes', after substituting margarine for butter. Obviously, margarine does contain an equivalent amount of – albeit vegetable – fat. What it lacks, though, is vitamin A, and a deficiency of this vitamin causes the eye disease. Similarly, var-

ious armed forces developed other deficiency diseases, such as scurvy or beriberi.[18]

The deficiency paradigm

Just before the war, scurvy and beriberi had been linked to vitamin deficiencies. Though a riddle to scientist for several centuries, precisely these diseases had become the catalyst for 'modern' vitamin research. It had, in fact, been Dutch research into beriberi – a disease of the nervous system – that had given rise to the deficiency paradigm at the end of the nineteenth century, though to a large extent in spite of itself. The Dutch Government had initiated a scientific expedition to the Dutch East Indies in 1886 to investigate the causes of beriberi. The disease had spread among the mostly indigenous armed forces of the Royal Netherlands East Indies Army during the Aceh War (1873-1904). In this war, more soldiers succumbed to beriberi than died in battle. Consequently, knowledge of the origin and treatment of the ailment had direct military relevance.[19]

In the context of this expedition, the medical scientist Christiaan Eijkman made his discovery that the cause of beriberi was related to nutrition. While hens that were fed white rice developed a polyneuropathy that was analogous to human beriberi, feeding them non-hulled rice appeared to cure them. Experiments with prisoners showed that the same was true for humans. However, the idea that the outer husk of rice might contain an indispensable, curative element clashed so badly with the concept of bacterial infection, that it was very difficult for scientists to accept it. This is how Eijkman's successor in Batavia, Barend Coenraad Petrus Jansen, explained it in his lecture at the University of Amsterdam in 1929:

> The idea that a well-defined disease like beriberi was not caused by an infection, but by a deficiency of traces of a still unidentified element in nutrition, was in such opposition with the prevailing ideas that it took years before medical scientists rated Eijkman's work at its true value.[20]

Ironically, it was Eijkman himself who failed to acknowledge the scope of his discovery in the first place. The man who was awarded the Nobel Prize for the discovery of vitamins in 1929 – a man whom the historian of science Bastiaan Willink once characterized as 'a solid researcher, not overly rich of ideas, not very productive'[21] – opted for the theory that the rice husk contained an antidote able to eradicate the supposed beriberi bacteria. 'The reluctant father of the vitamins'[22], Jansen later called him, because he kept clinging to his bacteria theory until well into the 1910s. The Assistant Director of the laboratory, Gerrit Grijns, accepted the existence of 'protective elements' in the husks of non-processed rice – as he called them in 1900 – with considerably more ease. He continued research

into beriberi when Eijkman had returned to the Netherlands in 1898 after having accepted a chair at the medical faculty of the University of Utrecht.[23]

Due to his aversion to the vitamin theory, Eijkman did not continue his research on beriberi in Utrecht. The Netherlands lost its position at the forefront of vitamin research, just when Eijkman's beriberi research had 'broken the spell' [24], to cite Jansen once more, in international medical science. The biochemist Hopkins made a name for himself with a publication based on his animal feeding experiments in 1912, proving that 'accessory food factors' were needed to make animals grow, in addition to the known nutrients.[25] The Polish biochemist Casimir Funk made a decisive step forward by linking this characteristic of beriberi with those of other ailments like pellagra and scurvy. While working at the Lister Institute in London, he introduced the term 'vitamins' – originally 'vitamines' – in 1912 to label the types of nutrients that if lacking would cause such diseases. However, the concept of vitamins could not be applied as anything other than a practical conceptual tool in the research of deficiency diseases. After all, it was not until 1926 that someone actually identified a vitamin by isolating it from the substance it was part of.[26]

Academic scientists gradually identified more and more ailments as being deficiency diseases – rickets being the most notable. This was done mostly by experimenting with the addition of typical substances like milk or yeast to 'purified' diets – containing nothing but fats, carbohydrates, and proteins – in laboratory animals. By perfecting these techniques, scientists gradually managed to distinguish the various types of vitamins and learned to understand how they worked in the body and what the consequences of deficiencies or overdoses were.[27] As Eijkman discovered for himself, by the mid-1910s it became increasingly difficult to deny the existence of vitamins. To cite the title of the programmatic book by the American biochemist Elmer McCollum, these elements were at the core of a 'newer knowledge of nutrition'.[28] Based on his experiences during World War One, it was Van Leersum's opinion that the Dutch public needed to be educated in this new understanding of healthy nutrition. Because of the lack of a lively academic discourse on vitamins in the Netherlands, Van Leersum decided to take the lead himself. What he aspired to was a private institute, solely dedicated to nutrition research and education.

