CEDEFOP

PANORAMA

Mass vocational education and training in Europe

Classical models of the 19th century and training in England, France and Germany during the first half of the 20th

EN

Mass vocational education and training in Europe

Classical models of the 19th century and training in England, France and Germany during the first half of the 20th

Wolf-Dietrich Greinert

Cedefop Panorama series; 118

Luxembourg: Office for Official Publications of the European Communities, 2005

A great deal of additional information on the European Union is available on the Internet.

It can be accessed through the Europa server (http://europa.eu.int).

Cataloguing data can be found at the end of this publication.

Luxembourg: Office for Official Publications of the European Communities, 2005

ISBN 92-896-0417-4
ISSN 1562-6180

Printed in Belgium

The **European Centre for the Development of Vocational Training** (Cedefop) is the European Union's reference centre for vocational education and training. We provide information on and analyses of vocational education and training systems, policies, research and practice.
Cedefop was established in 1975 by Council Regulation (EEC) No 337/75.

Europe 123
GR-57001 Thessaloniki (Pylea)

Postal Address:
PO Box 22427
GR-55102 Thessaloniki

Tel. (30) 23 10 49 01 11
Fax (30) 23 10 49 00 20
E-mail: info@cedefop.eu.int
Homepage: www.cedefop.eu.int
Interactive website: www.trainingvillage.gr

Wolf-Dietrich Greinert
Technische Universität Berlin

Edited by:

Cedefop

Mette Beyer Paulsen, Project manager

Published under the responsibility of:
Johan van Rens, Director
Christian Lettmayr, Deputy Director

Foreword

Why a history? That is a fair question to ask, given the many and varied challenges facing vocational education and training for the broad mass of the working population. The German commentator Walter Benjamin provided a succinct answer that is valid for all time, 'Without history nothing is modern', which can be taken to mean that any policy intended to be sustainable in the future – in whatever sector of society – is automatically condemned to fail unless it is aware of its historical antecedents.

This will doubtless be the fate of European vocational education and training policy if it is not prepared to consider the wide variety of training models that have developed in Europe since the 18th century, and which could at first sight lead to the erroneous conclusion that a different model of vocational training must have developed in each country. More importantly, policy needs to have regard to the relationship between vocational education and training and the neighbouring societal sub-systems, especially the employment system and the general education system, which varies from country to country, and to the traditions and mindsets that have grown up in these fields in the individual countries.

Vocational education and training systems are not isolated, randomly applicable institutional and organisational arrangements, but are rather integral parts of national 'cultures of work' and systems of social action which develop an extraordinary tendency towards inertia, mediated by tradition. Dealing with them, i.e. adapting them as required from time to time to changed circumstances, is always a challenge.

One of the main purposes of the history project of the 'European Centre for the Development of Vocational Training', which was launched in 2000, is to strengthen the historical perspective on the further development of European vocational education and training policy. Moreover, thirty years after Cedefop was founded, one of the obvious tasks of this institution would seem to be to take a fresh look at the traditions which necessarily influence that policy.

Christian F. Lettmayr
Deputy Director

Author's preface

The history of mass vocational education and training in Europe is an important chapter in European social history, which has so far been little researched. There are many reasons for this, and there is no need to recite them here; rather, the aim is to present an investigation which attempts to remedy this situation to some extent. This study is the continuation of a preliminary work which sought to review the wide-ranging and complex field of research of the history of European vocational training analytically, and to explore it through initial case studies.

The investigation builds on the analysis which I presented in 1999 of the social origins of the three 'classical' European models of vocational training (Greinert, 1999) by asking whether and in what way the modern forms of vocational education and training designed in England, France and Germany during the First Industrial Revolution were adopted, further developed or rejected in favour of other variants in the rest of Europe. To the extent possible from a largely German standpoint, Part 2 then looks at how the three classical models changed against the background of the Second Industrial Revolution, one of the purposes being to encourage further research into the development of vocational education and training for the broad mass of workers in the other European countries. Maybe it will reach one or two academic experts who view the investigation of this topic as important and academically rewarding.

Fortunately, the *European Centre for the Development of Vocational Training* (Cedefop) in Thessaloniki has already made it possible to take a first step in this direction: an initial conference was held in Florence on 11 and 12 October 2002 as part of the project sponsored by Cedefop on *The history of vocational education and training in Europe in a comparative perspective*, the results of which have now been documented (Cedefop, 2004). On the basis of the conference papers, an exhibition has also been created on the history of vocational education and training in Europe. This was shown at the Cedefop building in autumn 2003, and since 2004 it has become a travelling exhibition, visiting the countries of the European Union (Cedefop, n.d.). This study may be regarded, so to speak, as a third contribution, temporarily rounding off yet taking further Cedefop's welcome research initiative. However, this investigation can only offer part of the history of European vocational education and training, although it is not 'fragmentary' since it does describe the most significant stages in the development of modern vocational education and training models in Europe in the 19th century, including the pattern of their adoption in other countries.

Finally, readers interested more in the history of events than in theoretical problems of historiography may like to know that they can safely skip the introductory chapter without missing any vital information, since it is designed explicitly for academic researchers.

I should like to thank all those who read the manuscript and whose critical comments helped to improve it, as well as Thomas Deißinger and Alain Lattard, who were of assistance in finding the illustrations. I am particularly grateful to Cedefop, which facilitated the publication of my research. I should like this first attempt at a history of European vocational education and training to be viewed as a birthday present for this important institution of vocational education and training, which celebrated thirty years of existence on 10 February this year.

Berlin-Charlottenburg, April 2005 Wolf-Dietrich Greinert

Table of contents

List of tables and figures

Tables

Figures

Summary

This volume is intended to arouse interest in the history of European vocational education and training by examining its historical beginnings in the 19th century and describing the further development in the first half of the 20th century of the training models that had then been created in a few leading states.

Strictly, this is a history of mass vocational education and training in Europe after the onset of the First Industrial Revolution, which brought about the dissolution of the class-based vocational training model that had been more or less the same in nearly all European countries since the high middle ages. Although technological development took much the same course in most European states, industrialisation did not produce similar vocational training models, as in the middle ages, but a plethora of different training variants that appears impenetrable at first sight, with external and internal contours that seem difficult to analyse systematically.

By means of historical analysis, this study nonetheless attempts to isolate three 'classical' training models from this apparent variety: the liberal market economy training model in England, the state bureaucratic model in France and the corporatist dual vocational training system in Germany. The hypothesis is put forward that all other training systems in the other states of Europe developed out of these three models, either as variants or as combinations. The attempt is made to disprove this hypothesis with respect to the 19th century by examining the vocational education and training system in those states where there is evidence of the beginnings of a policy of national coverage of mass vocational training: Russia, Austria-Hungary and Switzerland. All other European states developed national schemes for the vocational training of broad sections of the population only in the course of the 20th century.

In establishing their vocational training systems in the 19th century, Russia, the Habsburg Empire and Switzerland did follow the three classical training models, although there were specific deviations from the respective originals: no attempt was made to adopt the doubtless specific, historically unique underlying political structure, but merely the training procedures that had been developed at the teaching level, the level of the learner, and these were integrated into the local 'culture of work'. Evidence still needs to be put forward for what happened in the 20th century when vocational training models were developed in the other countries of Europe. The author nonetheless stresses in his foreword that this investigation, although covering only part of the history of European vocational education and training, aspires to be more than 'fragmentary'.

Introduction: What is European about vocational education and training in Europe?

‘The transfer from school to the world of work is arranged quite differently in Germany and the United Kingdom. In Europe, the contrast is probably greatest between these two countries, although from the British point of view all continental European countries south of Scandinavia seem to work with watered down versions of the German system. From our perspective, Germany has the clearest version of what we regard as the typical continental model.’ This casual assessment by the Liverpool sociologist Ken Roberts (2000, p. 65f.) may be wide of the mark, given that the so-called ‘German system’ of vocational training is strictly speaking restricted to the German cultural area, but the statement does demonstrate the main difficulty faced even by experts in attempting to provide a complete overview of the European vocational education and training landscape. It is even harder to reduce the highly complex historical development of the vast array of training models in Europe, which seems all but impenetrable at first sight, to a set of comprehensible common denominators valid across systems.

In seeking to write a history of European vocational education and training, it is not enough merely to adopt an additive approach, comparing and contrasting the origins of national training systems. Such a description would fail both to take account of the current state of comparative educational historiography, and to explore the specifically European commonalities in its development.

I.

According to the historian Hermann Heimpel, what is European about Europe is that the history of Europe is a history of nations. This view of nations as the building blocks of European history allows for the recognition, however, that the developmental stages through which these nations have passed did not arise by themselves, but from the productive contacts and conflicts inherent in their ‘interconnectedness’ (Zernack, 1994, p. 17). Many different factors influence the relations between nations, such as a shared border or the exchange of goods; certain international or even universal historical trends may have been crucial, however. From the perspective of the origins of training systems for the great mass of the working population, one of these is undoubtedly the Industrial Revolution, or more broadly the industrialisation of the countries of Europe. In the wake of this world-changing process, which affected not just the economy and technology, but also the structure of society, social relations, life styles, the political system, patterns of settlement and even the landscape, the system of ‘reproduction of labour capital’ was exposed to far-reaching changes in all European countries.

Paradoxically, however, the process of industrialisation in Europe did not result in a standardised model of vocational training, but in the exact opposite: broadly, it swept away the long-standing craft-based vocational training that had been practised in more or less the

same way in all European countries for centuries, and gave rise to a variety of 'modern' training systems that seem at first sight to have little in common. In view of this variety, we need to use the term 'training or vocational training system' with caution. Walter Georg has pointed out rightly that it is only possible to speak of a 'vocational training system' in terms of epistemological systems theory 'where in the course of social differentiation, autonomous function-specific sub-systems have developed into a lasting context for selective communication. These demonstrate a particular measure of closed self-referencing, which cuts them off from the internal environment of society' (Georg, 1997, p. 159).

Georg argues that such separate systems of vocational training, typified by self-referenced internal structures and processing mechanisms, exist under the name 'dual system' exclusively in the German-speaking cultural area. Both the school-based training variants in other countries and the various types of work-place basic and continuing training rest on the logic of differentiated societal sub-systems: in the case of school-based initial vocational education, on the meritocratic logic of the general education system, and in that of work-place training on the logic of company production and labour organisation. Georg concludes that, 'The peculiarly German approach of separating out a self-referenced vocational training system independent of school and employer means that any attempted comparison with other "systems" leads to ethnocentric misunderstanding, because no object of comparison is generally to be found' (Georg, 1997, p. 159).

According to Georg, any model used to explain national differences in employment training for the broad mass of the working population needs to take into account the combinations of cultural and functional-structural contexts in a society – in short, its culture and structure. The values, norms, attitudes, beliefs and ideals of a society influence the features of education and training systems, and the organisation of labour and labour relations, as well as the relatively stable interrelationship between a country's specific vocational training system, other societal sub-systems, the system of general education, and the many patterns of regulation of the employment system.

If these objections are accepted, then the yardstick for international comparison of vocational education and training needs to be refined or enlarged in that a careful distinction has to be made between 'vocational training systems' and 'vocational training models'. The term system should only be used where there is truly an autonomous, self-referenced model of vocational education or training. There is also a need for a category superior to vocational education and training under which it is possible to define the operationalisable structural patterns and interrelationships between the societal sub-systems involved in vocational training. We suggest the term 'culture of work' to describe this.

II.

However, a whole series of methodological issues are associated with the term ‘culture of work’. How can the internal connections between these national sub-cultures be broken down appropriately? What are the crucial guiding principles and patterns that can be regarded as governing them? How can purely idiosyncratic prejudice be avoided in assessing them?

