Rural History in Europe 8

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Integration through Subordination. The Politics of Agricultural Modernisation in Industrial Europe

Edited by
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BREPOLS

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12. Mediators between the industrial state and agriculture: the social profile and professional activities of agronomists in Switzerland, 1871-2007

Daniel FLÜCKIGER

I. Introduction

As the number of people working in the agricultural sector decreased drastically in Europe during the second half of the twentieth century, the number of employees in closely related areas of the economy continued to multiply. Fewer and fewer farmers, farmers' wives and farm labourers faced more and more advisors, salesmen, teachers, clerks and researchers – many of whom were trained agronomists. For a long time historical research neglected the rise of these new occupations, even though their increasing prominence and interaction with the farming population is one of the more significant features of agricultural change in the twentieth century, as recently published studies have maintained (Auderset, Bächi & Moser, 2012; Moser, 2003: 25; Uekötter, 2006a: 148).

Historians have often argued that improvements in agriculture were initiated 'from above' and failed because of the 'stubbornness' of farmers. Frank Uekötter (2006a: 160) has pointed out that this interpretation, however popular it may be among political elites, certainly does not hold good in the sphere of environmental stewardship. By downplaying the relevance of practice in the development of theories and policies, the 'from above' perspective might even be said to be more part of the problem than the solution.

Éric Mollard (2002: 10-12) and Deborah Fitzgerald (2003: 5-6), for instance, suggest that the ongoing and intimate contact farmers have with the soil, plants and animals leads to a knowledge that enables them to use these resources in ways conducive to sustainable development. They describe the modernization of agriculture in the twentieth century, with its negative social and environmental effects, as a project that was forced upon agricultural communities from outside and as one that has mainly reflected the ideals of political elites. Agronomists, according to this view, were aligning themselves with the interests of the state and the political elites and represented their interests in the sphere of agricultural practice. Under such circumstances the social distance between the farming population and the new occupations was bound to widen.

While this perspective is convincing, the question remains: how well is the suggested social distance between the farming population and the agronomists supported empirically? Until recently, a major obstacle to answering this question was the absence of sources produced by the farming population themselves. Uekötter (2006a: 148) has suggested that the technical literature of agricultural advisors might be a fruitful proxy source of evidence. But such documents lamentably provide little information on the social background of agronomists and their relationships with farmers.

Fortunately, in the last ten years a great variety of sources produced by farmers, farmers wives and farm labourers have been unearthed and catalogued by the Archives of Rural History (ARH) in Bern. Since its foundation in 2002 the ARH have made accessible the papers not only of more than a hundred farmers and farmers organizations at the local, regional and national levels, but also a substantial body of new source material from agricultural colleges and research stations of the state. Many of these collections contain texts, minutes and copious correspondence written by young farmers who were educated in agricultural colleges by agronomists or by farmers and farmers wives who worked closely with scientists in plant or cattle breeding projects (Brodbeck, Flückiger & Moser, 2007; Brodbeck, Ineichen & Schibli, 2012). Switzerland, therefore, is a particularly suitable case to conduct an empirically based analysis of the relationship between farmers and agronomists and the process of knowledge creation and transfer between the new occupations and the farming population[1].

For more than a century here the agronomists (*Ingenieur-Agronomen*) were exclusively trained at the Swiss Institute of Technology (ETH) in Zurich. This training course was established in 1871 by the Swiss Federal State with the aim of forming a national elite in the agricultural sector. And, indeed, many graduates soon began to occupy important positions in the civil service, in agricultural associations and in private companies within the agro-industrial complex. This chapter aspires to provide a clearer picture of the Swiss agronomists as a distinctive and well-organised professional group. It aims, in addition, to shed light on the relationship between the agronomists and the farming population in the process of knowledge production.

To this end a social profile of agronomists is provided by first looking at their social origins, training and occupational outlets between 1871 and 2006. Then their professional self-organisation, and their means of advancing and defending their

[1] This article is based on a research project of the Archives of Rural History on agronomists which has been funded by the State Secretariat for Education and Research (SER) in the course of the COST action A35.

occupational interests will be discussed. Thirdly, some of the day-to-day activities of agronomists, in particular in relation to the topic of feed conservation techniques from the 1920s to the 1950s, will be examined more closely. The influence that social and institutional circumstances have had on the professional activities of agronomists will be assessed here as well as the claimed development of agriculture towards a science-based industry. Finally, the question of whether it is appropriate to see the modernization of agriculture as something imposed from outside and 'from above' will be discussed.

II. Social profile

The term 'agronomist' dates back to the middle of the eighteenth century (Mollard, 2002: 6) when it came to be associated with a European movement of agricultural reforms and improvements organized by 'economic societies'. Prominent examples of such societies are found in Edinburgh, Dublin, London, Rennes, Zurich and Bern (Holenstein, Stuber & Gerber-Visser, 2007: 13). In the Swiss context, the Economic Society in Bern (*Oekonomische Gesellschaft Bern*) has become the subject of extensive research during the last few years (Stuber *et al.*, 2009).