The first Dutch Professor in the pharmaceutical sciences

Van Leersum became involved in food education during the war. He treated the readers of the weekly *De Groene Amsterdammer*, for instance, to an abundant pharmaceutical analysis of the nutritive value of peeled, as opposed to unpeeled potatoes in 1917.[29] In general, the pharmacologist had a history of combining a strong feeling of social responsibility with distinct intellectual ambitions. Born in Utrecht in 1862, Van Leersum attended the local HBS – the recently developed

school type preparing for university without the classical languages that distinguished the Dutch 'gymnasium'. He then went on to study medicine at the University of Utrecht. During his studies, he worked for a while as an Assistant to the renowned medical scientist Franciscus Cornelis Donders. Van Leersum received his medical degree in 1886. A year later, he obtained his PhD at the university of Freiburg, far in the South of Germany. Having achieved a doctorate did not quell Van Leersum's academic ambitions. He continued his studies in Königsberg, Vienna, and Berlin, dedicating himself to metabolic diseases.

After this stint in Germany, he decided to return to his home country and settle there as a medical practitioner. He could not get accustomed to the small towns of IJlst and Opheusden, where he moved initially: he found them too rural. According to his later Assistant F.M.G. De Feyter, it was the vicinity to the cities – and the universities – of Utrecht and Amsterdam that made him subsequently decide to move to the village of Baarn.[30] Around the turn of the century, the then 35-year old physician moved his practice to Amsterdam, where he also found a job at the laboratory of Barend Joseph Stokvis, Professor in the Pharmaceutical Sciences at the University of Amsterdam.[31] Here, Van Leersum had his first experience in academic pharmaceutical research. During that time, his motivation to do hands-on work as a physician also brought Van Leersum to South Africa for a period of several months in 1900. There, he served as the Head of the Russian-Dutch field hospital during the Boer War.[32]

Having, until then, focused mainly on his work as a physician, his full-time return to the university a few years later came as quite a surprise to Van Leersum – as he once confessed to the daily *Algemeen Handelsblad*. He only found out about his appointment as Professor in the Pharmaceutical Sciences and in the History of Medicine in Leiden early in 1904 when a colleague called to congratulate him. Van Leersum himself had absolutely no idea, but his appointment was published in the *Staatscourant*, the state newspaper announcing new laws and other governmental decisions. Van Leersum described to *Algemeen Handelsblad* his conversation with Abraham Kuyper, Prime Minister and Minister of Internal Affairs – also responsible for Education – with whom he had requested an audience to find out why they had appointed him, of all people. After all, so he argued, he had never given any indication of having an interest in the history of his chosen field of study. 'That is no problem at all,' Van Leersum remembered the leader of the Orthodox-Protestant Anti-Revolutionary Party replying, 'I am meddling in many things now that I had no knowledge of before.'[33]

Van Leersum was not only the first Dutch Professor in the Pharmaceutical Sciences, but also in the History of Medicine. In this way, he honoured both the past and the future in his Leiden chair. Eventually, the twentieth century would grow into the age of the pharmaceutical sciences, which were a rapidly advancing field of research, highly influenced by the progress in medicine, chemistry and physiology. However, Van Leersum did not succumb to the temptation of neglect-

ing the historical aspect of his chair in favour of the exciting prospects in the pharmaceutical sciences. He published several books and articles on famous medical scientists of the past. He organized an exhibition on the history of medicine, entitled 'What is Past is Prologue', in 1907, and re-established the Society for the History of Medicine in 1913, taking the fields of history of mathematics and physics under his wing as well. As a result, all famous Dutch scientists, such as Lorentz, Zeeman, and Kamerlingh Onnes, were present at the founding meeting of the Society, which is celebrating its centennial under the name of *Gewina* in 2013. The fact that few of these Dutch Nobel Prize winners would ever show up at any of the Society's future meetings did not in the least detract from the festive atmosphere at this first meeting.