In the quest for a reasoned way of keeping this highly complex topic within bounds, we came across a study by Bercusson, Mückenberger and Supiot which attempts to establish a methodological approach to comparing the cultures of employment law (Mückenberger, 1998). A two-stage test was applied to the United Kingdom, France and Germany, using selected fields, to find out, first, what images of independent work govern the actions and decisions of jurists in the three countries (culture of work in everyday law), and secondly, what images and experiences their social counterparts in these countries have of ‘law’ in general and of ‘employment law’ in particular (legal culture in everyday work).

The study (Bercusson et al., 1992) describes three paradigmatic contexts in which employment law is embedded in the three countries and from which the law that is practised gains its meaning and shape (Mückenberger, 1998, p. 37f.).

(a) ‘In the United Kingdom, the production relationship is no longer regarded as a market process in which those who shape society are the players: employees and employers and the parties to collective agreements. Accordingly, the image of law is defined somewhat negatively: by “abstentions” and non-interference in the market process. “Rule of law, not of men” provides an appropriate legal paradigm for this.’

(b) ‘In France, the production relationship itself is regarded as politically conditioned. Those shaping it are the state and its agents, the *inspecteurs du travail*. This emphasis on the political is reflected in acceptance of the *ordre public social* – a method of regulation by which the state (not the market as in the United Kingdom or the interplay of private autonomy and control by the courts as in Germany) sets the key parameters for working life. The paradigmatic background to this Republican approach is the *majesté de la loi*, which is seen as the greatest achievement of the *Grande Révolution.*’

(c) ‘In Germany on the other hand, the production relationship is perceived in terms of communal, mutual responsibility and concern for the whole. The rules of this social community are, as in the United Kingdom, seldom directly political, but determined rather by the social antagonists themselves, complemented and to some extent corrected – more actively than in the UK – by a cautious, case-by-case process of adjustment, which consists in the interaction between the courts and legal experts. This system may be characterised by the paradigms “rule of civil law”, private autonomy and control by the courts.’

In the area of industrial relations and employment law, it can thus be seen that each of the three states has its own prime concern: economic (UK), political (France) and social (Germany). In the opinion of the authors of the study concerned, this is associated with a varying degree of primacy of ‘security’ and ‘freedom’. Social security was introduced sooner

and more comprehensively in Germany than in France and the UK, albeit with loss of freedom. In France, more weight is given to the protection of political expression, action, organisation and organisations, even militancy, than to social security. In the United Kingdom too, freedom has priority over security, although in a different way than in France, in the form of market trading and *collective bargaining*. In France, the study suggests, freedom is located politically: freedom in (and through) the state, not – as in the UK – freedom from the state (Mückenberger, 1998, p. 38).

From these statements it is clear that 'culture of work', like culture in general, is expressed through a 'vague idea of a consistent context' (Georg, 1997, p. 161). The possible methods of viewing national differences are certainly not exhausted by the example set out above, although it will be realised from it that investigations into culture reveal one general trend – the extraordinary inertia of the values and codes that are immanent in a culture, and of national mindsets (e.g. Hofstede, 1993). In consequence, it is notoriously difficult to change social systems.

If this is applied to our subject, the identification of European models of vocational training, it means that these are always a specific answer to changing technical, socio-economic and political problems, and that their process of structural change is underlain by a considerable tendency towards inertia mediated through tradition. Tradition and modernity are not so much in opposition but 'they are in fact identical in that modernity is always specific and tied to tradition' (*Bildung und Erziehung,* 1997, p. 382).

III.

It is certainly no accident that historical research into vocational education and training has identified three 'classical' European models of vocational training, the three key principles of which correspond to the three cultures of work described above. These are the liberal market economy model in the United Kingdom, the state bureaucratic model in France, and the dual corporatist model in Germany. These three models, which received their basic shape during the First Industrial Revolution, were to some extent the main response to the erosion of the old craft-based model of vocational training in the countries of Europe (Greinert, 1999).

Between the functional sub-systems of labour, capital and training that were created as part of a social development process influenced by capitalist industry, the liberal model – first created in England – establishes a link with the market: those contributing either labour or capital, who are as far as possible to be freed from all traditional constraints, maintain more or less 'free' market relations with the new sub-system of training. Because of their structural disadvantage, workers are unable to establish a place in the market as a 'skills' factor in production by means of the training sub-system. In consequence, they are simply sold as labour, sometimes with dire social consequences (e.g. child labour).

The resultant ‘market model’ of vocational training shows the following characteristics:

(a) The quantitative relationship between training needs and training provision is governed by the market. A variety of suppliers and demanders of vocational training meet voluntarily in a training market that is in principle ‘free’ – i.e. essentially not governed by the state.

(b) The nature of the vocational skills (the qualitative aspect) is ultimately determined by their likely use in the labour market, or more specifically in enterprises or government agencies. Transfer between employers of the vocational skills obtained varies (depending on the market) but is generally slight.

(c) There are no particular standards governing training. The market is open to purely school-based types, in-company basic training, block-release training that alternates between college and place of work, and organisationally and technologically advanced skills (e.g. distance learning or real-time e-learning). There are few generally accepted examinations and certificates.

(d) The costs of training are covered individually, usually by learners, but quite often by employers, where these are also the providers. In such cases the training generally follows the principle of cost minimisation, and is generally limited to a restricted range of skills.

(e) In countries with market models of vocational training, a sharp distinction is drawn both terminologically and institutionally between general vocational education and specific vocational training. The former always takes place in state schools, and the latter by free agreement between the players in the market.

The state bureaucratic model – first introduced consistently in France – establishes a political, power-based relationship between the sectors of capital and labour with the aid of the new sub-system of training: for overarching reasons of social policy, structurally disadvantaged workers are ‘skilled’ with the help of a state-regulated and state-funded education sector (which includes vocational training) and enter the sub-system of capital – which is also regulated by the state. This model runs the risk that the institutions of vocational training will be too heavily influenced by the principles governing the general education system and degenerate into a sub-division of it.

The resultant ‘school-based model’ of vocational education and training has the following features:

(a) The quantitative relationship between training needs and the vocational training actually delivered is established by state agencies – by the bureaucracy. Since such needs-based planning cannot go into much detail, it works most effectively if it operates on the basis of a limited range of basic occupations.

(b) The nature of the vocational skills (the qualitative aspect) depends less on the immediate application at the work place. The key principles of the curriculum in vocational schools are generally abstraction, verbalisation and theoretisation. These principles cannot be implemented in the way that might be desired in jobs typified by pragmatic patterns of action.

(c) School-based training models usually feature strong differentiation between individual courses. Access to the different types of school, which are strictly divided according to skills demanded and formal qualification gained, is generally via various formal qualifications from general education or special admission examinations.

(d) School-based vocational education is paid for out of public funds. The limits to these do not generally allow full coverage by vocational schools of a complete age cohort. From this angle too, school-based vocational education and training models usually embody elite systems which specialise above all in teaching more advanced vocational skills.

(e) School-based vocational education and training models are almost automatically affected by the so-called 'escalator effect', i.e., their courses tend at least in the medium term continually to rise up the ladder of qualifications. New training courses and arrangements therefore need constantly to be 'pushed in' at the lowest skill levels. As a result, mass vocational education and training is in almost permanent crisis.

The dual corporatist model – implemented exclusively in the German cultural area – mediates between labour, capital and the state by way of a new, autonomous sub-system of 'vocational training'. By involving traditional 'intermediate' institutions, which have been given a new lease of life by legislation (the public-law system of Chambers of Trades, Industry and Commerce), to manage and control the training of workers on behalf of the state, it is possible to overcome at least to some extent the failings of the state and the market in an area of significant public conflict. However, the clear organisational and legal separation of the 'vocational training' system from the 'upper and higher education' system (*Gymnasien* and universities) creates considerable problems of articulation.

The resultant 'dual system' of vocational training typically has the following features:

(a) Dual vocational training systems form an area of training that is largely isolated from general education, with its own organisational structure and legislative basis. This is due to its largely private character. The twofold model of regulation by the market and government bureaucracy requires complicated consultation procedures.

(b) The enterprise is the key place of learning in this 'co-operative' system. Young people conclude private training contracts with the employer, as employees but in the special role of trainees. In parallel, they are also legally students, attending a *Berufsschule*, and are consequently subject to the provisions governing the general education system.

(c) The shape taken by the training is determined primarily by the employer, or organisations representing the interests of groups of employers. The job profiles and the provisions governing training are laid down by agreement between employers, trade unions and state agencies, within a regulated framework, and are legally enshrined in national legislation.

(d) The costs of training are generally borne by the individual employer and may be set off as expenses against corporation tax. Trainees receive so-called 'training remuneration' from their employers, which is set through wage negotiations. The costs of the *Berufsschule* are covered out of public funds.

(e) Dual vocational training systems have a traditional, craft-trade background. Two elements of this tradition have been preserved to date: the principle of 'occupationality' or occupation-based training, and the principle of self-regulation, which applies at least to the core work-place part of the training. But the issue of where learning takes place is secondary: 'dual' training systems with only one place of learning are conceivable.

In our opinion, these three models of vocational education and training are the new prototypes which developed out of the quest by European countries for ways of reshaping or revising their mass vocational education and training under the influence of industrialisation (Greinert, 1999). We take the view that no other European model offered guidance in this process: all the other models of vocational training in Europe which developed in the various countries in the course of the 19th and 20th centuries were variants and/or combinations of these three prototypes or basic patterns.

IV.

The European dimension of the conceptual development of these particular basic types of vocational education and training in the industrial age emerges from an attempt to find the ideas behind the arguments set out in sections II and III. It is tempting to follow the three dialectical steps typical of Western thinking, since it takes little effort to identify three circles of thought in our quest which stand in a specific relationship one to the other: tradition (or the occupational principle) – liberalism (the market principle) – and rationalism (the knowledge principle).

The ideas behind the three models of vocational education and training are thus three central principles underpinning European thinking, which not only relate to the regulatory aspect of vocational training models, but also structure the didactic or operational level, i.e. the level of action, of specific types of vocational learning. We are thus drawing closer to the three ideal types of 'training styles' suggested by Thomas Deißinger (Deißinger, 1998), even though with some substantial differences.

We define our typology of the rationale behind European vocational training models as follows:

(a) Occupational orientation: in its modern – post-Enlightenment – version, this rationale rests principally on tradition, i.e., both on the pattern of occupations which actually existed in Europe from the middle ages, and on occupations as long-standing categories differentiating the ways in which labour is organised. From this perspective, occupations are seen as specific combinations of the elements of labour, training and remuneration. The patterns of action which they teach are determined by social agreement and inheritance.

    Within the individual occupations, the core elements are bundled together into typical means of barter. On the one hand, an occupation is a standardised means of social barter which forms the key vector of social relations determined by its 'role-bearing' character. On the other, occupations are the primary source of self-awareness, i.e. of the image that

individuals have of themselves and by means of which they present themselves to their surroundings. In essence, this has changed little even today in European countries.

By means of the category 'occupation', a training model develops the capacity to translate economic, social and educational factors or problems into a logic that is peculiar to the system, and to process them productively. This ability, known in modern systems theory as 'self-referencing', can lead to the moulding of an autonomous training system.

(b) Market orientation: This rationale rests on the lessons or principles of economic liberalism and the classical national economy. The central tenet can be seen in the conviction that people are able to organise their social cohabitation effectively – and therefore their gainful activity in particular – on the basis of their own insight and understanding.

