Ernst Cohen as an entrepreneur?

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When a few years ago Frits Broeyer and myself started the Cohen project, if I may call it like that a little bit disrespectful, our first focus was Ernst Cohen as a victim of Nazi-barbarism. Frits and I learned - by way of Cohen's grandson Ernst Verloop – of the existence of an account of his imprisonment in Amsterdam and in camp Vught that he had written in 1943 after he was surprisingly released from the concentration camp. We were fascinated by this account: how cool and almost scientific he wrote about it. This was partly due to his character. One of the phrases in the book says: "I decided not to think about my future". On the other hand, this is rather common for accounts of unpleasant, even horrific situations. People tend to normalize their position in such accounts in order to deal with it. When we published the text we tried to contextualize what we had found. Frits Broeyer tried to find out what exactly happened to Cohen in the last years of his life and I tried to give a first interpretation of the text and tried to see it as a source for the history of universities, which is my field. I aimed at giving the text a place amidst other autobiographical texts written by university professors.

After the publication of the account of his imprisonment we stood for a dilemma. What were we going to do with the lengthy memoirs to which the Amsterdam/Vught text was in a certain way a kind of a wry coda. I must admit that I was not so enthusiast in the beginning, which I have explained in the introduction to the book. Maybe I still had the vivid memory of the memoirs of the historian Pieter Geyl which I co-edited a few years before. Geyl was at least as self-conscious as Ernst Cohen and they are quite comparable in what I can describe as "geleerdenijdelheid", the typical vanity of successful scholars. But the text of Geyl's memoirs, which counts also hundreds of pages, had some literary qualities, that was a story unfolding, while the text of Cohen's *Na Driekwart Eeuw* is something like an enumerative description of his life, full of citations, newspaper clippings etc. Geyl was more autobiography, Cohen was more memoir, to use a distinction that we find in the literature about this topic. But Frits Broeyer convinced me and when Ernst Verloop gave a financial guarantee for the publication we started to edit the text, although I must admit that Frits did most of the editorial work.

After reading the text again and after writing the introduction to the book my opinion changed: there is much more in this book than you might think at first sight. Yes, there are all those people he has known, and yes there are all his trips abroad, including holidays and near-accidents when riding a bike with dysfunctional brakes near the Mosel river. But when we see how much the university administrations emphasize the importance of internationalization nowadays one might think that this is

a direction we only recently took. The historian of science knows better. In the University Museum, here in Utrecht, we keep the wallet of one of Utrecht's greatest scientists, the physiologist and ophthalmologist Frans Donders who was born in 1818 and died in 1889. It is not a coincidence that we find in this wallet two kinds of objects: cartes de visite and train tickets. And if we didn't know yet how much the nature of science is international with an urge for travelling that was boosted with the coming of trains in the nineteenth century, one has only to look at Ernst Cohen's life. He was travelling constantly and corresponding with everyone who meant something in the field of chemistry. In this respect the memoirs of Ernst Cohen can learn us a lot and provide ammunition for the thesis that internationalization is and was standard procedure in science.

Historians of science nowadays are interested also in networks: how are they organized? how do they function in the process of transferring knowledge or theories? how are they maintained? In Cohen's memoirs you can also see that these networks or circles overlap and that some are rather old. One of those of which Ernst Cohen was an active member was a committee with a very long name: the *Comité Permanent des Tables annuelles de constantes et données numériques de chimie, de physique et de technologie*, a commission to standardize scientific terminology and measurement. It is what some historians of science call "the need for cognitive homogeneity", a need that became stronger in the third quarter of the nineteenth century when developments in the natural sciences speeded up. It shows not only something of the scientific curiosity that has always been at the basis of scientific cooperation and exchange, but it is also a sign that there was no way back to the national scientific cultures of the first half of the nineteenth century. Ernst Cohen knew and he was in the middle of the process.

I will not elaborate any longer on this international side of the networking Ernst Cohen, Geert Somsen will tell us later this morning about the breakdown of some of these networks as a result of the First World War and the efforts of Cohen and a group of fellow scientists from Utrecht and the rest of the Netherlands to pick up the bits and pieces. It only shows how rich a source the memoirs of Ernst Cohen are for the historian of science.