The agronomists of the eighteenth century operated in significantly different surroundings compared to those of the late nineteenth and twentieth century: they lived in a pre-industrial economy[2]. Agriculture was the leading sector of the economy and their main aim was to achieve an optimal use of biotic resources. Society was viewed as depending on agriculture and as flourishing only when agriculture and forestry provided them with the necessary resources (Pfister, 1990: 37-49; Sieferle et al., 2006: 49-50). Furthermore, the eighteenth century agronomists were not professionals in the modern sense but rather, in most cases, landowners who experimented on their own estates or farms with new methods of crop and animal husbandry and discussed the results in learned journals. Most of these individuals belonged themselves to the political elites (Mollard, 2002: 9). They offered their followers opportunities beyond individual economic profit and their authority was often independent of their practical success or failure (Stuber *et al.*, 2009: 26). In the second half of the nineteenth century, agriculture lost its leading role in societies that had become, or were in the process of becoming, industrial. No longer did 'modernization' primarily mean optimizing the use of biotic resources; it now came to be associated with a more extensive consumption of fossil resources. In this situation, 'old' agronomists such as Albert von Fellenberg-Ziegler in Bern expected agriculture to become an industry

[2] The agronomists of the eighteenth century were familiar with the word 'industrious', but used it with a different meaning from what later came to be understood as 'industrial'. For them, 'industrious' people were essentially diligent labourers (Holenstein, 2007: 17; de Vries, 1994).

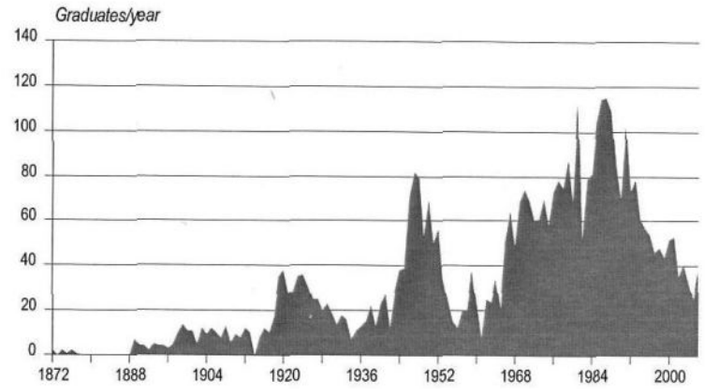
in the same rank as other industries (Flückiger, 2009a: 171-172). They regarded the creation of an academically trained profession as crucial for implementing their vision of a 'new' agriculture and used the newly established agricultural societies in the 1860s to further this demand.

For over a century the Agricultural Department at the Swiss Institute of Technology (ETH), founded in Zürich in 1871, remained the main institution for the education of agronomists in Switzerland. In contrast to their often self-educated predecessors, the 'new' agronomists were all formally trained and earned their living from pursuing their vocation. In the beginning it was difficult for the Agricultural Department to attract students from Switzerland; in fact in the first two decades most students were foreign and all the professors were German (Kraemer, 1896; Düggeli, 1929). The small number of Swiss graduates soon gave rise to criticism, and in 1883 the Federal government responded by supporting the cantons in establishing or expanding agricultural colleges (Schweizerischer Bundesrat, 1883: 871). Before long these colleges had become the most important single source of students for the Agricultural Department at the ETH.

Figure 12.1 illustrates how, in the aftermath of these reforms, an increasing number of students completed their degrees in agriculture. It also shows how the number of agronomists rose particularly strongly after World War I, World War II and again from the 1960s to the 1980s. These three waves, associated with the two World Wars and with the boom in the second half of the twentieth century, are equally evident across the entire range of disciplines taught at the ETH. But since the 1990s, as expansion gave way to contraction, the Agricultural Department has suffered the sharpest decline in student enrolment.

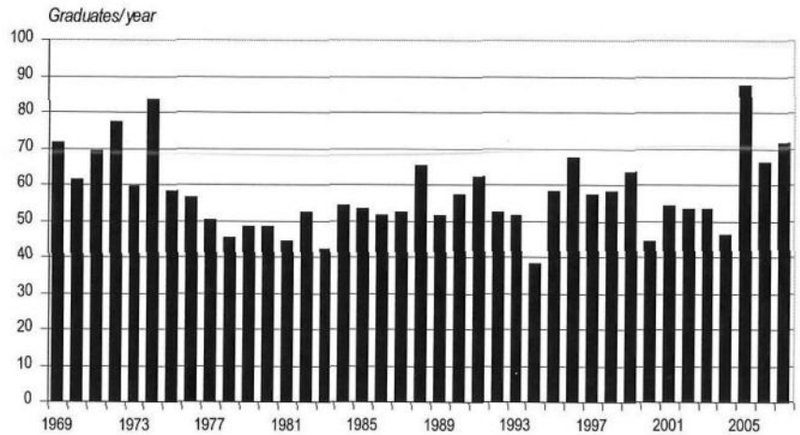
Since the 1970s the ETH has no longer been the sole institution educating agronomists in Switzerland. Several other institutions began to confer a similar, but not identical title on their graduates. The most important of these is the Hochschule für Agrar-, Forst- und Lebensmittelwissenschaft (HAFL) in Zollikofen. In contrast to the ETH, the numbers of graduates at the HAFL has remained stable (Figure 12.2). However, education at the HAFL also has been subject to fundamental changes during the last 30 years. Agriculture, compared to rural-based leisure activities such as horse keeping, has declined in importance at the HAFL as well.

Figure 12.1. Graduates in agricultural sciences at the Swiss Institute of Technology (ETH Zürich), 1872-2006



Sources. Erteilte Diplome an der ETH Zürich 1855-2002, url: http://www.ethistory.ethz.ch/materialien/statistiken (accessed: 02.01.2007); Diplome für Bachelor-, Master- und Diplomstudium 1990-2006, url: http://www.fc.ethz.ch/facts/studierende/zeitreihen/ (accessed: 15.12.2006).