Besides the principle of a consistently decentralised economic order, private property, free competition, free choice of occupation and place of work, and the principle of performance, economic liberalism stresses above all the rejection of any state intervention in the economy, which is in the hands of autonomous individuals, and requires state policy to restrict itself to satisfying a few collective basic needs. In particular, this requirement includes the avoidance of compulsory relationships ('obligations' laid down in law). Strict compliance with individual responsibility is not only interpreted as an element of freedom, however, but from the liberal point of view it also fulfils in an excellent way the function of a social adaptation mechanism.

In market-oriented training systems, only those skills are taught that have a currency in the market place, i.e., usually functional knowledge, abilities and attitudes that are specific to particular enterprises and relate in concrete terms to specific jobs. After completing compulsory education, young people are under no obligation to undergo any particular employment training. Their integration into the system of social employment is primarily left to the market.

(c) Knowledge orientation: This rationale also rests on the conviction that the principle by which the teaching of vocational skills should be organised can be derived from the rationality of academic knowledge. Practical applicability to the material world is no longer created by applying academic discoveries in arrears to the experience-based rules of individual trades and occupations that are tied to tradition, but by subjecting all practice to scientific calculation and experimentation.

The idea of knowledge-based vocational training is a direct outcome of the Enlightenment and thus embodies the true dimension of modernity, namely the assumption that the world can be controlled – above all technologically – by knowledge, and especially by mathematics and the exact natural sciences. Starting with the foundation in 1795 of the *École polytechnique* in Paris as a central institution for the basic technical training of engineers, knowledge-based specialist education and training became the standard educational principle for all levels of vocational training.

Strictly knowledge-based vocational training models are most effective in so-called 'higher', theory-based – largely academic – occupations. The necessary acquisition of a

combination of intellectual skills and appropriate patterns of occupational behaviour has nonetheless remained to this day a practical teaching problem in training.

The three rationales set out above for the modern arrangement of vocational education and training in Europe are central ideas which have been regarded since the Enlightenment as new principles for the ordering of human cohabitation and the modern understanding of the world. However, huge doubts remain as to anything based on tradition – quite wrongly in our view. In the most famous educational novel of the modern age, Jean-Jacques Rousseau's *Émile* (1762), the issue of religious orientation is naturally also addressed. Given the relativisation of all beliefs in the philosophy of the Enlightenment, Rousseau no longer has any rational basis on which to make a choice: all revealed religions necessarily seem equally good options. However, Rousseau surprisingly recommends that his pupil remain faithful to the 'belief of his fathers', justifying this by tradition, a position which, from a critical perspective, places him outside the Enlightenment. Herwig Blankertz comments on this as follows in his *Geschichte der Pädagogik*: 'Tradition is the storehouse of values which we do not adopt because reason obliges us to, but because we inherit our belief in them from preceding generations, [...] Rousseau's pedagogy refrained from overstressing reason, adding instead the power of tradition to the rational system of his natural education as a last source of enquiry to justify the norms that guide human beings' (Blankertz, 1982, p. 78f).

Occupational, market and knowledge orientations, we argue, can be discerned as patterns of educational orientation in all European vocational education and training models, including those in which a specific structural or regulatory pattern appears to predominate. In the German system, the market orientation also applies at the operational level alongside the occupational principle (e.g. in vocational continuing training), as does the knowledge orientation (in practically all vocational schools). The French training model accepts the occupational and market orientations as well as the knowledge orientation, and even the obviously very market-oriented British training model is also guided by occupations and, in further education institutions, by systematic vocational knowledge.

If an attempt were to be made to sharpen the profile of the European approach by contrasting it with an alternative model of vocational training, one possibility would be the pattern of training in Japan, especially that adopted in major Japanese industries. This is 'different in principle', one key feature of the difference being the absence of any occupational orientation. Unlike the situation in the countries of Europe, there is no 'occupational culture' in Japan; neither the employment system nor the education and training system is structured in terms of job patterns. 'In Japan, the emphasis in training is much less than here on the job-specific content and far more on the social context of the activity: it is not mastery of a field of work that is socially certificated, but the willingness and ability to form a productive part of a specific working context – i.e., the enterprise to which the trainee belongs' (Deutschmann, 1989, p. 420). Occupational culture is replaced in Japan by 'enterprise culture' or 'corporate identity'. 'Cross-company standardisation of work and training is replaced by a structure of organisation and training tied to a single company, and occupational identity is replaced by unquestioning loyalty to the company' (Georg, 1993, p. 195).

V.

To sum up, the arguments set out so far point to three structural patterns of European training model, which reveal typical features falling into three categories that can be viewed as forming higher typological units:

(a) In terms of culture of work, Type A emphasises economic concerns. In terms of regulation of the training model, the market orientation predominates. At the operational, learning level, the predominant didactic principle is the functional requirements of the enterprise or of specific jobs.

(b) In terms of culture of work, Type B emphasises political concerns. In terms of regulation of the training model, bureaucratic management predominates, on the basis of legislation. At the operational, learning level, the predominant didactic principle is the knowledge principle.

(c) In terms of culture of work, Type C emphasises social concerns. In terms of regulation of the training model, 'dual' management predominates, i.e. a combination of market regulation and bureaucratic monitoring. At the operational, learning level, the predominant didactic principle is the occupational principle.

These three types of vocational education and training for the mass of the working population have to a considerable extent formed the building blocks of all vocational education and training models in the various states of Europe since the Industrial Revolution, proving as suggested above an extraordinarily durable pattern of orientation. There is in our view no evidence of any general, consistent divergence from this tradition – on the contrary, it can be observed that in the British and French models of vocational education and training, for example, which have been heavily modernised or reformed in recent decades and are among the European classics, the key initiatives and elements of that reform – 'national vocational qualifications' and *alternance* – strictly follow on from the traditional models of training developed in the 19th century in these two countries (Greinert, 1999). Both in the United Kingdom and in France, the political decision-makers spared no effort to consider alternative suggestions thoroughly. But ultimately they had no other option.

In Germany, in whose cultural area the third classical model of European vocational training was developed, the new 'Vocational Training Reform Act' came into force on 1 April 2005, updating and replacing the 'Vocational Training Act (*Berufsbildungsgesetz*) of 1969. Initial analysis suggests that despite considerable changes in recent decades in technology, organisation of work, society and the economy, the basic framework of the so-called 'dual system' has not been affected by this legislation. This may be ascribed to a lack of will to reform in German politics, but equally correctly to the inertia of social systems of action.

The typological model that we have developed to explain the pattern and history of vocational education and training in Europe is primarily analytical and is not to be taken or used as a direct representation of the training systems and models that actually exist. Within this theoretical framework, an attempt is made in what follows to outline the first phase of the

history of vocational education and training throughout Europe, guided by the development of the three classical training models in England, France and Germany, which form as it were the socio-historical and comparative core of the investigation carried out. The further development of the three classical models in the era of the Second Industrial Revolution is sketched out in the second part to encourage further international historical research into vocational education and training.

The reference to social history means that we have attempted critically to analyse both the organisational structures and institutions of training models that grew up historically, and the political, socio-economic and technological driving forces that brought them about. In doing so, the study makes use of the paradigmatic model for interpreting the course of the three Industrial Revolutions that is generally used today, both in social, technological and economic history. Comparison means that we have attempted to capture developments in other European countries during the First Industrial Revolution relative to the social origins of the three classical training models, although less thoroughly than in England, France and Germany. One of the main reasons for this way of proceeding is that the historical development of vocational education and training in most European countries has not yet been adequately researched and documented. Since this study relies almost exclusively on secondary literature, all that can be established in this context is the current state of research in a few selected countries.

VI.

An initial attempt to systematise education and vocational training from an international perspective, in this case European, can be found in Lorenz von Stein (1815-1890), the well-known expert on state law and the national economy. In 1868 he published his ‘Theory of Government’, in which he describes and analyses in part five of volume one ‘The elementary and vocational education system in Germany, England, France and other countries’. In the subsequent handbook of 1876 he compares literature and legislation in this field in France, England, Germany and Austria (von Stein, 1868 and 1876).

Education and employment are seen by von Stein chiefly in terms of their social function. In his view, the idea of an occupation must be awoken in each individual, since an occupation is to be understood as the individual’s ‘task in life made conscious’ (von Stein, 1876, p. 245). The author regards the education system as part of the area of ‘internal administration’, and draws a distinction in two directions: in his understanding, ‘general education’ embraces moral controls and the press, while specific education is divided into elementary education and vocational education, a subject-specific form of education that goes as far as university. According to von Stein, vocational education includes the arts, ‘oeconomics’ and ‘learned’ education – an approach that already sounds modern.

Lorenz von Stein was thus seeking to take a broader view of education than was then customary, guided by Hegel’s ideas and attempt to identify and systematise far-reaching trends of historical development (Hahn, 1969). In the event, von Stein makes this attempt

initially in respect of education in Europe by using the method of international comparison. In describing the transition from a stratified to a 'civic' social order, in other words his own times, he distinguishes three typical kinds of 'inner life of the state' in the 'main European states', namely the United Kingdom, France and Germany, and he contrasts these with the typical 'active idea of the state' and the 'social order' of each.

In the UK he sees the class-based social order most strongly preserved, although he argues that it is dominated by the 'purely negative stance of the free individual', according to which interference by the state in the life of the individual for the sake of 'general development' is regarded as unacceptable. In France, on the other hand, the 'civic society' has emerged victorious from the Revolution; France is therefore the country in which the power of the (state) administration dominates society. What is peculiar to German development is seen by von Stein as being that both class-based and civic elements are united within society. The class-based nature of self-government and observance of this principle in legislation are therefore accorded high value because they provide support for the autonomy of the individual and his or her social groupings against the power of the state.

In his 'Theory of Government', Lorenz von Stein regards education, and of course vocational education in particular, as an 'outcome and integral part' of this larger national whole, although he relates all national versions of education in Europe to the English, French and German models. He maintains that all other European states can be likened to these three main types (von Stein, 1868, p. 39f.). Surprisingly, this typological approach has not been taken up again and expanded further; on the contrary, it is still criticised as too 'idealistic', and it is credited with at best 'modest implications' (Gonon, 1998, p. 160). However, von Stein succeeded in the second half of the 19th century in developing a theory-based typology which still proves useful and even apposite for the systematisation of vocational education and training in Europe to this day.

VII.

One important theoretical outcome of this investigation relates to the conditions in which models of vocational education and training come into being. Although similar technological changes took place, no standardised model of vocational training became established during the First Industrial Revolution as the successor to the class-based model of socialisation. The three classical training models in England, France and Germany developed as a reaction to a wide range of complex political, socio-economic and attitudinal factors in the individual countries, the variation between which was largely due to principles 'laid down' before current market and labour processes came into being. The country-specific predominance of economic, political or social concerns in the shaping of the overall 'culture of work' relates rather to norms and routines of behaviour and structural patterns of organisation 'which lend security and continuity to co-operation between people at work and in their trading relations in the market-place' (Baethge, 2001, p. 29).

Given their high degree of economic and social functionality, the institutional arrangements based on these principles develop a considerable tendency towards inertia mediated through tradition, which is generally sustained for a long time even where the conditions for its continuance no longer obtain. Models of vocational education and training are undoubtedly among these institutional arrangements, so that there appears little prospect of changing their basic structures fundamentally or of transplanting them to other countries or cultures. As our work can show, successful education and training practice is not transferred by a policy of adopting the entire system, but at the much lower level of adopting training methods or vocational syllabuses. The less these come into conflict with the established tradition of training, the easier it is to transfer them – as the example of Russia demonstrates.

Structures of vocational education and training are not institutional arrangements that can be exchanged at will but are, as we have been able to show, integral parts of national cultures of work which are generally both firmly rooted in history and interwoven with the current specific structures of national labour markets, e.g. with the particular recruitment strategies of various enterprise cultures; they are also linked to the specifics of each country's employment law and with the widely varying ways in which social security is organised. And not least, they are firmly tied in with the values of the working population of each country.