'An expression of peaceful internationalism'

Clearly, Van Leersum knew Hendrik Antoon Lorentz through the Society, if he had not already met him at the University of Leiden where they had worked simultaneously for eight years. The letter Van Leersum sent to Lorentz in December 1917 was written in a correspondingly familiar tone. Van Leersum addressed Lorentz with 'Dear amice!' followed by a request. Lorentz had retired from his position as Ordinary Professor in 1912, in order to be able to dedicate himself more to physical research. As the curator of the Physical Cabinet of the Teyler's Stichting in Haarlem, he had his own laboratory at the Teyler's Museum – something he had always had to do without in Leiden. Also, Lorentz was the Secretary of the *Hollandsche Maatschappij der Wetenschappen*, an organization to promote science, which was housed directly opposite the Teyler's Museum on the other side of the Spaarne River. When Van Leersum wrote to him, Lorentz had just been appointed Chairman of a committee to gather and elaborate ideas on how science could make itself useful to society. Van Leersum wondered whether his initiative of establishing an institute for nutrition research and education had a place side by side, or within this committee.

Lorentz had no history in taking social responsibility as a scientist, as Anne Kox has argued so eloquently, for example in an article on Lorentz' work for the *Zuiderzeewerken*, the dike that reduced the *Zuiderzee* inlet to an artificial lake after World War One. According to Kox, 'Lorentz was first and foremost a scientist interested in doing fundamental research into the nature of matter and the quintessence of phenomenon like electricity and magnetism.'[34] However, the Great War had changed something for Lorentz, as it had done for so many other academic scientists in Europe. In particular, all kinds of scientists in the warring nations, not just those in medical or pharmaceutical faculties, began to engage themselves with the war effort. Evidently notorious are the contributions of the Berlin chemist Fritz Haber to the military use of gas, or the pamphlet '*Aufruf an*

die Kulturwelt' (Call to the World of Culture) that so many German scientists signed in 1914.[35]

Although they were incomparable to those in most of the warring nations, the worsening circumstances in the Netherlands had had the same effect on Dutch scientists. Just as they had encouraged in Van Leersum a sense of public responsibility, the same was true for the Royal Dutch Academy of Arts and Sciences as a whole. The Academy had approached the Dutch Government with the initiative for a scientific committee for advice and research in the interest of the well-being and the defensibility of the Dutch people (*Wetenschappelijke Commissie van Advies en Onderzoek in het Belang van Volkswelvaart en Weerbaarheid*) in the Autumn of 1917. The government gladly gave its permission. Lorentz, who recognized the value of the initiative, became Chairman. [36] As Van Leersum's and Lorentz' interests coincided here, Van Leersum wrote and asked Lorentz whether he would be kind enough to support his own undertaking.[37]

Van Leersum's letter to Lorentz was one of the first letters he wrote on behalf of his nutrition initiative. It turned out to be an essential one. Lorentz wrote to praise his colleague's initiative, not just to Van Leersum himself, but also to the responsible officials. Lorentz' committee officially advised Prime Minister P.W.A. Cort van der Linden on the matter, who, as Minister of Internal Affairs, was also responsible for issues of national health. 'Both here and abroad, experts have emphasized for a long time,' the committee's report said, 'the need to subject this most essential and versatile matter of national health to structural study.' [38] The committee also stressed that the type of institute Van Leersum had in mind would be in line with international developments. It presented the *Forschungsanstalt für Lebensmittelchemie* in Munich, with its budget of almost 5 million Reichsmark, as an example. Similar to this institute were the Nutrition Laboratory in Boston that the Carnegie Institution of Washington had founded as early as 1906. As an institute for nutrition research is 'an expression of peaceful internationalism', so the committee concluded, 'the Netherlands cannot be left behind.'[39]

The official endorsement that the Lorentz committee had elicited, gave Van Leersum's institute the decisive momentum. Thanks to funding by the Ministries of Internal and Economic Affairs and by private financiers, Van Leersum had a starting budget of almost 200,000 guilders. In addition, he had the assurance of continued state and municipal funding of 33,000 guilders annually, at least for the first five years. It was Van Leersum's strong ambition for his institute to become self-sufficient, earning its income from research on behalf of industry. With the long list of companies in trade, finance and commerce that had committed themselves to the initiative, at least in name, the prospects looked bright.