Figure 12.2. Graduates in agricultural sciences at the Swiss Agricultural College (SHL Zollikofen), 1969–2007



Sources. Schweizerische Hochschule für Landwirtschaft, 1969-2006; Pressemitteilung, 17.01.2008, url: http://www.shl.bfh.ch/, accessed: 29.01.2008; Pressemitteilung, 25.04.2008, url: http://www.shl.bfh.ch/, accessed: 04.05.2008.

Beside the statistical information, extensive information on agronomists has been amassed by the ARH from obituaries in the *Bulletin of the Swiss Association of Agronomists and Agricultural Teachers*. The analysis of these obituaries makes it obvious that the social composition of those attending the Agricultural Department at the ETH has changed since the turn of the new century. In the twentieth century, most students were Swiss, predominantly from the German-speaking area; they came from both religious denominations, Catholic and Protestant, and represented all four language groups. (Zollikofer, 1954). In Zürich, as in Wageningen (Burg & Bos-Boers, 2003: 38), women began to study agricultural sciences later than men. The first female student to graduate in agronomy in Zürich was Sophie Sawicka who was awarded her diploma in 1904[3]. But it was only in the late twentieth century that the number of women studying agricultural sciences increased significantly. Between 1970 and 1998 the proportion of female students rose from five to forty-six per cent[4]. For most of the period under survey the ETH offered graduates of the agricultural colleges a special entrance examination. Since many of them were from a farming background, they were in a relatively privileged position when studying agronomy at the ETH where all students at the Department of Agriculture needed at least twelve months work experience in agriculture before they could graduate (Zollikofer, 1954).

Our sample consists of 131 agronomists, among them most of the renowned members of the profession in the twentieth century[5]. Overall, at least a third of those who graduated before 1971 had formerly attended an agricultural college or completed an agricultural apprenticeship. Some two-thirds were graduates from grammar schools (Gymnasien) or had completed a non-agricultural apprenticeship before studying at the ETH. The proportion of sons of farmers among all agronomists was most likely even higher. Of the 131 examined obituaries relating to agronomists who died between 1933 and 2005, two-thirds (87) were the sons of farmers. Although only a few per cent were the sons of agronomists, a small number of highly prominent dynasties of agronomists (such as the Keller family) did exist. Sometimes the sons of agronomists even became farmers themselves. Farming was, at least until the 1970s, not an inferior activity for agronomists. For Switzerland, therefore, it is hardly appropriate to assume a big social distance between agronomists and farmers or to claim that this 'new class' forced an alien modernization project upon farmers. The results for the agronomists fit fairly well with the general pattern of the professions

[3] See the biographical database Personen der ländlichen Gesellschaft im 19. und 20. Jahrhundert (www.agrararchiv.ch).

[4] Weibliche Studierende an der ETH Zürich 1917-2002, url: www.ethistory.ethz.ch/statistik/, accessed: 15.12.2006.

[5] All the biographical information relating to Swiss agronomists used in this article is to be found in the biographical database Personen der ländlichen Gesellschaft im 19. und 20. Jahrhundert (www.agrararchiv.ch).

(lawyers, medical doctors, and engineers) in Switzerland which seem to depend less on the central state than elsewhere in continental Europe (Siegrist, 1988: 94; Siegrist, 1996: 353). On the other hand, state institutions were crucial in Switzerland as well for creating and promoting the agronomists as a profession.

III. Professional organization and activities

Professions can be viewed as occupational groups who obtain a jurisdictional authority over specific fields on the basis of their monopoly of specialised skills. They usually form their own organizations, accredit the skills of their members, justify their claims with reference to public purposes and functional necessities and generate considerable individual incomes on the basis of eliminating the competition of laymen (Ridder-Symoens, 1996; Brassley, 2005; Siegrist, 2005: 70). Although Harold Perkins (1989: 83) uses the notion of 'professional classes', more recent contributions emphasize that professions were more open than closed in a way that allowed for a certain social mobility (Ackroyd et al., 2006: 17-19). In this context, the Swiss agronomists are rather a profession than a 'new class'.

The vast bulk of the 'new' agronomists spent their working lives in three areas (frequently changing from one to another in the course of their careers): education and extension, central administration and the agricultural organizations. These fields of activity were especially important, but of course many agronomists were also to be found right across the food chain: from the field of production to the processing industries and food retailing.

The Agricultural Department at the ETH had also been established to educate agricultural teachers for the agricultural colleges. When the 'new' agronomists founded their own organization in 1901, teaching was their main concern; the name of the new institution was: Swiss Association of Agricultural Teachers (*Schweizerischer Verband der Lehrer an Landwirtschaftsschulen* SVIAL). The association published textbooks, organized further vocational training, established contacts with colleagues in other countries and kept its members informed of job opportunities. In this institutional context agronomists also reflected on their collective identity and on the defining tenets of their profession (*Schweizerischer Verband der Lehrer an landwirtschaftlichen Schulen und Ingenieur-Agronomen*, 1951: 9–13).