1. First Industrial Revolution

1.1. The classical reactions to the erosion of the traditional class-based vocational education and training model in Europe

The term 'Industrial Revolution', which we now use with hindsight to describe a world-changing process (Toynbee, 1969), became a fixture at the latest in 1928 with the appearance of the English translation of the book published in 1905 by Paul Mantoux, *La Révolution industrielle au XVIIIe siècle*. 'In the view of the author, the term "Industrial Revolution" stands for the age when the capitalist industrial system arose in Great Britain between 1750/60 and 1840/50 and for all the changes associated with it, not only in trade and technology, but also in the structure of society, in social relations, in life style, in the political system, in types of settlement and even in the landscape. The Industrial Revolution was a complex technical, economic and social upheaval with which industrialisation marked by rapid economic growth began, but did not end' (Paulinyi, 1991, p. 271). More precisely, the term 'Industrial Revolution' describes the shift from an agricultural and craft-based economy to an economy determined by industrial and machine-based manufacture, the change-over from a feudal, power-based form of society to a civic, capitalist form.

If we want to find a few general characteristics to describe this change, Toynbee suggests the following structural features of the Industrial Revolution (Deißinger, 1992):

- 'The control mechanisms of the medieval order are replaced by the market and competition. The philosophy of *laissez-faire* stands out as the driving force behind this change.
- The Industrial Revolution is accompanied by a growth in population that begins in the mid-18th century and goes hand in hand with the phenomenon of urbanisation and a decline in the rural population.
- Trade and industry are marked by increased growth, capitalisation and the development of new structures of organisation and manufacturing. As more efficient techniques of production are introduced, the factory system supersedes the domestic system and craft production.'

In our context, we are concerned with one specific issue which the Industrial Revolution inevitably brought in its wake: the abolition of the old class-based employment and occupational order, which had been typical of the European economy since the high middle ages, and the associated erosion of the class-based model of socialisation. That model could in fact be likened to a particular form of vocational training.

The class-based model of socialisation

From the 12th century, the craft guilds that grew up in medieval towns and cities determined the outward form of the class-based socialisation process through their generally uncodified customary rights. The guild (German: *Zunft*, from OHG *zumft* = what is proper) was both a living and working community and a political, peace-keeping, military, religious, trading and cultural and social institution which set standards for the domestic and family life of its members and rules for their work, craft and commercial activities (John, 1987).

These comprehensive functions naturally included regulations for the recruitment and training of the next generation. It was probably no accident that the guilds developed a system of training by stages similar to that of the nobility, the Church and the universities – from apprentice via journeyman to master, or full member of the guild – whose craft skills and teaching abilities are still taken as a model today ('A master craftsman must learn from masters'). The rights of a master craftsman provided a guarantee and a proof of mastery of the usual craft skills and of a way of living and behaving appropriate to the guild. Membership of the guild gave authority to perform the craft independently, and the two together – rights and membership of the guild – resulted in the right and obligation to train future craftsmen, i.e. to pass on the craft skills and the corporate virtues of the guild to the coming generation.

Although the craft training process proceeded by stages, it only offered one written form of certification: the master's certificate. The so-called 'testimonials' were not journeyman certificates in the modern sense, providing confirmation of practical and theoretical skills and other achievements demonstrated by standardised examination. The traditional indentures merely confirmed the formal fulfilment of the first part of the craft socialisation process, the 'apprenticeship'. All that mattered for the future career of the ex-apprentice was to be 'discharged before the open chest', i.e. the guild chest, or in other words, to be ritually discharged honourably from the protection of the master's household. It was the discharge rather than any proof of specific craft skills that opened the way for the apprentice to join the brotherhoods of journeymen, and thereby to enter the next stage of corporate class socialisation, the 'journeyman years' (Stratmann, 1967).

The family of the master providing instruction formed the narrower framework of the guild training. When a young person began his apprenticeship, not only did the parents' authority pass to the master, but the apprentice also switched directly to the latter's sphere of life and activity: he entered the master's 'entire house', both workshop and household, and thus played his part in the complete everyday life of the master's house (Brunner, 1968). The craft and family training was marked by the immediate exercise of authority, a direct instructional relationship between educator and pupil, rather than by largely formal principles of organisation such as those found in a school or training workshop. The teaching of skills, knowledge and occupational behaviour and attitudes, the whole learning of the trade, thus took place through direct personal contact between master and apprentice, and not according to some didactic 'theory', however expressed. The person of the master, in his capacity as an 'honourable member of the guild', 'instructor', father figure and head of the household and

family, embodied the whole aim of traditional teaching: the craft model of vocational training was defined by imitation of his occupational skills and identification with his personal skills.

The craft and class-based culture of socialisation thus formed a closed circle of occupational information. The teaching principle of learning by imitation and identification was an important mechanism of tradition: the tested norms of the craft were acquired, and the inherited specialist foundations of the trade learnt and passed on as an obligatory 'custom' through imitation of a way of life. Departures from tradition, even in purely technical matters, were neither provided for nor permitted since they could unleash incalculable potential threats to the closed world of the guild. 'Teaching the apprentice a technique other than what the master found right was regarded as "leading him astray", away from the true path and enticing him into evil ways. Working in a manner different from the master was aberrant' (Stratmann, 1993, p. 237). The technical capacity of the master, or indeed his lack of capacity, was the norm which was not to be shaken. This being so, occupational diligence in the sense of individual competitiveness was not the purpose of craft-based vocational training. Dependable compliance with the prescribed traditional framework was far more important.

In the light of this state of affairs it is not surprising that the guild rules governing apprenticeships in the various trades stated nothing about what was to be taught but were concerned almost exclusively with formal matters. Strict rules about access to apprenticeship training, and ultimately to the guild, were of particular importance. The admission criteria for apprentices were thus the crucial instrument of outward demarcation and preservation of inward solidarity. Applicants for a craft apprenticeship were usually required to provide proof of 'honourable' Christian birth in wedlock, as well as physical and mental aptitude: girls were excluded from craft trades in the same way as 'dishonourable' or 'unfree' persons, for example, or Jews.

The decline of the craft economy, the most important pillar of premodern production, was already in evidence in the later middle ages, and it accelerated appreciably on the continent after the Thirty Years War, and then during the age of the mercantilist economic policy of the 'enlightened' princes of the 17th and 18th centuries. Since occupational activity and vocational training had formed an almost indissoluble whole (Wissell, 1985; Stratmann, 1993), the craft-based model of vocational training was eroded along with the economic decline (Stratmann, 1967; Pohl, 1979).

The crucial elements of the new development which called into question and in fact threatened completely to destroy the traditional craft-based training system of the old middle class were the new-fangled liberal economic policy, especially the growing adoption of freedom of occupation and place of residence, and the superiority of the new technologies and working methods of expanding industry (Engelhardt, 1984). The two focal agents of socialisation, the guild and the 'entire house', had largely lost their key role by the second half of the 18th century. The decline of the guilds, hastened by increasing abuses and rebelliousness among journeymen, had repeatedly faced the state with the challenge of creating a reliable craft trade organisation through legislation, but it was not until 1731 that the guilds lost their right to manage their own affairs in Germany, for example, by virtue of an 'Imperial decree' – the age of the autonomous craft culture was thus brought to an end in law as well as in practice (Wissell, 1985).

Changing conditions of production brought about the abandonment of the master's household as an educational institution. The trend towards establishing larger manufacturing units necessarily led to apprentices and journeymen leaving the master's immediate family environment. The reduction of apprenticeship from a quasi-moral relationship to a contractual relationship restricted to technical training very quickly brought about a general 'crisis of vocational training', which required new patterns of skills (Stratmann, 1967; Titze, 1973).

Although this development was similar throughout Europe, its timing and particular features varied very considerably in individual countries, and these must be regarded as the specific starting points and background conditions for the development of new training models. Such differing sets of circumstances occurred especially in England, France and Germany.

1.1.1. England: the liberal answer – the market model of vocational training

There is general agreement in historiography that the spearhead role played by England in the First Industrial Revolution was fostered by conditions – social and political structures, mental attitudes and values – that had already developed there in the 16th and 17th centuries. The answer to the question *Why was England first?* begins with acknowledgement of the agricultural revolution that had set in at the turn of those centuries and of the foundation of a mercantile culture, but more particularly with the victory of Protestantism and parliamentarianism in the two revolutions of 1640 (the Great Rebellion) and 1688 (the Glorious Revolution). In the 17th century, England already had a bourgeois culture and civic awareness, and had largely abandoned the traditional tutelage of Crown and Church (Levy, 1912). Puritanism in particular, and the effects of the Puritan Rebellion, favoured the creation of a bourgeois middle class in whose everyday lives 'inner-worldly asceticism' and the notion of observing the faith in secular working life played a critical role (Weber, 1920).

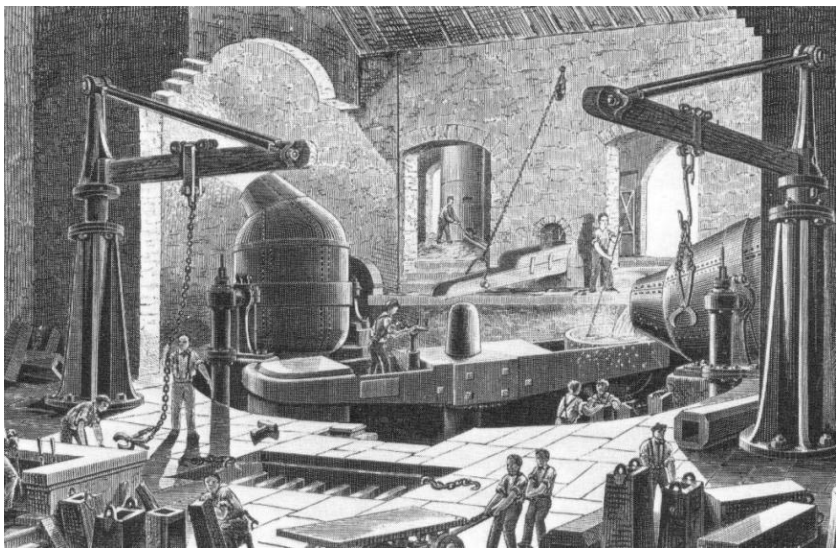
The erosion of feudalism at the end of the 16th century, the dissolution of the monasteries in the wake of the Reformation, the 'enclosure' of common land and the consequent restructuring and capitalisation of agriculture were accompanied by 'a change in life styles and in the structure of trade and industry, which was to become the basis of the economic dynamism that ushered in the Industrial Revolution' (Deißinger, 1992, p. 50). The expansion of the textile industry and coal-mining did the rest: the growth in sheep-farming for wool production brought about the social rise of the gentry – the commercially active land-owners – a development which substantially strengthened the middle class, who were in future to form the core of the new bourgeois competitive society.

The actual 'Revolution' stage, the crucial process of change between 1760 and 1820, should not be perceived as a sudden, colossal event in England, but was brought about rather by the effects of other potential factors that added to those already mentioned. These potential factors were primarily the economic liberalism that had emerged from the English Enlightenment and the revolutionary changes in production techniques – the use of new forms of machine power and machinery.