As I said, the memoirs of Ernst Cohen provide a lot of facts and insights in his life and times. He was many-sided. To my surprise and to my pleasure he had a weakness for history and although they are contributions of a certain kind, in his bibliography one nevertheless can find a whole list of articles on historical themes ranging from eighteenth century work on Boerhaave to biographical contributions on chemists in the twentieth century. One of the most sympathetic quotes by Cohen is from a speech he held at Cornell University in Ithaca, New York, in 1926 when he was there as a visiting professor. He said that he hoped that every student would set up a little library of his own. And then he continued: "In this library he should find a place for books which treat the history of science, as well as for those which I should like to call the 'belles lettres' of science... Historical studies are part and parcel of a scientific education... The man who studies the history of science will

get a better insight into the problems that are nowadays a center of interest...” This was a Cohen I had not expected. There was however a Cohen which I expected, but didn’t find. The title of my contribution today is “Ernst Cohen as an entrepreneur?”. This title is explicitly with a question mark. Because to me that is one of the enigma’s of Ernst Cohen. But first, let us look at the context.

I said before that sometimes we find contemporary issues about science and about the university that are debated so vehemently that you would almost believe that it is the first time they are on the agenda. It is not only internationalization. For instance there is also the idea of the commercialization of the university and the sciences. The critics speak of a large scale bargain sale of the university, they speak of selling the soul of the university to the devil and see a neo-liberal conspiracy to degrade everything that is sacred. One of my colleague historians wrote an article with the title: “From homo academicus to homo economicus.” He also edited a book *If you’re so smart, why aren’t you rich?* This not an isolated outcry of a Dutch historian who has lost touch with the real world. A random pick into my own library produces Jennifer Wasburn’s *University Incorporated. The corporate corruption of higher education* and also *Mission and Money. Understanding the University*. These books are all warnings against the entrepreneurial university. I will not go into the question here if we all are indeed going to the devil or that we are heading full speed to the MacUniversity, but it is important to make one remark at least: this is much more complex than can be summarized in a slogan and most important: this has an historical background.

First we must make a distinction in the concept of the commercial university. Very often people confuse the idea of practical knowledge or applied science on the one hand with the commercial university in the way as it is used in the book I just mentioned. Applied science or the production of practical knowledge is as old as science or knowledge production itself. But somehow there is this idea of pure science which is not only meant as theoretical or non-experimental science, but the term “pure” has also moral connotations. It has something to do with what is sometimes called the myth of Wilhelm von Humboldt, the philosopher and founder of the University of Berlin. His ideas about Lernfreiheit and Lehrfreiheit - the freedom to teach and the freedom to learn – have had a huge impact on the concept of the university and the concept of modern science. Many people believed that this set of ideas were the basis of the enormous success of German science in the nineteenth century and especially the notion of the so-called pure science: science without state intervention and without bonds with the industry. Historical research has – however – shown that the success of German science *and* industry in the nineteenth century is surprisingly – or maybe not so surprisingly – the result of a close cooperation between state, industry and science.

In the Dutch situation an important date is 1876 when at last a Law on Higher Education was issued. With this law *higher* education became *scientific* education and one of the results of the implementation of this law was that the universities started to train their students to become scientists. It is also the period of the Second Golden Age as it is sometimes called, the era in which the first generation of Nobel prize winners are building up their career: Van ‘t Hoff, Lorenz, Zeeman, Van der

Waals and Kamerlingh Onnes. It might be argued that in this period until about 1920 "pure science" had a higher status than practical or applied science. On the other hand, the situation is somewhat more complex: of course there was applied science in this period. But what still can be said is that after circa 1920 we see a debate emerging about this applied science. One of the questions was if the state didn't have the obligation to play a more stimulating role. Of course it was especially the First World War that triggered this debate. Science was rather Janus-faced during this Great War, the outbreak of which we commemorate this year. On the one hand there was a huge disappointment and resentment towards science. This was after all the war in which technology came to the forefront, technology like machine guns and poisonous gas, based on the results of scientific research. On the other hand much hope was placed on science as a saviour in perilous times: society was much burdened by the war, there were shortages of all kinds. The idea was that science could help to increase the production of food and could help industry to solve the problem of the shortage of raw materials by developing synthetic replacement of those raw materials.