Table 12.1 shows the occupational activities of agronomists during the twentieth century. The columns from 1900 to 1972a are based on the obituaries mentioned above. The columns from 1972b on are based on membership surveys conducted by what was now called the SVIAL Association. Education was by far the most

important occupation open to agronomists in 1900; after a slow relative decrease it still accounted for one-fifth of their known employment in 1999. It should be noted that the percentages shown for extension are most likely too low because, initially, advising farmers in the fields was a summer occupation for agronomists who taught winter classes at the agricultural colleges. It was during the long summer break that they were able to visit farms, work for agricultural organizations or conduct experiments. Sometimes these part-time activities developed into new full-time occupations. The connection between education and extension was especially strong in Switzerland where a separate advisory service was established only in 1958 (Blum, 1993; Baumann & Moser, 1999: 122-127, 380-382).

Table 12.1. Professional activities of members of the *Schweizerischer Verband der Ingenieur-Agronomen und der Lebensmittel-Ingenieure (SVIAL)*, 1900-1999

Professional Activity (%)	*1900*	*1925*	*1950*	*1972 (1)*	*1972 (2)*	*1985*	*1989*	*1999*
Public Administration	17	10	11	12	13	16	16	11
Education	44	37	28	22	22	24	20	21
Agr. Unions/ Associations	8	15	20	20	na	na	na	Na
Marketing/Management/Sales	na	na	na	na	15	11	18	10
Research and Development	14	17	20	23	35	20	30	16
Extension	0	0	3	5	8	22	11	30
Development Cooperation	0	1	2	3	4	2	5	na
Divers	17	18	16	17	3	5	0	11
Total	100	100	100	100	100	100	100	100
Number of Persons	20	113	188	150	na	na	1549	352

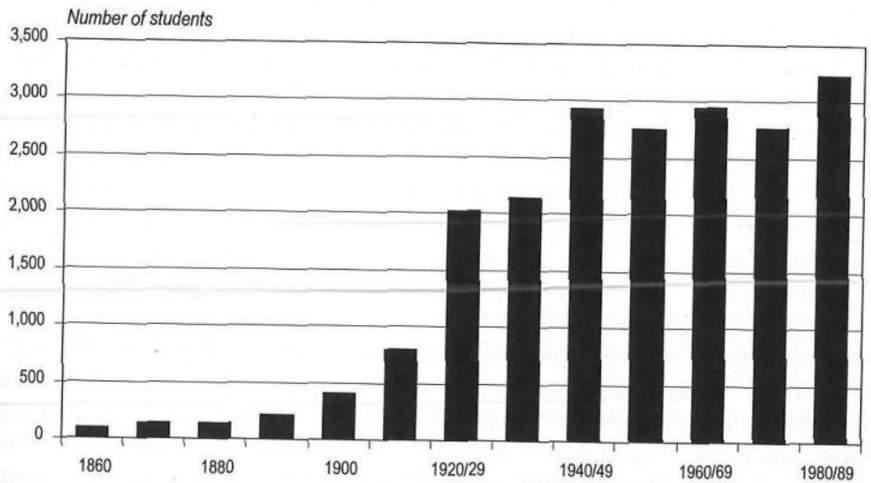
Sources. Archiv für Agrargeschichte: Personen der ländlichen Gesellschaft im 19. und 20. Jahrhundert; Archiv SVIAL (1971(2)-1999). With the exception of the column for 1999 more than one answer per person was possible.

The expansion of education and extension was crucial for both the survival and the later success of the Agricultural Department at the ETH. At the beginning of the twentieth century a majority of the Swiss students came from agricultural colleges. While these colleges provided the most important reservoir for prospective students of agronomy, they also offered the most important job opportunities for agronomists. Typically agronomists went back to teach in agricultural colleges after graduating. The circle was completed when some of their own students decided – frequently on the advice of their teachers – to become agronomists themselves.

Agronomists played an active role in the development of the agricultural colleges. Adolf Kraemer, one of the first professors at the ETH in Zürich, supported the introduction of winter classes (*Winterschulen*), a new type of agricultural education which he knew from the south-west of Germany. From the 1880s onwards agronomists such as Hans Moos, Josef Käppeli and Carl Moser set up dozens of new winter classes. This led to a big increase in the number of students. Especially the sons of farmers, whose presence on the home farm was indispensable during the summer months, now attended the agricultural colleges in significant numbers (Käppeli, 1911; Wahlen, 1943).

Figure 12.3 shows how the number of students at agricultural colleges increased between the 1890s and the 1920s, the period when winter courses were introduced. The winter schools were essential for the developments of the agronomists as a group, although one should not overestimate the institutionalization of formal education in agriculture before the 1950s when, in addition to the attendance at the agricultural colleges, the number of apprentices increased rapidly (Stuber et al., 2009: 39-41).

Figure 12.3. Students of agricultural colleges in Switzerland, 1860-1989



Sources. Brugger & Landwirtschaft (1850-1914: 334); Brugger & Landwirtschaft (1914-1980: 17, 20-29).

Agronomists used the typical strategies of the professions to consolidate their position by relying on a sympathetic state (Siegrist, 2005: 78-81). Agricultural colleges were operated by the cantons, but from 1884 the Federal government paid part of the costs of the textbooks and the teachers' salaries as a means of supporting education

and gaining influence. Significantly, the support of the Federal government was granted only if the teachers were graduates of the ETH (Schweizerischer Bundesrat, 1951: 156).

Furthermore, in the first half of the twentieth century, agronomists achieved a monopoly of teaching in agricultural subjects at schools for further training (*Fortbildungsschulen*) in many cantons outside the mountain areas. At the beginning of the twentieth century in many cantons these *Fortbildungsschulen* had become compulsory for rural youth who left school at the age of 16 without taking up formal vocational training; other cantons, mainly in the mountain areas followed suit in the middle of the century (Wegmann, 1960: 56).