Economic liberalism in England can look back on a long and imposing ancestry ranging from the Enlightenment philosophers Hobbes (1588-1679) and Locke (1632-1704) via the Earl of Shaftesbury (1671-1713) and David Hume (1711-1776) to Adam Smith (1723-1790), the proponent of the theory of the 'natural economic order' (= the free market), and David Ricardo (1772-1823), the actual founder of the theory of the classical national economy. The 'Political Economists' – after Smith chiefly Malthus and Ricardo – and the 'Philosophical Radicals' – notably Bentham and John Stuart and James Mill – then opened the way, in the eye of the storm so to speak, to the ultimate success of the liberal dogma of the free development of the forces of production and the claim to leadership of the bourgeois middle class. In 1846 English economic liberalism culminated in the victory of the so-called free trade movement under the leadership of Cobden and Bright: England had thus conclusively opted for industrialism; the bourgeois middle class had triumphed over the nobility, manufacturing over agriculture (Deißinger, 1992, p. 111ff.).

The old model of production was transformed at more or less the same time as this upheaval in traditional thinking on economic policy and identity. In the course of the 17th and 18th centuries, the domestic system – a typical instrument of commercial capitalism – became the dominant form of production in the English textile industry and completely supplanted the old, largely craft-based trade (Sombart, 1987). This did not at first mean that the organisation of work and production techniques changed under the impact of this commercial development. This only occurred with the revolution in the processing of cotton after 1760, when new spinning and weaving technologies and new sources of power were discovered and began to lead to mass production. It should be noted that although the First Industrial Revolution in England started with the revolution in cotton processing, the use of machinery, which was its central feature, was entirely dependent on the availability of coal and iron ore and the capacity to process these. The development of the iron and steel industry must therefore be regarded as the technology that actually drove the First Industrial Revolution.

Figure 1: Bessemer steelworks



Source: Rundle, 1973, p. 115

The establishment of the liberal training model

This brief outline of the main factors affecting the First Industrial Revolution in England is necessary in order to understand the specifically English answer to the collapse of craft-based vocational training, in particular by trade guilds, and the reaction to the changes in the skills and socialisation required in expanding manufacturing.

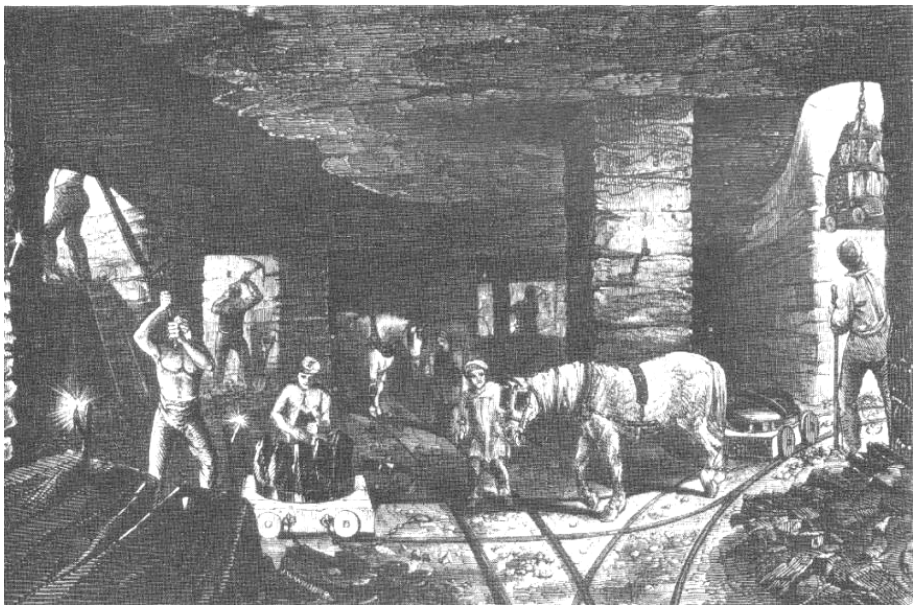
The vocational training model that had grown up in England during the middle ages was not in essence very different in the way it was organised and functioned from the pattern of craft-based training that had developed on the continent during that period. However, the process of replacing it began far earlier than in Germany, for example, with the attempt by the early mercantile Elizabethan state to soften the effects of the agricultural revolution – large sections of the population fleeing the land – by targeted social and economic legislation.

In this context, the Statute of Apprentices, which appeared in 1563, was a key measure. This law not only confirmed the English medieval guild system but extended it as the norm to the entire country – at least on paper – until 1814: apprenticeship was set at seven years for all those wishing to learn a traditional trade, and issues of control and compliance with the numerous legal requirements were transferred to local justices of the peace. This attempt to stabilise the old guild system with its traditional patterns of recruitment and training, which concentrated craft trades in the towns and cities, was clearly directed against the rise of the guild-free domestic system in rural areas which, as suggested above, was encouraged largely by the expansion of the English wool trade and textile production.

The statute of 1563 had an ambivalent effect, however: on the one hand it did initially stabilise the old urban guild system as intended, although it could not in the long term prevent a gradual incursion of 'free workers' into the guild trades; nonetheless, the guilds continued to draw up exclusive agreements under the protection of the Statute of Apprentices, and craft training was subjected to a wide range of restrictive rules and restricted to towns and cities. On the other hand, the statute also had some distinctly negative consequences: a good three quarters of the population of England, which had been growing since the 16th century, were excluded from any regulated vocational training as a result of its one-sided system of privilege (Deißinger, 1992, p. 34ff.).

In order to help to integrate this majority, Parliament was obliged 40 years later to introduce a poor law – the 'Old Poor Law' – which established the practice of allocating apprentices and thus introduced a disastrous dichotomy into English vocational training. The so-called 'parish apprentices' defined in the law, the children from workhouses and orphanages who were compulsorily put to work in non-guild areas of production, were a significant step on the way to the later 'training' situation of child labour in England. Essentially, the main motivation behind both the Statute of Apprentices and the Old Poor Law, which were driven by population growth and the influx of 'free workers' from rural areas, was 'social control': the state was attempting to ensure social stability by introducing measures specifically to counter imbalances in urban labour markets, which were leading to huge social tensions, increasing proletarianisation, vagrancy and a rise in begging (Deißinger, 1992, p. 36).

Figure 2: Bradley Mine, near Bilston in Staffordshire



Source: Rundle, 1973, p. 51.

In order to understand how mass long-term child labour came into being in England in the 19th century, it is necessary to have a grasp of the parish apprentice system, a kind of compulsory apprenticeship in domestic work, agriculture and other non-guild activities. As noted above, this practice of 'binding out' became widespread under the Old Poor Laws (of 1597 and 1601), a piece of social legislation introduced by the English state that was at the time unique in Europe. However, in the opinion of many British historians (Bowman, 1966; Hutchins, 1966), these two reform laws and the way in which they were implemented were a precursor to the child labour of the 19th century in England. There is much historical evidence to suggest that the frequent abuse of the provisions governing the upbringing and education of pauper children laid the foundations 'on which the uncontrolled exploitation of an unskilled pool of labour became possible and associated social problems arose' (Deißinger, 1992, p. 52).

From a vocational training perspective, the 17th and 18th centuries in England can be described as the attempt by the 'old order' to combat the capitalist penetration of their trades. The English tradesmen aimed, like their German counterparts in the 19th century, to preserve the key elements of the specific form of cultural tradition that had developed in the middle ages – the craft guilds and the notion of trade monopolies – and the principle of appropriate class livelihoods and guild training.

The Statute of Apprentices of 1563 from the Elizabethan age continued to provide a guarantee of such pre-industrial regulation of trades. By retaining and defending this statute, the craft trades, which were still organised in guilds in England in the 17th and 18th centuries, were therefore pursuing their own political and economic interests, but they were unable any longer to prevent the old order from being undermined. Significant new industries such as coal and iron ore mining were organised outside the guilds, and in the dominant wool industry the domestic system had more or less taken over by the end of the 16th century, while the expanding industrial areas of the West Riding, Lancashire, and above all the Midlands, with

major centres in Manchester, Birmingham and Wolverhampton, were regarded as 'unimportant' and were therefore outside the influence of the old guild regulations. Despite huge efforts, it proved impossible to extend the guild system to these places in the 17th century. Of the 200 major towns and cities that existed in England in 1689, only a quarter therefore had any form of organised guilds (Deißinger, 1992, p. 144).

The training situation in the 19th century

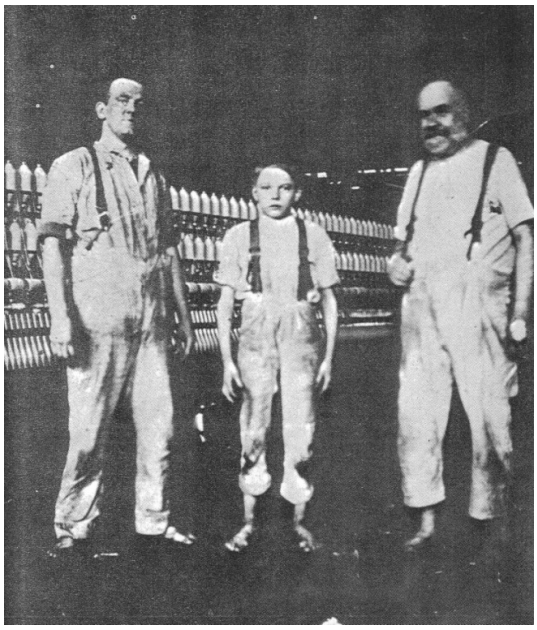
At the start of the 19th century – at the apogee of the Industrial Revolution in England – its old system of production and trades came to a definitive end in law as well as in practice. A combination of factory and trade legislation increasingly subjected the 'apprenticeship principle' to economic considerations and signalled that the state intended in future to lay down standards for training at the work place. In retrospect, two acts of Parliament may be regarded as crucial, the Factory Act of 1802, and above all the Statute of 18 July 1814. The latter abolished the enforceability of seven-year apprenticeship as a requirement for access to a trade, putting a legal end to the economic system of the guilds (Deißinger, 2004).

As a result of this abolition of obligatory apprenticeship for all trades, it now became permissible to practise any occupation without having been apprenticed, and to train or employ apprentices without regard to the regulations that were still in existence. There was thus no longer a formal legal definition of the group of persons entitled to train apprentices, nor any restriction on the recruitment of apprentices. Furthermore, the formal legal criteria distinguishing between apprenticeship and employment were in practice removed. The Municipal Corporations Act of 1835 finally abolished the last privileges of the guilds. The exercise of a trade was no longer dependent on the 'freedom of the city' and hence on membership of a guild (Deißinger, 1992, p. 135ff.).

There was thus no longer any bar to using apprentices as cheap labour. The industrial child labour described in the parliamentary reports of the 19th century that have come down to us was hence one result of the gradual erosion of the craft-based society and the legal framework established for it by the state (e.g. Alt, 1958). This stage of the history of English vocational training, which can be described as one of 'extreme reluctance' on the part of the state in respect of vocational training, essentially only ended with the adoption of the Industrial Training Act in 1964 (Perry, 1976).

The consequent 'liberation' of children and young people in the interest of unfettered economic expansion resulted in terrible condi-

Figure 3: *Three generations of spinners at the Bank Top Spinning Company, Oldham 1900*



Source: Joyce, 1980.

tion in England, particularly up until 1870. In 1851, for example, 28% of 10-15 year olds were in work; 42 000 children under 10 years of age worked in factories, workshops and private households, 28.4% of all employees in agriculture, 30% of all domestic staff and 41.3% of workers in the textile industry were under 15 years of age. The figures for child labour in Manchester in the same year are as follows: 41% of 12 year olds, 60% of 13 year olds and 76% of 14 year olds were in employment. Not until 1871 did the proportion of young workers between 10 and 15 years of age in England fall to 26%, and in 1911 finally to 14% (Deißinger, 1992, p. 167).