Now the most prominent question that remained was where to start. The City of Amsterdam had granted Van Leersum a plot of land, almost for free, to build his institute. However, what should an institute for nutrition research and consulting look like? The vitamin research that Van Leersum considered essential to

his nutrition institute was still highly innovative in Europe and lacked established institutions that could function as a source of best practices. The combination of an institute specializing in vitamins and applied research as well as consulting was even less common. Van Leersum decided that the United States was the best place to become inspired. He resigned from his academic chair in Leiden and set out on a trip of more than seven months across the United States, from the Autumn of 1919 until the Spring of 1920.[40]

The United States take the lead

Van Leersum's choice for the United States was less obvious than it appeared. Dutch academics had traditionally focused primarily on Germany. Not only Van Leersum and Christiaan Eijkman spent part of their academic careers there, many of the scientists of their generation had done the same. Physicist Heike Kamerlingh Onnes studied in Heidelberg, biologist Hugo de Vries worked in Würzburg, Heidelberg and Halle. Chemist Jacobus van 't Hoff not only spent part of his student days in Germany, but also the major part of his career. The same was true for Dutch physicist Peter Debye.[41] Whether in medicine, biology, chemistry or physics, it was German science that had set the pace in the latter half of the nineteenth century.

The ever-expanding American academic enterprise began to fascinate Dutch scientists at the turn of the century. However, American science on the whole could not live up to the reputation of the German, English or French academic traditions.[42] Illustrative of this is the correspondence of Austrian-Dutch theoretical physicist Paul Ehrenfest with his elder brother Hugo who had immigrated to the United States in 1911. In search of an academic position, Paul asked his brother, who was working as a gynaecologist in St. Louis, about the working conditions at American universities. The rather discouraging answer provides a fine – albeit highly personal – view on the reputation of American academic life:

> What attracts you in the United States is the undeniable fact that 'America is a young, growing country'. It is growth and progress everywhere, nowhere stagnation – this is true. However, you must remember one thing: the child is still very young, although it grows quickly – at least physically. Mentally, it is, relatively speaking, a bit retarded. Yes, you can make it here, but don't forget you have to start at the very bottom. [...] When you believe you can give a lecture here like you do in St. Petersburg, surrounded by a large crowd of intelligent students who are eager for knowledge, you are mistaken.[43]

The conditions in American academia did improve quickly. After, or rather because of, World War One, the Dutch scientific focus on Germany was gradually replaced by a fascination for the United States. This was especially the case for

nutrition research, in which American and English scientists created the revolutionary paradigm changes the discovery of vitamins brought about. Consequently, the shift from the dogma of calories to the focus on vitamins also meant the supremacy of Anglo-Saxon nutrition science at the expense of the former German dominance. In the English-speaking world the vitamin theory opened up competition with the German founders of nutrition science who had shaped the perspective on food in Europe and the United States throughout the nineteenth century. This was as much the case for Justus Liebig, with his one-sided focus on proteins, as it was for Carl von Voit and Max Rubner, for whom nutrition centred on the concept of energy.

Because of the stature of these scientific authorities, it was hard for vitamin theory to gain a foothold in Germany during the first decades of the twentieth century. All the more easy was its breakthrough in the English-speaking world. Great Britain and the United States took the lead in vitamin research with physiologists and biochemists like Hopkins, Jack Drummond, Elmer McCollum and Lafayette Mendel. These and other scientists worked on the expansion of the scientific corpus of the newer knowledge of nutrition. Now American books on nutrition research were translated into German, instead of the other way around.[44]

Van Leersum realized that the prototypes for the kind of institute he had in mind were to be found in the United States. He wanted vitamin research to be the core of his institute's activities. In Van Leersum's view, it was the apparent importance of vitamins for public nutrition and public health that justified the funding of this type of research. In addition, the new knowledge of nutrition emphasized the significance of nutrition education that took into account the existence of vitamins. Ideally, nutrition education would be an important task of the institute. Therefore, he wished to explicitly name his institute a 'vitamin laboratory'. The then 70-year old Professor Pekelharing, who had mentored Van Leersum since the start of his initiative, advised him against adopting this name. An institute looking for cooperation with industry and aiming at education of the public should not, so Pekelharing argued, carry a name that the public, to a great extent, was still unfamiliar with.[45] The institute would eventually adopt the name Netherlands Institute for Public Nutrition (*Nederlands Instituut voor Volksvoeding*, NIVV).