Already in the 1930s SVIAL members discussed the desirability of making specialised vocational training compulsory for all farmers who were running a farm – either in the form of an apprenticeship or attendance at an agricultural college (Günthart, 1933: 92; Lichtenhahn, 1942). But it took several decades before this aim was realized. Only the new instrument of direct payments in the 1990s gave the Federal government the power to make farmers conform to whatever the state required them to do or not to do. Since 2007 farmers only receive direct payments for environmental stewardship if they had passed a course of formal vocational training[6]. But the compulsory formal education of farmers is only one part of the ever more encompassing regulation of their economic activities which has been compared to a cage of steel (*stählerner Käfig*) within which European farmers must operate today (Uekötter, 2006b: 123).

State regulation of the agricultural sector contributed substantially to the professional advancement of agronomists. Agronomists were members of the government in the 26 cantons as well as on the national level. And as civil servants they were not only working in the departments of agriculture. Even though the absolute number of politicians and civil servants recruited among the agronomists was never especially high (Table 12.1), those who entered the civil service or made political careers were crucial for the growth of the profession. Many of them were teachers at agricultural colleges before becoming ministers where they often were directly responsible for the expansion of agricultural education. Moreover, since 1913 the director of the Federal Office of Agriculture (BLW) has always been an agronomist. The BLW was crucial in formulating and implementing the agricultural policy that was centralized on the national level since the last quarter of the nineteenth century. During World War I, the director of the BLW, Josef Käppeli, outlined a new conceptual scheme that

[6] Weisungen und Erläuterungen vom 31. Januar 2007 zur Verordnung über die Direktzahlungen an die Landwirtschaft vom 7. Dezember 1998, Art. 2.1.c, url: http://www.blw.admin.ch, accessed: 04.02.2008.

determined the shape of agricultural policy for the next few decades (Moser, 2005). In 1959/60 and again in the early 1990s it was again the BLW that formulated (and implemented) yet another new conceptualisation of agricultural policy (Baumann & Moser, 1999: 366-393; Moser & Brodbeck, 2007: 93-109).

One of the consequences of World War I was that the state intervened to a far greater extent in the agricultural sector than before. During the war the BLW established new producer associations as tools to co-ordinate production and provide food supplies for the domestic population. For most farmers membership in producers' associations became compulsory. For instance, farmers no longer were allowed to retail their milk directly to consumers, but had to deliver it to the local cooperative which then sold or transformed it into cheese in accordance with needs at the national level. As a result, the membership of agricultural associations grew to an unprecedented extent up to the 1950s (Moser & Brodbeck, 2007: 15-21).

The growth of the agricultural institutional matrix (Schuurman, above) created more and more job opportunities for agronomists who often became the heads of these new institutions. However, the new policy developed by agronomists also provoked conflicts between farmers and the state. In the 1930s and again in the 1960/70s dissatisfied farmers repeatedly established new associations that opposed the official agricultural policy. Agronomists often tried to appease the members of these movements and pleaded for co-operation with the existing authorities. Overall, agronomists were very loyal to the state and hardly ever played an important role in dissident organizations (Moser, 1994: 393; Baumann & Moser, 1999: 150-186). Renowned agronomists such as Oskar Howald strongly influenced agricultural policy when in office, but tended to become outsiders when they had retired and began to oppose the (new) mainstream consensus around Swiss agricultural policy (Baumann & Moser, 1999: 198-202, 375-380).

After World War I, as we have seen, agricultural associations employed more and more agronomists. Consequently, the Swiss Association of Agricultural Teachers changed its name to the Swiss Association of Agricultural Teachers and Agronomists (SVIAL) in 1933. Agronomists increasingly worked now as advisors, for agricultural associations, as salesmen or as civil servants (Schweizerischer Verband der Lehrer an landwirtschaftlichen Schulen und Ingenieur-Agronomen, 1951: 23–25).

Table 12.1 shows that after 1972 organizational work in agricultural associations disappears as a distinct category. The SVIAL, in its surveys, no longer considered this as a distinguishable form of activity. At the same time, the importance of employment in industry and commerce rose. However, the original questionnaires in the archives of the SVIAL reveal that agronomists themselves designated their

work in associations as 'Marketing/Management/Sales', 'Research and Development' or 'Extension'. For the agronomists themselves the difference between working in agricultural associations and 'industry and commerce' was in reality rather fluid.

The fact that representatives of agricultural associations increasingly saw themselves as doing basically the same work as employees of industrial or commercial companies explains to a certain degree the tendency of agronomists to distance themselves from the farming world they often came from. At the ETH itself, professors of the Agricultural Department for the first time questioned their position at the intersection between science and agricultural practice – seeing themselves more and more exclusively as scientists. Already in 1955, Hans Deuel and Edzard Zollikofer demanded the abolition of the special entrance examination (created with farmers' sons in mind). They failed in 1955, but in 1969 a further attempt was successful. Moreover, the Department extended the length of the course of studies from four to five years (Zollikofer, 1954). At the same time the HAFL was established in Zollikofen. The SVIAL was one of the main promoters of the new institution. It planned to leave the 'lower' and more technical and practical occupations to graduates of the HAFL, while the graduates of the ETH – their own members – would compete for the more theoretical (and better salaried) jobs. Teaching, of course, was intended to remain an exclusive domain of graduates of the ETH and the title of 'agronomist' (Agronom) continued to be reserved for ETH graduates[7]. However, the HAFL successfully emphasized the value of practical experience and invested in teaching didactical skills. It didn't take long before their graduates were successfully applying for the same positions as those of their ETH counterparts. In the 1990s they even gained access to teaching posts in the agricultural colleges (*Schweizerische Hochschule für Landwirtschaft,* 1969/70: 10; *Schweizerische Hochschule für Landwirtschaft,* 1970/71: 9; Moser, 2009: 242). Today, HAFL graduates are regarded as much more suitable for teaching jobs in agricultural colleges than their few ETH rivals.