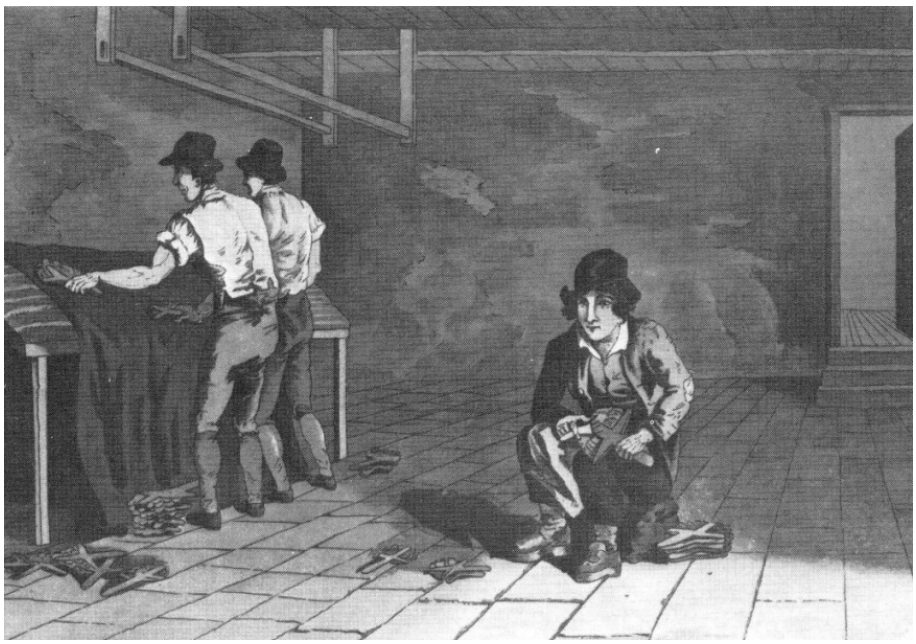
The phenomenon of English child labour in the 19th century has frequently been portrayed, analysed and criticised. A long list of peculiar circumstances are cited as the causes of this social aberration. It is probably crucial that child labour was not a new occurrence in the First Industrial Revolution in England, but had already played an important part in the integration of paupers, of the 'lower orders', in the pre-industrial age. The institution of parish apprenticeship, the compulsory placing of children and young people from parish workhouses and orphanages in lowly non-guild jobs and other 'free' employment, clearly marked the transition to subsequent 'pure' child labour, particularly in textile factories.

For our topic we are less concerned, however, with the causes of child labour in England in the 19th century than with the question why England came up with no conclusive answer to the degeneration of the traditional training system during the First Industrial Revolution. In his comprehensive analysis of the background to the establishment of the English vocational training system – on which our account is largely based – Deißinger attempts to resolve this question by putting forward four suggestions (Deißinger, 1992, p. 404ff.). When these are examined closely, however, it becomes noticeable that all four can ultimately be traced back to the influence of liberalism. This edifice of ideas, which established itself as the outstanding, sole authority in England (e.g. Bullock et al., 1985), was directed initially, as we have shown, against the privileges of the traditional guild system, the 'old order' of the feudal system, which restricted or destroyed competition, and subsequently with yet greater vehemence against the state. In its various political and economic guises, British liberalism encouraged huge scepticism about the legitimacy and benefits of state intervention in social relations, especially in the fields of production, training and employment.

It was not until 1870 that the Government felt obliged on grounds of social justice to compromise and take on limited responsibility for education. For the first time, the resultant Education Act provided for complementary state provision of elementary schooling, which had previously been dominated by private and Church initiatives. In the England of the 19th century, however, the elementary education of the 'lower orders' was governed more importantly by the various Factory Acts of 1802 to 1901, which provided for the so-called 'half-time system of education', the teaching of basic cultural techniques to factory 'apprentices' alongside their training, or more properly alongside work (Deißinger, 1992, p. 223ff.). This attempt to combine factory work and elementary education shows in our opinion particularly clearly that educational and social policy concerns were subordinate to the demands of the economy in social and political action. In 1890, 175 000 children were still

employed under the half-time system in England, half of them in the textile area of Lancashire. These factory children did not even enjoy the modest protection afforded to parish apprentices.

Figure 4: *The brushing boy. The two men in the background are carding the cloth. The brushing boy is using an iron comb or brush to remove the bits of wool sticking to the carding combs that have just been used.*



Source: Rundle, 1973, p. 67.

The answer to the question why general and vocational education were not regarded as beneficial to production or social integration in the England of the 19th century, even though France and Prussia had clearly demonstrated their usefulness, must in our view ultimately go back to the unquestioned authority of the 'libertarian principle', although it cannot be ruled out that this shortcoming can also be attributed to the pioneering role of England in the First Industrial Revolution. For a long time, the novelty and lack of precision of a process that was only later seen to have been world-changing diverted attention from the close connection between education, in the form of general school education and vocational training, and industrialisation. Since broad sections of society were involved in industrial modernisation in England, unlike the countries on the continent, 'practical sklls' were what were thought necessary and therefore dominated training, while technical specialists had already been receiving systematic training for some long time.

The issue is also related to an English tradition with a background in religion: the integration of the lower orders into society had been managed since the early 17th century by means of the so-called Poor Laws. These reveal points in common with the laws governing production, training and occupational activity, particularly where they are concerned with the release of the individual into the labour market. As a result of this link, the impoverishment of the labouring population in the England of the 19th century became a matter of political economy, which meant, as interpreted by the liberalism that had become established, nothing less than

that the poverty and misery of the lower classes were to be seen as the inevitable consequences of industrial manufacturing (Deißinger, 1992, p. 121ff.).

1.1.2. France: the rational bureaucratic answer – the school-based model of vocational training

While the Industrial Revolution in England had already reached its zenith at the beginning of the 19th century, a similar level of development can only be observed in France at the end of that century (Hoselitz, 1968, p. 285). In 1750 the French proportion of world industrial production was around 4%, double that of England. By 1800 England had caught up, by 1830 its volume of production was already 1.8 times that of France (182.5%), and by 1860 it was 2.5 times as great (250%) (e.g. Kennedy, 1991, pp. 237 and 264).

This slower development seems surprising since France had definitely occupied the leading position in Europe in the 18th century in the natural sciences and education. The *Encyclopédie* (1751-1772) produced by the Enlightenment philosophers D. Diderot (1713-1784) and J. L. d'Alembert (1717-1783) was a unique work which impressively established a new philosophy of the 'sciences, arts and crafts' and a correspondingly novel, rational image of the world and humanity in opposition to the clerical, absolutist *ancien régime*. France also led in higher technical education: besides the longer-established schools of military engineering, the first training institutions for civil engineering had been set up in the middle of the 18th century – the *École des ponts et chaussées* (1775) and the *École des Mines* (1783); the great schools such as the *École polytechnique* (1794), and the *Conservatoire des arts et métiers* (1794) were then established during the Revolution and rapidly became the models for technical education throughout Europe (Artz, 1966).

There are many reasons why these achievements were not enough to bring about a dynamic development similar to that in England: for one thing, the guilds still controlled the conditions of production, and there was little national economic unity until the Revolution of 1789. The *manufactures royales* and *manufactures privilégiées* established in the wake of a consistent mercantilist policy in the 17th century were able to circumvent guild regulations and market monopolies to some extent, but they could not be expected to press for individual enterprise or to search unceasingly for new techniques of production. The far-reaching tax privileges, monopoly rights and other subsidies were intended rather to prevent this. The state factories were also restricted to military and luxury products, which created an almost insuperable obstacle to a transfer to industrial mass production such as occurred in the English cotton industry, for example.

Similarly, there was no pressure from population growth or rural depopulation which might have brought about industrial development. In 1846, 75% of French people still lived on the land; the growing population was fed not from an agricultural revolution but from the employment of greater numbers in agriculture. Until shortly before the First World War, agriculture still contributed the largest share to the total national economy, while this had not been the case in England since the end of the 18th century (Hoselitz, 1968, p. 288).

The most decisive obstacles to development probably lay, however, in the fact that France had, as a result of the Revolutionary and Napoleonic wars, lost the position of power in Europe that it succeeded in maintaining in the 18th century. Some 1.5 million French citizens died in the wars between 1793 and 1815 (Kennedy, 1991, p. 263); France lost a large part of its colonial sources of supply and overseas markets, its fleet was almost completely destroyed, and its sea ports decayed. The long struggle had not only caused widespread damage to the French economy, but the country also faced a commercial challenge in the peace after 1815 from its great British rival. Given this economic dominance, which it found hard to counter, France sought salvation in a protectionist economic policy which hindered rather than helped its industrial development. Not until the 1860s, when customs tariffs were reduced substantially, did France end this policy of shoring up its internal market and join in the rapid development of industry (Fremdling, 1982, p. 78).

The rejection of the traditional model of production

We shall now look at how the traditional guild-based economy came to an end in France. In 1774, during the final stages of the *ancien régime*, the grain trade was freed under the Finance Minister and reformer A. R. Turgot (1727-1781); under legislation enacted on 5 January 1776, statute-labour was discontinued, the guilds were abolished and the exercise of trades and commerce was liberalised. Free competition and equal taxation were intended to encourage an increase in the production of goods; at the same time, the formation of coalitions of workers and journeymen was prohibited (Meyser, 1996, p. 87f.). But these reforms proved impossible to put into practice, so that the representatives of the Revolution were the first to succeed finally in doing away with the medieval corporations by abolishing the entire feudal system, and introducing unrestricted freedom of occupation and place of residence (Griewank, 1958).

However, it was the right to form occupational associations formulated by the Revolutionaries that proved crucial to resolving the problem of training in France, in the 'manual trades in the narrow sense' (Schriewer, 1986, p. 75ff.). Besides abolishing all non-state corporations, the decree of 14 June 1791 (*Loi Le Chapelier*) provided that: 'There are no more corporations in the state. There exist henceforward only the interest of each individual and the general interest' (Charlot et al., 1985, p. 27). In Schriewer's view, this radical restriction on the relations between state and citizen is an expression of the programmatic theory of the state and economic policy of early French liberalism, based on the notion of the *volonté générale* that was influenced by the *Encyclopédistes*, the physiocrats and above all Rousseau. According to this theory, the particular interests of intermediate bodies (*associations partielles*) threatened the state, the sovereignty of the nation embodied in it, and the equality of citizens and their right to freedom of personal development, especially of course in the areas of commerce and industry.

The decree of June 1791 – subsequently an integral part of the political and administrative constitution of the country – proved a huge obstacle to the adoption of appropriate legislation on associations, societies and trade unions in France in the 19th century and determined the political climate of the *Grande Nation*, with some minor amendments in 1864 and 1884, more

or less right up until the First World War, together with uninterrupted economic liberalism (Schriewer, 1986, p. 76): freedom through the state, not from the state as in England.

In view of the political and legal situation described above it appears logical that no movement of craft workers intent on restoring guild structures and privileges was able to establish itself in France – quite unlike Germany – during the 19th century. Hesitant attempts in this direction were energetically rejected by the new class of urban property-owners and traders, the true beneficiaries of unrestricted freedom of trade. Apprenticeship, which was freed from all control and supervision in France, was in consequence necessarily more seriously threatened by the increasing industrialisation that began around the middle of the century than in Germany, for example, where most of the organs of self-regulation of the old middle class continued to exist even after the introduction of freedom of occupation, albeit without the compulsory character typical of the guilds. – 'The Revolution and the Empire destroyed the social bases of traditional apprenticeship but did not put in place any other system of vocational and technical training,' is the judgment of the French historian (Charlot et al., 1985, p. 29).