Pioneering vitamin researcher Lafayette Mendel had put together a travel plan for Van Leersum, taking him to around ninety different scientific institutions, private laboratories, organizations for public education, and nutrition companies. After having travelled 30,000 kilometres through thirty different American states to visit them, Van Leersum was impressed by the way American scientific research was organized. [46] Not only did the US possess many universities and colleges that were able to compete with the European academies, the country also housed some very wealthy private research facilities like the Rockefeller Institute for Medical Research, the Carnegie Institution for Science, and the Smithsonian Institu-

tion. These institutions had yet to find their equals in Europe. Because private financing of scientific research was common practice in the US, ties with industry were not as unnatural for scientific facilities as they were in Europe. Moreover, in a country that was industrializing so massively, with its relatively young academies, a separation between 'pure' and 'applied' science would have been artificial and counterproductive. In the United States, Van Leersum had seen what he had in mind for his own private institution, a natural combination of fundamental vitamin research with opportunities for direct application through industrial connections and public education.

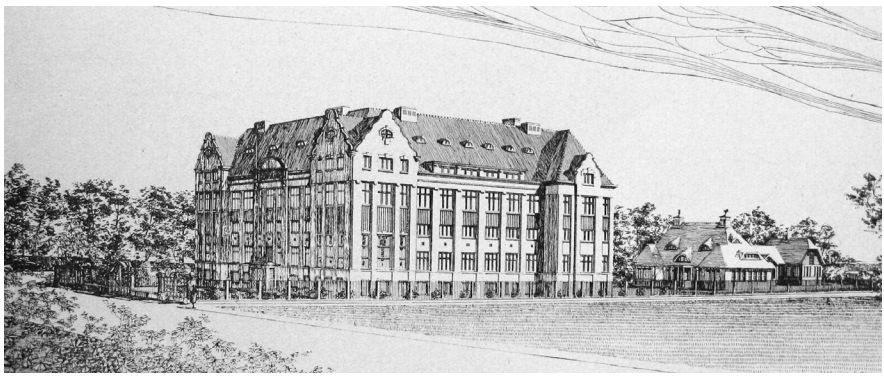

Fig. 2 – The 'Vitamin Laboratory' as Van Leersum had imagined it. Architect Evert Breman had designed the building that would never be built. Source: Stadsarchief Amsterdam

The American journey would turn out to be pivotal to Van Leersum's initiative. 'I wished the Dutch government and some prominent industrial bodies would send their promising young people here, to let them work in your laboratories.' 'That would mean the tables have been turned. After all, until now we were used to school ourselves in Europe.'[47] For reasons unknown, Van Leersum chose the stylistic approach of an imaginary conversation with literary figure Rip van Winkle to explain to his readers in the daily *Algemeen Handelsblad* why he viewed American laboratories as a model and inspiration for the Dutch. 'I have noticed that American researchers are preferably engaged in solving practical problems, of which public nutrition profits highly.'[48] Further on in the article, he railed against Dutch – and, for that matter European – nutrition science: 'We have locked ourselves in our laboratories and have concentrated our attention on abstract problems.'[49]

Van Leersum had been given a thorough and diverse impression of state of the art nutrition research in the United States. He had met the leading scientists of the moment: Mendel and Thomas Osborne in Yale, Harry Steenbock – as McCollum's successor – at the University of Wisconsin, and the eminent McCollum himself at Johns Hopkins University in Baltimore. He had been introduced to new techniques, like calorimetry and respirometry, to study human metabolism.

He had learned how essential animal feeding experiments were for nutrition research.[50] Van Leersum's goal was to accommodate his institute-to-be in line with his ambition to emulate American facilities, so an architect was commissioned to design a suitable building, to be built in Amsterdam.