IV. Towards a science-based industry?

In the third part of this paper the promotion of new feed conservation techniques is analysed in order to look at the agronomists' activities in promoting new technologies. Such activities became a crucial element in the frequently described development of agriculture towards a science-based industry. The very notion of a science-based industry (*Verwissenschaftlichung*) implies the increasing dominance of science in a specific field (Wieland, 2004: 8; Straumann, 2005: 313). The success of individual

[7] The lobbying that accompanied these changes is well documented in the archives of the SVIAL.

professions such as the agronomists to establish themselves as a body of experts can be interpreted as a part of the broader trend to build science-based industries.

Historians and sociologists have long argued that politics became less important with the development of science-based industries. But recent studies indicate that scientists too were relying on political power in advancing their claims. Indeed, political decisions were a major driving force behind the development of agriculture towards a science-based industry (Wieland, 2004: 233; Harwood, 2005: 224). A good example to study the link between applied science and politics is the promotion of new feed conservation techniques such as silage-making in the interwar period. While the principles of this technique were already fairly well known in the late nineteenth century (Wahlen, 1979; Brassley, 1996), it was not widely applied in practice in Switzerland until after World War I when the agronomists began to promote silage making on farms as a means of advancing the new agricultural policy of the government.

This policy clearly advocated food security for the domestic population over the production of food for the export market. The young generation of agronomists expected that the shift from a specialised, cattle-based agriculture producing cheese for the world market to a more tillage-based, mixed agriculture would result in a decrease of the land available for fodder production. To maintain a high level of milk and meat supplies for domestic consumption, fodder production had to be made more efficient. This became even more important during World War II, when imports of feeding stuff declined and became insecure. The implementation of more efficient conservation techniques such as silage-making and the use of wooden tripods for hay cocks became increasingly seen as the solution to the problem (Grandjean, 1943: 7; Hess & Ryf, 1943: 6-8).

To improve feed conservation techniques had been one of the aims of the Institute of Animal Feeding (*Institut für Haustierernährung*) ever since it was set up at the Agricultural Department at the ETH in 1925. In close collaboration with agricultural colleges, research stations, large farms and industrial companies, agronomists at the institute conducted surveys and experiments relating to silage making, artificially dried grass and the use of wooden tripods for hay cocks (Wiegner, 1935: 184; Landis, 1945: 16-20). The institute also cooperated with Artturi Ilmari Virtanen, the renowned Finnish silage expert, who was to win a Nobel prize in chemistry for his methods of fodder preservation in 1945 (Wiegner, 1935: 220; Grandjean, 1943: 11). In the late 1930s agronomists and farmers also set up silage associations on a cantonal level. In 1942, the regional associations established the Swiss Silage Association (SSA). The

records of the Bernese Silage Association (BSA) illustrate the interaction of farmers and agronomists in producing and transferring knowledge of the new techniques.

The interaction and cooperation between research stations, industrial companies, silage associations and farmers who practised the new method of fodder conservation was facilitated by close personal relations amongst many of the relevant agronomists. Hans Kellerhals, the president of the BSA, for example, had already used Virtanen's methods on the big farm he managed in the 1920s. He cooperated closely with the federal research station in Zürich-Oerlikon whose director, Friedrich T. Wahlen (later to become a minister in the federal government), had been his classmate at the ETH. Hermann Gutknecht, the secretary of both the Bernese and the Swiss Silage Associations, had been a student with Kellerhals and Wahlen and, as director of the federal research station in Liebefeld-Bern, was now a colleague of the latter. And Samuel Grandjean, who conducted an impressive range of experiments on fodder conservation, was research assistant at the Institute of Animal Feeding while working his own farm and acting as a sales representative for industrial companies (Wiegner, 1935: 223; Grandjean, 1943: 11). And: all of them were members of the agronomists' association (SVIAL).

In their oral and written promotion of silage-making, Grandjean and his colleagues constantly emphasized their own practical experience, mentioned the positive feedback received from other farmers, depicted the apparently higher efficiency of silage with bar charts, and calculated the difference of feed value in monetary terms (Grandjean, 1943: Hess & Ryf, 1943; Bickel, 1957). To 'prove' technical advantages in monetary terms was, of course, a widespread practice among engineers in the nineteenth and twentieth century (Smith, 1990: 660; Gudermann, 2005: 37).

Uekötter (2006a: 157) interprets the tactic of highlighting the advantages of specific techniques in monetary terms as a response to farmers' expectations. This is an interesting hypothesis, but does it find support in our data? Until recently, the lack of adequate sources had made it impossible to answer this question. But the newly catalogued papers by the Archives of Rural History (AHR) enable us to analyse farmers' expectations and reactions more closely. Especially valuable are the minutes of students' papers and discussions at the agricultural college of Schwand-Münsingen; they document the interaction between agronomists and young farmers meticulously. A close analysis of this unique source shows that the students used the same semi-scientific language as their teachers and that they indeed also calculated in monetary terms the apparent feed value lost by sticking to traditional conservation techniques. If agronomists estimated the advantages of new techniques in monetary terms they, one can argue, essentially used the same methods as the farmers. And the agronomists

used a language that the young farmers were able and ready to understand, as well as to use, themselves.