According to the new legal code in France – e.g. the law of 1851 – a contract of apprenticeship was a 'private-law contractual relationship freely negotiated between two economic parties' (Schriewer, 1986, p. 80). The conditions laid down followed the liberal fiction of the balance of individual interests, the training of apprentices was no longer tied to any specific vocational or personal skills, and neither its quality of expertise nor its important final certification was subject to binding regulation.

The consequent quantitative and qualitative erosion of this form of training led to discussion in France from as early as 1850 of the 'crisis of apprenticeship training', a cry that was heard constantly thereafter (Charlot et al., 1985, p. 35ff.). Foreign observers also, such as the German constitutional lawyer Lorenz von Stein, described French vocational training at the start of the second half of the century as a disconnected muddle of 'more or less two worlds, two main processes of education'; training in elite state 'schools' for the learned professions and senior civil service staff on the one hand, and 'completely arbitrary', 'disorganised' training with no 'internal order' for 'purely commercial' jobs on the other (Schriewer, 1986, p. 80).

As this example shows, the middle of the 19th century saw the beginnings of international arguments about the connection between economic progress and technical vocational training. One major platform for these was the world exhibitions that were held regularly from 1851, which enabled perceptive observers to make direct comparisons between the quality of the products of the main European industrial competitors, and of the structure of their vocational training (e.g. Reuleaux, 1877).

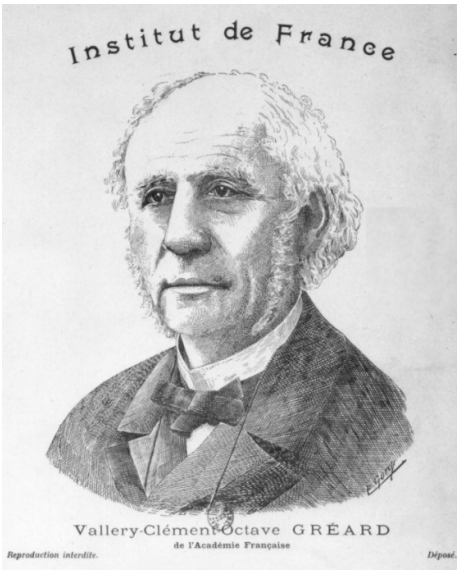
Around 1850, the vocational training sector in France boasted the following institutions: first, there were the *Grandes écoles*: *Centrale, polytechnique, des ponts et chaussées, des Mines,* etc. (and some new schools of engineering were added in the 1850s and later, in Lille, Lyon, Nancy and Paris); there were also the three *Écoles des arts et métiers* in Chalons, Angers and Aix. Each of these three production schools trained about 300 students on each three to four-

year course. But there was no solution at all to the problem of training an elite of manual workers, let alone mass education for the working class (Charlot et al., 1985, p. 137ff.).

The beginnings of state regulated mass vocational education

The stimulus for finding a solution to this problem of mass vocational training in the 1880s and '90s was not the realisation that there shortcomings in training, however, but the obvious consequences of social and political crisis, or to be more precise, a virulent tendency for bourgeois capitalist society to break down. In the case of Prussia-Germany there is copious evidence for this which leaves little doubt (e.g. Greinert, 1975), and in the French case, while the exact aims and intentions of political integration and stabilisation of the system differed, the overall reasons behind the policy were very similar to those in Germany.

Figure 5: Vallery-Clément Octave Gréard



Source: Institut de France, 1900

It was therefore no accident that the 'French Kerschensteiner', Octave Gréard, wrote his significant Memorandum on the Reform of Apprenticeship Training in 1871, the year of the Commune. Political agitation and rebellion by the workers were the godparents, so to speak, of his writings. The dispute with Ollendorf and Corbon-Tolain about the creation of an *École professionnelle pour les ouvriers* reveals striking similarities to Kerschensteiner's notion of civic education – albeit in typical French form: 'C'est le citoyen qu'il faut former *à travers l'ouvrier*' – the citizen is to be educated through the worker (Charlot et al., 1985, p. 150f.). Was the Munich Inspector of Education Dr. Georg Kerschensteiner familiar with the writing of Gréard when he wrote his celebrated prize-winning article '*Staatsbürgerliche Erziehung der deutschen Jugend'* – the 'birth certificate' of the *Berufsschule*, thirty years later?

In order to find a solution to the problem of mass training, France was not able like Prussia-Germany to fall back on a policy of stabilising or restoring guild models of training. In the first place, the main support of the old middle class, the craft trades, were no longer in existence as an organised social grouping capable of political expression, and secondly, the restrictive rules of constitutional and association law passed during the Revolution and still in force did not permit the requisite re-establishment of self-regulating corporations.

In seeking a solution to the problem, France therefore turned to the model that was familiar and available to it: the technical vocational schools providing higher levels of training, nearly all of which had a long, successful tradition behind them. These were primarily the celebrated *Écoles des arts et métiers*, the higher state colleges of trades and industry launched by

Napoleon for training middle-ranking master craftsmen and overseers (*sous-officiers pour l'industrie*, *contre-maîtres pour les manufactures*, *chefs d'ateliers*; Meyser, 1996, p. 37).

However, there was little organisational or educational consistency between the numerous state and private *écoles professionnelles*, whose programme was modelled on the early German *Realschulen* in response to the needs of small and medium-sized craft enterprises, tradespeople and farmers. Alongside these schools for the middle level of training, there were also the so-called *écoles d'apprentissage*, which were clearly at the level of specialised apprenticeship training for skilled workers. The success of the best known of these schools, the *École Diderot* in Paris, the organisation and curriculum of which had been designed by Octave Gréard, had a direct influence on the crucial draft legislation on the establishment of *écoles manuelles d'apprentissage* (= manual apprenticeship schools) in 1878, which passed into law in 1880 after a number of revisions (Charlot et al., 1985, p. 139ff.).

The Law of December 1880, adopted in direct association with the primary school legislation of the 3rd Republic, led to the creation of two types of vocational school: the *Écoles nationales professionnelles* (ENP) and the *Écoles pratiques de commerce et d'industrie* (EPCI). The ENPs were state schools providing preparation for the *Écoles des arts et métiers*, while the EPCIs could be operated by *départements* or groups of neighbouring communes and received subsidies from the Ministry of Trade (Charlot et al., 1985, p. 155ff.). In both cases, they were similar to the German *Berufsfachschulen* in that they offered both work experience and occupational theory within a closed course.

With hindsight it is clear that France laid the foundations even before Germany for a state, government-regulated, school-based system of vocational training in the form of these *écoles manuelles d'apprentissage*. This did not mean, however, that the issue of traditional vocational training was finally settled; far from it: in accordance with the 'escalator effect' inherent in school-based training, the first generation of apprenticeship schools tended to rise up the qualifications ladder: under the Vichy Regime, the EPCIs were renamed *Collèges techniques*, and in 1959 they were combined with the ENPs (and extended by one year) and henceforward known as *Lycées techniques*. In the early 1980s, the name was changed to *Lycées d'enseignement technologique*, and in the early 1990s they became fully integrated into the general education system under the title *Lycées d'enseignement général et technologique*. There were continual attempts to modernise traditional vocational training, but on the eve of the Second World War it was found necessary to fall back on the school-based model of organisation to provide mass training for the armaments industry (see Part 2).

1.1.3. Germany: the traditional corporatist answer – the 'dual model' of vocational training

'By comparison with its two historical precursors, England and France, industrialisation in Germany was late, swift and thorough' (Dahrendorf, 1965, p. 46). Strictly speaking, this process did not get under way in Germany until after the failed revolution of 1848, when the bourgeois middle class turned its attention from politics to the economy. In 1840, for example,

1.5 million tonnes of pig iron were produced in England, 0.4 in France and 0.2 in Germany; between 1870 and 1910, production barely doubled in England but increased threefold in France and tenfold in Germany (Gleitze, 1960; Henning, 1979). This late industrialisation was therefore a rapid process that affected all sections of society.

According to Dahrendorf, there were five crucial features of the Industrial Revolution which reached its zenith during the Second German Empire of the Kaisers. The first (1) was the size of the economy created in the wake of industrialisation. Unlike what happened in England and France, it was big public companies with limited liability, the major banks and large-scale enterprises that drove industrialisation. There is little evidence in Germany of the broad substratum of bourgeois businesses found, for example, in England. This meant (2) that the state – contrary to its declared liberal beliefs – played a key role in industrialisation in Germany, one particular aspect of this involvement – the third phenomenon – being the accumulation of a considerable proportion of state ownership (3).

This state capitalism was matched, seemingly paradoxically, by (4) an explicit form of state socialism. Social security measures such as sickness, accident, old age and invalidity insurance were key features of industrialisation in the German Empire. An examination of the overarching ideology of this peculiar development reveals the quite extraordinary phenomenon that the German process of industrialisation (5) essentially 'stifled the liberal principle rather than fostering it' (Dahrendorf, 1965). According to Marxist criteria of interpretation, the First Industrial Revolution in Germany cannot in fact be called capitalist. The dominance of the state in the process shows rather that the state succeeded in 'maintaining state authority against the onslaught of capitalist anarchy' (Dahrendorf, 1965, p. 54).

Helmuth Plessner's celebrated book about the 'nation that arrived late' (Plessner 1959) has had an enduring influence on the interpretation of this 'separate path' in Germany. However, Plessner's diagnosis of this 'lateness' does not relate primarily to the lateness of national unification or the delay to the Industrial Revolution, but is actually far broader, referring to the peculiar inertia of the underlying social, cultural and intellectual context. In Prussia-Germany, even industrialisation did not lead to bourgeois liberal society acquiring the weight to counteract the state. The tenacity of traditional antiliberal social structures and patterns of thinking was one of the parameters determining the way in which a 'new' model of vocational training developed in the German Empire.

But let us look back first to the background to this process: under the old German Empire, the attempt by the state drastically to restrict the autocracy of the guilds entered its crucial stage in the 17th century. Mercantilist economic policy and numerous 'Imperial Resolutions' against rampant abuses formed a two-pronged approach to trying to restore effective control of the craft trades throughout the Empire. However, recognisable results were not achieved until the Imperial Resolution of 1731 – the last concerned with guilds – as a consequence of which some of the larger states, under the leadership of Prussia, took firm action.

This Imperial legislation put an end to the long era of self-regulation by the craft trades in Germany. Even with the help of provisions outlawing abuses, however, it did not prove

possible to achieve a functioning restructuring of the craft trades (Wernet, 1959). The starting point for this was not reached until the Napoleonic wars and the reforms brought about as a result of the defeat of Germany, particularly the introduction of freedom of occupation and residence – in Prussia through the Edict of 2 November 1810. There were, however, two distinct lines of thinking behind the measures enacted in the parts of Germany occupied by Napoleon, such as Westphalia. The liberal, revolutionary spirit which favoured the French actions resulted at most in the ephemeral reforms of Hardenberg, but the vast majority of these measures were dominated by the aim of preventing the financial collapse of Prussia and thereby saving its political existence by liberating the forces of society (Kosellek, 1968, p. 68).

It is evident from the subsequent fate of freedom of occupation during the 19th century that it was not seen as a crucial precursor to the development of a bourgeois capitalist society in Germany. Occupational legislation varied widely in the German states during the first half of the century, sometimes following the French model, and sometimes complying with pressure from the guilds. Prussia itself was no exception: it can in fact be regarded as a typical example of how the implementation of unrestricted freedom of occupation in Germany was constantly affected by the need to compromise with the old middle class, and in particular the craft trades.

The Prussian Crafts Code of 1845, about the content of which there had been wrangling for some 20 years, reintroduced substantial restrictions to freedom of occupation by comparison with the Edict of 1810. The law once again permitted crafts to govern themselves, in the form of *Innungen* or restructured guilds, and the 'training of apprentices' was stabilised by official examinations, with the result that the craft trades acquired a considerable competitive advantage over industry (Schöfer, 1981, p. 51ff.). These measures might even be interpreted as a 'first step towards the protection of the middle class', a policy which was not pursued consistently until the last third of the 19th century (Kosellek, 1975, p. 599).