This is what Ernst Cohen also saw. In his memoirs he writes: "How false it is to set 'pure' science against 'applied' science was never stronger shown than during the First World War. It would be interesting to write the history of the cooperation of those two as it has developed in almost all the countries in the world during this sad period" (p.168). In the Netherlands there was an official state committee, installed by the government as the result of an advice of the Royal Academy of Sciences, Cohen was a member of it. It was short-lived, because the war ended a few months after the committee began its work, but it led eventually to another committee in the nineteen twenties which resulted in the founding of the still existing Dutch Organization of Applied Scientific Research TNO in 1932. So, for Cohen the division between pure and applied was superficial. On page 342 of his memoirs, he quotes from a speech by the physicist John Tyndall in 1879 which he approves completely: "Few seem to comprehend the real origin of the marvels of industry and the wealth of nations. I need no other proof of this than the frequent employment in lectures, speeches, and official language of the erroneous expression 'applied science'(...) There exists no category of sciences to which the name of 'applied science' could be given. We have science and the applications of science which are united as tree and fruit". Interesting is that Cohen also quotes Carl Duisberg, one of the leaders of IG Farben: "Wissenschaft und Technik gehören zusammen, keine kann heute mehr ohne die andere sein, die Trennung ist ein grosser Fehler" (Science and Technology belong together, nowadays the one cannot exist without the other, the separation of both is a big mistake). And then Cohen adds as his personal view: "This is a notion, which had not yet been generally accepted by Dutch industry". So he reverses the issue: it is not science that is the problem, but industry. Cohen writes this after 1939.

He had an eye for the industry and he already expressed that in his inaugural address in 1902 *Rumor in Casa*. In the address he argues that the laboratory is the central element in the education in chemistry. As an extra argument he pointed at the large-scale industry, which uses the results of research in the lab. By way of the industry the chemical lab thus influences the economical situation of

the civilized world. But although he always had this open eye for the industry, he realized there also was a tension between that what the industry needed and wanted and science. I already indicated that in 1918 Cohen was a member of the committee that had to solve the problem of the shortages in food supply and in raw materials for the industry. This committee was an initiative of the Section for Natural Sciences of the Royal Academy of Science of which Cohen was a member since 1913. Cohen was aware – as I said – of the needs of the industry, but on the other hand he also had a little distrust of the non-scientific world. During the discussions in the Academy about this committee an earlier discussion popped up again about the question if there was a need for a central laboratory for testing and calibration. Cohen took part in the discussions and made clear that what he wanted for this kind of institutions was a firm grip of science itself. Science had to take the lead over here.

This understanding that science and industry needed each other but that there was a certain kind of final responsibility of science is typical for Cohen. He had a real nineteenth century optimistic view about science, or like his PhD-student and later colleague Hugo Kruyt said in his obituary in 1949: Cohen "was a typical nineteenth century positivist". I think that is a correct view. Part of this nineteenth century positivism is also an optimism, an optimism that ultimately, with a lot of hard work and trial and error, science would solve the problems. In his book on the experimental physics at Utrecht university Han Heijmans points at the plea Cohen made in the middle of the First World War in favour of the natural sciences. He wanted a further integration of science and society, because he thought that science could have a beneficial influence on society. He especially wanted to oppose the distrust of science that runs as a romantic undercurrent through the history of Western society. As Kruyt formulated it in his already mentioned obituary: "philosophical reflection and especially metaphysics were a mysticism to him". In his 1916 speech *Quo vadimus*, Where are we going, Cohen says about the war which held the greatest part op of Europe in the embrace of terror: "One begins to understand the influence on the advancement of culture and morality, one recognizes, that the so called humanities alone are not capable to bring the humane in man to the highest expression, that they have not been capable to prevent the erection of the stake and that they (he is still talking about the humanities) are only useful for a few individuals" (p. 444-445).

There is a little discrepancy over here, but in general this is an idea that is a constant in his thought and he utters it the more when science seems to be in times when he feels there is an oppression of science. The discrepancy is this: although he is not artistic what so ever (he says so himself in the opening pages of his memoirs and regards the efforts of his music- and drawing teachers as a waste of time) he is a man of culture. He knows his classics, he is able to cite Goethe and Condorcet, he quotes Michel de Montaigne and reads Dickens. He is the typical representative of the "gebildetes Bürgertum" as the Germans express it so adequately. He also believes in that. That is why he is so annoyed when he discovers how many people are ill-treating the Dutch language. In his memoirs he gives a whole list of examples from everyday experience of this phenomenon. On the list are not only quotes from students (everyone who has to grade papers of students can easily produce

such a list) but also from cabinet ministers, government officials and school masters. But indeed, for Ernst Cohen all this is standard behaviour of an elite. Culture and knowledge of the past are prerequisites for the maintaining of society. He doesn't believe in the claims of some parts of the humanities that art and culture should have a higher status than the sciences.

In his dissertation *Synthetisch denken* which deals with the ideas of scientists about their position in modern society in the first half of the twentieth century, David Baneke takes as a case the bankruptcy of science debate in the eighteen nineties originated by Ferdinand Brunetière. Brunetière wrote an article in the *Revue des Deux Mondes* in which he declared science "bankrupt" and concluded that religion was on its way back into the hearts and minds of the people. Science hadn't realised what it had promised. Brunetière also was, more than once, one of Cohen's targets. What Cohen irritated was not so much the predominance of religion in Brunetière's thesis, that was one's personal choice, but that he didn't seem to know anything about what science really was and that he relied of science popularization of the worst kind. That strengthened the idea in Cohen that science education in a broad sense was absolutely necessary.