Conclusion: Common good versus the commercial way

However unsatisfactory it may be to conclude this way, Van Leersum's trip across the United States may have been the highlight of his efforts to develop private nutrition research. Subsequent developments in establishing an institute for public nutrition were largely frustrating for Van Leersum. The projected building, for one thing, would never be built. Van Leersum had managed to collect funds at a time of great national ardour at the close of the war. Private companies, the government, and affluent citizens alike felt committed to invest in the revival of the Dutch economy and in the improvement of the well-being of its people. The restoration of an adequate food supply formed an essential part of this effort. However, times changed quickly. Confronted with budgetary deficits, the governmental agencies that were his main benefactors gradually began to reduce his funding after 1921. Before Van Leersum had had the chance to turn his building plans into reality, the government agencies obliged Van Leersum to first prove the viability of his institute. In the unoccupied rooms of the biochemistry laboratory of Professor W.E. Ringer, Van Leersum tried to show that establishing an institute of his own was justified, but he had the greatest difficulties in doing so. Yet, it is doubtful that the building Van Leersum had in mind would have made much of a difference.

Above all, Van Leersum's institute lacked a sound basis for cooperation with industry. The institute started, in accordance with Van Leersum's ambitions, to specialize in vitamin research. However, at the start of the 1920s, manufacturers of foodstuffs and pharmaceutical companies hardly showed any interest in vitamins. The first vitamin products did not come on the Western markets until the second half of that decade. Van Leersum intended to assist vitamin manufacturers in their production methods and calibration practices, or by finding new applications. Instead of vitamin producers, his main commercial partners were manufactures of cod liver oil, who he assisted in calibrating and standardizing their oil's vitamin D levels. Beginning in 1928, Dutch companies started to make vitamin products of their own, following the successful marketing of vitamin products from the United States and Germany. Yet, this did not change the situation for Van Leersum's institute. The main two Dutch vitamin manufacturers, the pharmaceutical companies Organon and Philips-Van Houten, set up and managed their own R&D, instead of outsourcing it to the institute.

These companies' disregard of the Netherlands Institute for Public Nutrition (*Nederlands Instituut voor Volksvoeding*, NIVV) illustrates why the failure of Van Leer-

sum's initiative was more or less structural. To persuade potential sponsors, Van Leersum had initially cited the common good and 'the need to jointly find solutions for the all important questions of nutrition research and food supply'.[51] Immediately after the war such phrases did not fall on deaf ears, but as time passed, competition in the market began to prevail over the common good. Van Leersum never really learned how to cope with the commercial way of doing things. According to Van Leersum's own writings, he learned, for example, how to produce vitamin D in yeast by means of ultraviolet radiation more or less at the same time as the Wisconsin biochemist Steenbock. Whereas the latter instantly patented his discovery and earned a fortune by selling commercial manufacturing licenses, Van Leersum actively tried to give his knowledge away for free to any interested company.[52] His interest in the common good began to clash more and more with the private interests of industry. Companies like Organon and Philips-Van Houten tried to protect their knowledge through patents instead of deploying it for the greater good. For this reason, they simply had no interest in the NIVV.

In all, Van Leersum's institute may not have been the best example of successful cooperation between academic research and industry. The NIVV had to close its doors in 1933 to avoid bankruptcy. Still, the initiative itself counts as a good illustration of how far academic scientists were able to go in engaging themselves in practical matters or in working for the 'common good'. It shows, in any case, how great an impact the Great War had on Dutch scientists, and in doing so it also sheds some light on the psychological motivations for the establishment of Lorentz' committee. In the end, the NIVV's demise turned out not to be as final as Van Leersum must have feared in 1933. Although he did not live to witness it, the institute was re-established in 1938 by B.C.P. Jansen, the biochemist mentioned earlier. He housed it in the laboratory he headed as Professor of Biochemistry at the University of Amsterdam. After World War Two, it merged with some other organizations into what is now called the *Voedingscentrum* (Nutrition Centre) in The Hague, which is the principal Dutch institution for nutrition education. With thanks to the public engagement of Professor Evert Cornelis Van Leersum.

Notes

1. De Feyter (1938), p. 826.
2. Ibidem.
3. Van Leersum (1920a).
4. This article draws from my PhD research on pre-World War Two vitamin and nutrition research in the Netherlands, an undertaking I could not have successfully finished without the critical and inspiring supervision of Anne Kox and Péjé Knegtmans. See: Huijnen (2011).
5. Theunissen & Van Lunteren (1994); Baggen (1998); Theunissen (2000); Knegtmans & Kox (2000); Maas (2001); Knegtmans (2007), esp. on pp. 265- 344; Maas (2010).
6. Kox (2007).