What the minutes of the college further reveal is that young farmers gave the use of new techniques a meaning that connected their social identity with their preferences for modern and 'progressive' farming techniques. According to the students, young and 'progressive' farmers used silage or wooden tripods for haycocks, while old and 'conservative' ones did not. Thus, the often enthusiastic attitude of young towards the new feed conservation techniques was a question of sober calculation and helped to create a group identity of 'young progressive farmers' prepared to do what they were convinced society expected them to do. When they talked about feed conservation, these young farmers tried to present themselves as a group that was able to provide food for the people – and as a group that at once expected and deserved a bright future.

Interestingly, the teachers, exclusively agronomists for agricultural subjects, did not support the enthusiasm of their students unconditionally. On the contrary, they constantly drew attention to potential problems with the new feed conservation techniques in specific situations. They even demonstrated their own tacit knowledge of agricultural practice. Werner Daepp for example, the director of the agricultural college in Schwand-Münsingen, pointed out the importance of motivated, well-trained and experienced labour if wooden tripods for haycocks were to be used efficiently. He distinguished between more and less motivated and skilled labour exactly in the same way as his students did. But while the students used the argument in favour of the wooden tripods, Daepp used it to justify the practice of making hay without them on the college farm.

Whether used for or against the wooden tripods, the argument concerning the importance of individual skills and motivation went far beyond what could be measured in a scientific experiment at the time. It was only in the 1950s that the experiments of research stations showed that the use of wooden tripods required twice as much labour as the ordinary, long practiced hay harvest methods (Bickel, 1957: 364). Wooden tripods are one, but by no means the only, example of agronomists going just as far as farmers beyond what they could measure when making decisions about what to do and how to do it. Even at the beginning of the present century, students at agricultural colleges were being taught to judge the quality of fodder not only with the help of chemical analyses but also with their own noses, hands and eyes (Flückiger *et al.*, 2008: 219).

It is therefore questionable if an epistemic difference between farmers and scientific experts existed in Switzerland to the extent that has been claimed for France, Germany and the USA. In Switzerland the use of human senses and tacit

knowledge was important in the daily work of farmers and agronomists alike – and it remains so even today. Patricia Fry, based on field research at the end of the twentieth century, emphasizes the convergence between farmers and scientists as regards their perceptions of the soil (Fry, 2001). Two of the main reasons for this relative closeness of farmers and agronomists in Switzerland are the similar social background of both groups and the relatively high theoretical standard of teaching at the agricultural colleges from the late nineteenth century. Farming backgrounds and practical experiences gave the agronomists the necessary tacit knowledge to understand the feedback responses of farmers to technical problems. And farmers who graduated from agricultural colleges generally had more than a basic scientific knowledge. They shared, as in other countries, a certain collective identity (Uekötter, 2006a: 158; Fitzgerald, 2003: 175)

In Switzerland agronomists were well aware of the enthusiasm of many young farmers for new technologies. The farmers' openness to new technology was important for their cooperation with the agronomists. However, agronomists also acknowledged difficulties with the new techniques and emphasized the need for 'practical solutions' to these problems. Sometimes scientific methods were used to explain and to provide objections to specific novelties – a practice that can also be observed in the history of organic farming (Vogt, 2000: 302-306). In the case of feed conservation techniques for example, the Institute of Animal Feeding at the ETH studied the methods of Arnold Messmer, an agronomist in Zurich, who sold silage facilities for the production of 'sweet green fodder' (*Süssgrünfutter*) in the interwar period. With scientific methods, the institute proved that Messmer's 'sweet green fodder' actually was acid and had a much lower feed value than ordinary hay. After the publication of the results of these tests, Messmer's method of producing silage was discredited and disappeared (Wiegner, 1935: 219-220; Grandjean, 1943: 9-10).

Other methods were also important in illuminating technical problems. For a long time the breeding of plants and animals has produced undesired effects, such as diseases or exhausted soils, alongside the desired ones. Farmers generally coped well with environmental challenges before the twentieth century by using their intelligence and experience (Sieferle et al., 2006: 17-20). The farmers' perceptions and their generally pragmatic approach to unintended and undesirable effects created by old or new techniques have yet to be studied comprehensively. In the case of feed conservation techniques, the Swiss sources support the suggestion that the foundation of associations for feed production and feed conservation was also prompted by quality problems encountered in cheese making. These problems were mainly detected by the human senses. Werner Daepp's successor as director of the agricultural college told his students that he himself had eaten 'Swiss' cheese from

Denmark produced with milk from cows that were fed silage. But this cheese, he argued, had a completely different taste to the 'real' Swiss cheese made with raw, unpasteurised milk[8]. Because it was impossible to alter the taste of cheese made from silage milk using scientific methods, the use of silage fodder on farms delivering milk to cheese-making creameries was prohibited altogether (Moser & Brodbeck, 2007: 174-175). In order to remain competitive on the world market with a distinctively tasting Swiss cheese, the dissemination of a method of fodder conservation that saved labour and improved food value had to be restricted to certain areas and farms producing milk for purposes other than cheese making.