Education was crucial for him. In a certain way his ideas about scientific education were of an Humboldtian colour. Already in his inaugural address in 1902, *Rumor in Casa*, he said that lab work for students also has an "ethical-aesthetical side". Not only, Cohen argued, "does lab work develop meticulousness and independence and not only raises self-confidence, it also makes him who works earnestly realize how he can best distribute his time and how much patience and perseverance is needed to elicit the secrets hidden in nature" (17). For Cohen scientific education and character-building were one as this quotation shows. He repeated it at several occasions, also in his memoirs. He takes himself as an example: "To the development of those qualities which constitute the character, I only mention perseverance, self-control, a sense of justice, cautiousness in judgment, modesty (hear, hear) and altruism I was wonderfully well schooled by doing research into nature" (184). Those persons who have gone through this *and* who have learned to apply the methods of science are really wanted by industry. They will steer the existing companies into new directions and they are the ones who contribute in the most direct way to the prosperity and happiness of the nation.

Cohen seems to be in tune with his times when he agrees that the university is an important supplier of scientifically educated alumni for the industry. He had, however, strong ideas about what kind of students he wanted to turn out. We learn something about that in the years around 1920, when there was a major change in the Law on Higher Education. In the new regulations one of the changes was that no longer the PhD was compulsory for graduation. It was no longer a doctor that left the university, but a doctorandus. In this operation the programme was reduced to 5 years: three years for the Kandidaats (say: Bachelor) and two years for the Doctoraal (say: Master). Cohen "deeply regretted" this step, as he himself formulated it. On several occasions he aired his feelings. The doctorandus, he wrote, is someone whose scientific development has come to a standstill. Cohen speaks of a suddenly interrupted process. The five years of study of the doctoraal he sees as just

introductory. The most important for him is the PhD, that is when a student has proven himself. Cohen was not the only one who ventilated this opinion. In 1924 an interesting brochure appeared, published by the Amsterdam based national newspaper *De Telegraaf* . It included interviews with reknowned university professors. One of them was Nobel prize winner Pieter Zeeman and he also complained of the new system. For him also the graduated PhD student was to be preferred above the doctorandus graduate.

I mention this, because when I compare this with Hugo Kruyt's well known brochure *Hooge School en Maatschappij* which he published in 1931 Kruyt had been, like Ernst Cohen and many of his colleagues to the United States, but he came back with other ideas than most of them. Kruyt had seen the campuses of American universities and he noticed the variety in students that were studying on those campuses: different levels, different programmes, difficult course duration, etc. Wouldn't it be more beneficiary for the students *and* for society when such a system would be introduced in the Netherlands? This brochure *Hooge School en Maatschappij* generated a broad discussion on the topic, although nothing changed. Nevertheless, what we see is a rift in the discourse on higher education. Maybe we can call it a rift between generations. For Cohen, as we have seen, there was no such thing as a dichotomy between pure science and applied science. He also saw no problem in training students for jobs in the industry. But the starting point for all this was scientific work. The profit for society resulted more or less automatically from doing science, classic experimental science.

Maybe you think: when is he coming to the point and will he go into the question of the entrepreneurial Ernst Cohen. Well, to come to that I first needed to explain that for Ernst Cohen there was no real division between pure and applied science and that education for him was more than just training useful employees. But again I will first look at the context. In his inaugural address *Speuren op de tast* Ernst Homburg maps out the early twentieth century history of industrial research. He sees a convergence of the developments somewhere in the nineteen thirties. In the first decades of the twentieth century we see that scientists at the universities (like Ernst Cohen for instance) develop an open mind towards the needs of the industry but maintain the idea that science for science' sake is what really matters. Good fundamental science will lead to commercial applications and there is nothing wrong with that. On the other side, I mean the side of the industry, we see the founding of some very well equipped laboratories of big firms (oil companies for instance) which do basic testing and some product research. In the nineteen twenties and more so in the nineteen thirties we see another development. We see a tendency that the laboratories of the big corporations are doing more and more fundamental scientific research. An important example is the Philips Physics Lab. In the universities we see the reverse of this development. More and more the professors are earning surplus money to keep their laboratories up to date, to buy new and expensive equipment and to develop new research programmes. This was partly instigated by the economical circumstances of the nineteen twenties and the nineteen thirties. It was also a result of the speeding up of the technological needs and possibilities

for research labs, possibilities that were very expensive. This way of earning money however had also something to do with a change of mentality, another attitude towards the idea of science and education.