7. Van Leersum (1920a).
8. The other days of the week, the passengers were served the same dishes in various variations.
9. Van Leersum misspelled this as 'labscows'.
10. Van Leersum (1919).
11. Ibidem.
12. The concept originates from Elmer V. McCollum, see: McCollum (1918).
13. Moeyes (2005), pp. 270-276.
14. To be translated as *The woman and her home*.
15. Burgers (1918).
16. Wittop Koning (1918).
17. Teich (1995).
18. Smith (1997), pp. 143-144.
19. Kamminga (1995), p. 236.
20. Jansen (1929), p. 9.
21. Willink (1998), p. 120.
22. Jansen (1929), p. 9.
23. Jansen (1938), p. 1. Many publications have dealt with the exact roles of Eijkman and Grijns in the discovery of a food deficiency being the cause for polyneuritis and, in effect, with the question who can most justifiably be called the real instigator of vitamin research. See, for example: Reith (1971) or Carpenter and Sutherland (1995). Kamminga analyzes the respective stances of Eijkman and Grijns on vitamins in detail and argues that Eijkman needed a very long time to be convinced of the existence of vitamins: Kamminga (1995).
24. Jansen (1929), p. 9.
25. Hopkins (1912).
26. Carpenter (2000), pp. 98-100.
27. Ibidem, pp.105-9.
28. Cf. footnote 12.
29. Van Leersum (1917).
30. De Feyter literally, and somewhat ambiguously, writes that 'a small town was not the right place to live for a man holding scientific illusions': De Feyter (1938), p. 826.
31. *Algemeen Handelsblad* (1932).
32. The Russian-Dutch field hospital was one of the four field hospitals the Dutch Red Cross had sent to the war: three Dutch field hospitals were financed by the Dutch Red Cross and the Russian-Dutch field hospital was financed by a group of prosperous Dutchmen and Russians in St. Petersburg. See: *Bataviaasch Nieuwsblad* (1900).
33. *Algemeen Handelsblad* (1932).
34. Kox (2007).
35. On the 'Aufruf', see: Böhme (1975). On Fritz Haber, see: Szöllösi-Janze (1998).
36. Baggen e.a. (2003), pp. 165-167; Otterspeer and Schuller tot Peursum-Meijer (1997), esp. on. pp. 21-74.
37. Van Leersum to Lorentz, 25 December 1917, Lorentz Archive (inv. nr. 166), Noord-Hollands Archief, Haarlem.

38. 'Advies Wetenschappelijke Commissie van Advies en Onderzoek in het belang van Volkswelvaart en Weerbaarheid aan minister van Binnenlandse Zaken', 10 September 1918. Archive Nederlands Instituut voor Volksvoeding, Voedingscentrum Den Haag [ANIVV].
39. Ibidem.
40. Committee for the establishment of a Dutch institute for nutrition to its members, 14 June 1919, ANIVV.
41. See, for the German scientific supremacy in Germany: Willink (1998), pp.51ff. For Kamerlingh Onnes: Van Delft (2007); for De Vries: Zevenhuizen (2008); for Van 't Hoff: Snelders (1990); for Debye: Hoffmann & Walker (2011), pp. 11-17.
42. Knegtmans (2003), pp. 233-244.
43. Hugo Ehrenfest to Paul Ehrenfest, 17 September 1911, Paul Ehrenfest Archive EPC 2, Section 5, 58, Museum Boerhaave, Leiden. For Paul Ehrenfest's search for a position, see: Huijnen & Kox (2007).
44. Kamminga & Cunningham (1995), pp. 6-10.
45. Cited in: De Knecht-Van Eekelen (1996), p. 44.
46. E.C. van Leersum, 'Overzicht van de studie-reis door de Vereenigde Staten van Noord-Amerika en Engeland (27 Aug. 1919-11 April 1920)', ANIVV.
47. Van Leersum (1920a).
48. Ibidem.
49. Van Leersum (1920b).
50. Ibidem.
51. E.C. van Leersum, 'Een Nederlandsch Instituut voor Volksvoeding', included in: Van Rijnberk (1918), on p. 1078.
52. Annual Report Director NIVV April 1930-April 1931, ANIVV; Apple (1996), p. 44.

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