The story of feed conservation techniques from the 1920s to the 1950s illustrates how the often assumed tendency of agriculture to become a science-based industry was a complex and often contradictory one. Its success depended not only on scientific but also on non-scientific knowledge in the production, marketing and political spheres. Many of the agronomists themselves realised that a systematic communication of farmers' and tacit knowledge to the scientific community supported scientific progress – as well as the funding of scientific research (Wiegner, 1935: 186).

V. Conclusion

Since World War I Swiss farmers have been embedded in a close network of agricultural institutions. They were obliged to attend formal vocational education and operated within regulated markets. And in order to improve their production they received financial grants and had to comply with innumerable rules and regulations. Yet the perception that this modernization has been forced upon the agricultural community by outside forces, such as the agronomists, would be misleading. The national agrarian elite, including agronomists and many farmers, aligned itself with the expectations of an industrial society represented by powerful groups outside agriculture such as state functionaries, consumers, industrialists and scientists. To get individual farmers to conform, agronomists resorted to a variety of means, just as many other professions in western societies did as well. Modernizing initiatives were hardly ever unilaterally forced upon agriculture from the outside; usually they were introduced, negotiated and re-shaped by actors within the sphere of agricultural practice. It is probably exactly this process of negotiation, transformation and re-shaping that made the process of agricultural modernisation so effective. The close interaction of agronomists and farmers was strongly influenced by the social background of the former and the relatively high formal education of the latter. At least until the 1970s, agronomists were mainly recruited from an agricultural

[8] Archives of the Landwirtschafts- und Haushaltungsschule Schwand-Münsingen (AfA Nr. 141), Dossier 215-05).

background and were familiar with the everyday life of farmers from their own personal experience. Indeed, many of them considered this practical knowledge to be a precondition of their professional activity. Acknowledging farming to be a worthy occupation, they functioned in an industrial society and often perceived themselves more as mediators between the state and agriculture than merely one-sided promoters of a specific modernization project.

Many farmers held similar values and attitudes to those of the agronomists. The evidence of the manuscripts and minutes of students' papers and presentations in the agricultural colleges indicates that the young farmers were often as enthusiastic about new feed conservation and other techniques as their scientifically trained teachers. And agronomists as well as the young farmers referred to scientific and to practical and tacit knowledge in conducting a sophisticated discussion of the advantages and disadvantages of new techniques.

The sober, sometimes even critical, attitude of agronomists towards new scientific findings did not impede the implementation of an agricultural policy that aimed at industrialising the agricultural sector. Quite the contrary, it made these efforts even more effective. The Bernese silage association, for example, did not hinder the spread of silage pits when it warned its readers of 'non-reliable' suppliers of silage facilities, because at the same time it advertised the names of 'trustworthy' ones. Receptiveness to the difficulties created by new techniques helped agronomists to create the trust which in turn facilitated close contact between farmers and the agricultural sector within the industrial world. In short, one can say that the enforcement of the state's agricultural policy was probably so successful because the relevant actors – in the civil service, the agricultural associations and private companies – were closely related to the farming population, coped pragmatically with individual problems and cooperated with farmers who were themselves relatively well educated scientifically.

Agronomists played a prominent role in this process of integrating the agricultural sector into the industrial society. Only very seldom did qualified agronomists associate themselves with fundamental opposition to state agricultural policies. Typically they referred to the needs of industrial society (whether current or anticipated) as they helped to change agricultural policies.

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13. The prohibition of dogcarts in Belgium: a hidden agricultural policy?

Serge SCHMITZ

I. Introduction

This chapter analyses the context and the consequences of the prohibition of dogcarts in Belgium. It considers in particular the impact of the legislation prohibiting dogcarts on the Belgian peasantry. In the early nineteenth century dogcarts were widely used in agriculture in different European countries (Denmark, the Netherlands, Belgium, France, England, Switzerland, Italy, Germany, Czechoslovakia are examples), especially when the size of the farm was too small to invest in a horse. By the beginning of the twentieth century, however, the use of dogcarts had either been banned (as in England in 1854 and in France in 1925) or strictly regulated (as in the Netherlands in 1910 and in Czechoslovakia in 1926). In Belgium, however, it was only in 1926 that legislators discussed the question of banning the dogcarts seriously. And it was not until 1975 that the dogcarts were formally banned at the national level.

My argument here is that the prohibition of dogcarts in Belgium was meant to contribute to the modernization of agriculture as much as it was concerned with the wellbeing of the animals. Dogcarts had to disappear in order to turn the ordinary farm into a professionally run commercial unit. Of course, the regulations regarding dogcarts were also based on concern for the wellbeing of animals. Nonetheless, the agricultural dimension of the regulation and its impact on the peasantry should not be ignored. This dimension, I will argue, should be taken much more seriously by historians since it could have been part of a hidden agenda for modernizing agriculture.

Three general issues are raised in my discussion of the Belgian dogcarts. The first concerns the contribution dogcarts made to the peasant economy. Secondly, there is the issue of the politics surrounding the state's efforts to ban dogcarts – the failed attempt in the 1920s, a considerable amount of regulation in the municipalities and provinces in the pre-1960 period and finally a prohibition at the level of the central state in 1975. A third concern highlights the consequences of prohibiting the use of dogcarts, both in everyday life and at the level of the law. Through analyses of parliamentary debates and interviews with older farmers, my discussion underlines the gap between the parliamentary reform of agriculture and the realities of agricultural