In history and sociology there is a theory that uses the concept of generations to give an explanation of historical change. I won't go into the details of this theory now, but maybe we can see here a change of generations. Cohen's younger colleagues were prepared to go a step further than he did. Take for instance the physicist L.S. Ornstein in Utrecht who had connections with a foundation for lighting and a foundation for heat. And via these foundations he was connected to the industry. A considerable part of his lab personnel was hired with money he earned with work for commercial third parties. Ornstein was not the only one of his generation. There was also Ernst Laqueur in Amsterdam who worked with the slaughterhouses in the town of Oss and eventually was one of the founders of the pharmaceutical industry of Organon. Or take Paul Ehrenfest in Leiden who earned money for his institute as a result of cooperation with the Philips Physics Lab in Eindhoven. For all of them science was science, but they all were walking the path of commercial exploitation of their respective sciences. Cohen did not.

One might wonder why. To begin with: was it something in his background? Wasn't he used to industry? On the contrary. He was the grandson of a manufacturer of vinegar and his father was one of the founders of a chemical firm that from coal produced raw materials for the dying industry. Because of his father all kinds of industrialists frequented their house in Amsterdam, among them J.C. van Marken, the well known owner and founder of the Nederlandsche Gist- en Spiritusfabriek. So, it was not his background, from childhood on he was acquainted with industry and trade.

What else could have prevented him from making the commercial turn? His character perhaps? It becomes rather clear from Cohen's memoirs that this was not the case. When in 1918 Cohen celebrated the 25th anniversary of his doctorate, friends and colleagues presented him a special issue of the *Chemisch Weekblad*, the Chemical Weekly. Hugo Kruyt wrote in it: "Cohen is a man of action" and he was right. Cohen also didn't have contempt of money. When the Dutch Congress for Science and Medicin gathered in Utrecht in 1921 he saw that the financial situation of the Congress was not good. So he asked a friend of his who was in the tourist business and asked him to take care of the programme leaflets: the idea was to fill them partly with advertisements. And indeed: they didn't cost anything. On the day of the meeting of the Congress he went to the large coal trading firm SHV which existed 25 years. Cohen congratulated the board of directors and asked them to give a birthday present to the congress. They did and he brought with him to the opening session of the Congress a cheque of 5000 guilders, which is nowadays more than € 36.000 worth. Yes, he really was a man of action. When he came to Utrecht in 1902 he came on one condition: that the university gave him a new laboratory. When this did materialize fast enough he personally went to the prime minister and within a few week he had a plan and got approval. He did the same in 1916 when he visited the minister who was responsible for education to negotiate the enlargement of the Van 't Hoff laboratory.

Cohen had the energy, the will and the capabilities collect money. He had, as we would say today, certainly an earning capacity. But this energy did not go into relations with the industry like his younger colleagues would do in later years. For him it was important to convert this energy, of which he had a huge supply, into a social return. Countless were the clubs and societies of which he was a member, or rather of which he was in the board.

When I try to summarize this is what struck me most and what surprised me when I read Cohen's memoirs: if there was any of the scientists in the Netherlands in the first decades of the twentieth century of which I had expected that he scientist and the entrepreneur would have merged it would have been Ernst Cohen. From character, temperament and background he seemed almost to have been destined to be a great scientific entrepreneur. Of course this is psychology of a very amateurish kind, but I think it was the same background that prohibited it. He was from a nineteenth century bourgeois family for which it was important that the social fabric was preserved. Civilization, politeness, refinement, culture, good manners: they are all words you can find in a dictionary when you search for an exact translation of the word "beschaafdheid" or "beschaving" and they all can be applied to him. That is also why Cohen has always emphasized the importance of education and that is also why for him the past was as important as the future was. Business and industry were important for the prosperity of the nation, but there was always something else that was deep down more important.

This idea of "beschaving"is maybe also one of the keys to another enigma in relation to Ernst Cohen. Ever since I have read the story of Cohen's life I have been wondering why oh why he didn't go into hiding after he was released from camp Vught: it would have been easy. He knew people, money could not have been the problem. But he didn't. Instead he went to his friend and colleague Willem Pompe, one of the law professors. The story goes that Cohen asked how it was legally possible that all this nazi-barbarism couldn't be stopped. Pompe must have answered that this regime had nothing to do with the legal foundations society was used to. And therefore my idea that the reason why he didn't hide when they came for him is this: he stood for nineteenth century civilization and there was no place for a system that violated everything he stood for. You don't discuss with them.

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