In the 1840s the craft trades gradually become organised into a political protest movement, which first gained national influence in the aftermath of the 1848 Revolution. The General Congress of Craft Trades and Industries, which met in parallel to the National Assembly in Frankfurt, presented its 'Draft of a General Craft Trades and Industry Law for Germany' both to that body and to the Prussian National Assembly in Berlin, a document calling for the outright large-scale restoration of the rights of the craft trades in the previous century (Simon, 1983). In Prussia at least, these absurdly anachronistic 'wishes' achieved their political effect: the Crafts Code of 1845 was further weakened by the Order of 2 February 1849 in the interest of the crafts, purely and simply to prevent further disturbances and 'revolutionary machinations' among the craft trades, as the authorities stated quite openly (Schöfer, 1981, p. 55ff.).

A knowledge of this background history is needed to understand how it came about that the foundations of a new model of vocational training could be laid in the German Empire in the last third of the 19th century without 'major industry' giving any indication of wanting to play a part in this important development, or to influence it in its own interests.

Figure 6: Village smithy of the Maaß family, Britz bei Berlin, Chausseestr. 16 (circa 1895)

Source: Greinert, 1998, p. 198.

The reinvigoration of the traditional model of vocational training

The crucial (third) stage of the concerted protest by the craft trades against the social and economic consequences of the Industrial Revolution in Germany began in 1873. The immediate causes of the so-called 'middle-class movement' were the 'Great Depression' – the long economic crisis that followed the overblown speculation after the foundation of the Second Empire in 1871 – and the new, now truly liberal Imperial Crafts Code, a concession by Bismarck to his bourgeois allies, the National Liberals. The introduction of full freedom of occupation in craft trades and retailing caused people to fear for their livelihoods on financial grounds, and the long economic crisis after 1873 eventually stimulated panicky political activity among the middle class (Winkler, 1971).

In the craft trades, the political programme of the 'middle class movement' after 1873 was expressed initially through demands for the establishment of an 'Association of Self-Employed Tradesmen and Manufacturers' (Böttger, 1893). There were calls for Parliament to introduce Chambers of Industry and Trades, courts of occupational arbitration, compulsory continuation schools, occupational corporations (*Innungen*) and reforms favouring the middle class in the areas of prison work, auction of goods and door-to-door selling. Particularly after 1878, following the second economic collapse during the Great Depression, the bias of this programme in favour of the guilds was further strengthened and then achieved a complete breakthrough at the 'General German Craft Trades Assembly' in Magdeburg (1882). The majority of the tradesmen present spoke in favour of compulsory membership of an Innung and full certification (Grosser Befähigungsnachweis, restricting management of a craft business to qualified master craftsmen). The 'General German Craft Trades Association' set up at the same congress attempted to push through these demands in the next few years (Waentig, 1898).

This programme was greeted by the Government in particular with great reservations and was rejected because of fears that acceptance would threaten economic growth. However, powerful forces within Government, and more particularly in Parliament, had moved away from the liberal principles of economic policy that had prevailed thus far, and had adopted an essentially protectionist stance which lent support to middle-class demands. The German Conservative Party in particular had supported the demands of the craft trade representatives because it saw them as an opportunity strongly to expand its pool of voters among middle-class tradesmen at a time of social and political crisis. For similar reasons, the Centre Party reacted positively to the craft trades demands, whose guild ideology it shared. The National Liberals, the majority of whom had turned away from free trade since 1879, and were inclined to support protectionist demands for reasons of electoral tactics, gave in at the decisive moment to the demands from the craft trades lobby, which had been considerably watered down after 1896 (Linke, 1955).

It was only the left-wing Liberals who opposed this majority in the Reichstag and continued to fly the flag of liberal dogma, and the Social Democrats, who were convinced in accordance with Marxist theory that the collapse of middle-class businesses and their decline into the proletariat was inevitable.

Between 1878 and 1897 – and again after 1908 – the Reichstag majority composed of Conservatives, the Centre Party and some of the National Liberals pushed through a series of amendments in favour of the rights of crafts trades, in addition to a number to protect retailing which, while not fulfilling the complete programme of the craft trades movement, went a considerable way towards legalising economic advantages for the craft trades at the expense of third parties – especially consumers (Winkler, 1972). The most significant amendment, the so-called 'Craft Trades Protection Act' of 1897, took account of the common interests of self-employed tradesmen by permitting the establishment of Chambers of Trades as public-law bodies and created the institution of

Figure 7: *Façade of the First Craft School in Berlin (gateway to Market Hall II, Lindenstraße 97-98, built 1886)*

Source: Greinert, 1998, p. 200.

'optional compulsory guild membership' (compulsory membership of an *Innung* by majority decision). Oversight of apprenticeships and the conduct of examinations were vested in these institutions. Full compulsory certification was approved by the Reichstag in 1890, but was rejected by the Bundesrat (the upper chamber) because it clearly exceeded the willingness of those forces within the Empire aiming at economic growth to reach a compromise with the demands of the middle class in the interest of stabilising the social and political status quo.

The 1908 'Lesser Certification' Act (*Kleiner Befähigungsnachweis*) was a somewhat inadequate replacement: from then on, only certificated master craftsmen were entitled to train apprentices (Coelsch, 1910).

The Crafts Code Amendment of 1897 was not only the most significant piece of legislation in the Empire concerned with the reorganisation of craft trades, but it also allowed the craft trades largely to restore their traditional training system. The amendment introduced fundamentally new provisions governing apprenticeship: 'general' provisions in Paragraphs 126-128 and 'special' provisions in Paragraphs 129-132 relating only to apprenticeships in the craft trades, which cemented the long-lasting advantage of those trades in industrial training and made the craft trade model of vocational training the pattern for non-academic training as a whole in Germany (Hoffmann, 1902; Stütz, 1969).

The restoration of the guild-based craft training model would not have been possible without considerable planning and active public support. Powerful bourgeois groupings worked in its favour: particularly the Evangelical Social Congress and the People's Association for a Catholic Germany, the most influential Catholic social movement, as well as sections of the Social Policy Association. In 1900, they were joined by the Society for Social Reform. These associations not only succeeded in gaining the ear of Government, but they also had the support of powerful political parties – such as the Centre Party – in achieving their political aims (Abel, 1963, p. 31ff.).

The Crafts Code Amendments of 1897 and 1908 are today generally regarded as the most important pillars of the so-called dual system of vocational training. This model sprang, as has been indicated, not from the demands or needs of progressive social forces but were rather an embodiment or outcome of the 'reaction against socialism, which linked the then leading groups of the nobility and the upper middle class with small businesspeople' (Lempert, 1971, p. 114). The historian H. A. Winkler coined the appropriate term 'political reinsurance system' to describe the middle class policy of the Empire. Winkler regards this system of 'mutual reinsurance by the "powers seeking to preserve the state" from the upheavals of social revolution and parliamentary majoritarianism' as typified by 'a professedly non-party political state apparatus independent of parliamentary majorities combined with privileged wielders of social power'. Because of their lack of political and economic power, middle-class tradespeople became drawn into this system through a process of 'refeudalisation', i.e., the restoration of specific guild-based forms of organisation and privileges (Winkler, 1972, p. 57ff.).

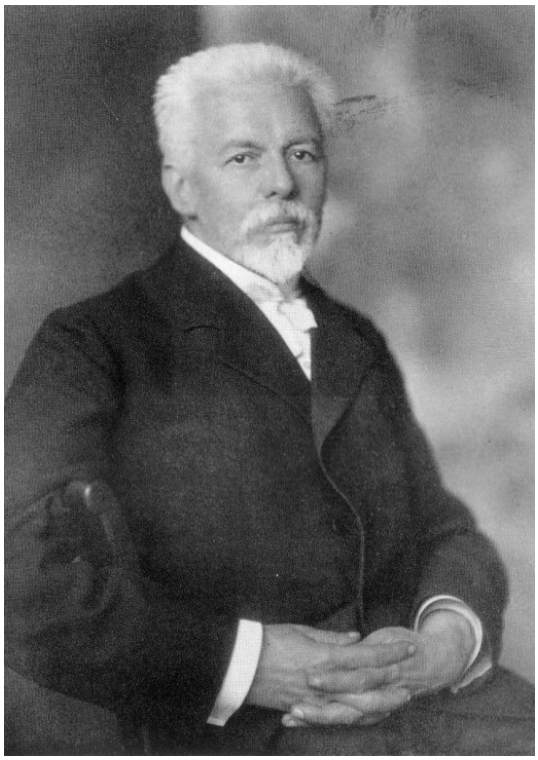
While the reinvigoration of guild-based vocational training may be described as a conservative and clerical variant of middle-class policy, the attempt to establish the second pillar of the dual system of vocational training, continuation schools, must be regarded as a liberal variant of that policy. Schools providing 'continuing' education had existed in Germany since the 17th century, both as institutions of general education for young people leaving school (Sunday schools) and as trade schools, particularly for the craft trades. However, these schools were not successful or effective, and there were continual threats to their existence (Thyssen, 1954).

The establishment of continuation schools (Fortbildungsschulen)

The expansion of continuing education did not get under way until the last third of the 19th century, when the gap in secondary socialisation – especially for young males – became a huge issue for bourgeois society in the wake of rapid population growth and could no longer be ignored. The first attempt to exercise an educating influence on young people in employment by means of a *Volksschule* programme was nonetheless a failure (Greinert, 1975).

The criticism of this attempt at crude compulsory ideological indoctrination, which was frequently regarded as an instrument of the class war, culminated in 1900 in the proposal by Georg Kerschensteiner to transform this form of schooling into an institution consistently based on learners' occupations, thereby tying it in with the programme of official middle-class policy. Kerschensteiner's idea of associating vocational training, and hence the jobs done by young people from the lower and lower middle classes, to the bourgeois nation-state, may be seen as the crucial turning point in the move towards compulsory vocational schooling. When putting forward his plan for continuing education, Kerschensteiner had been aware of recent developments in industrial vocational training, especially in the German-speaking countries of Europe, but he was equally interested in what was happening in France and England, countries which he only visited, however, after compiling his comprehensive report of his travels, 'Observations and Comparisons' (Metz, 1971).

Figure 8: As Inspector of Education around 1905.



Source: Kerschensteiner, 1939, p. 118.

Figure 9: The Kerschensteiner Vocational School in Liebherrstraße, Munich, built 1904/5.

Source: Kerschensteiner, 1939, p. 137.

Between 1895 and 1914, the school reformers based around Oskar W. Pache and Georg Kerschensteiner, together with the government bureaucracy, all of whom favoured bourgeois

liberalism, succeeded in standardising and considerably expanding the number of vocationally oriented continuation schools, and in turning them into compulsory schools complementing the newly restructured training in the craft trades (Harney, 1980). The 'role model of middle-class occupational identity and loyalty to the state' (Harney, 1980), which liberals and the Government had adopted as the general model for the education of the clientele of continuation schools by the 1890s at the latest, thus gained educational as well as social importance as the 'new thinking on education and schooling' in the history of German education (Abel, 1963).

The modernity of the unmodern

Traditional German vocational teaching constantly tried to argue that the way to fulfil the anachronistic purpose of the dual system was by creating a compulsory school of continuing or vocational education as a 'modern' addition to vocational training. In the event, these institutions, which followed a rational structural pattern, were established by liberally minded groups and individuals opposed to conservative-clerical industrial policy. However, there is no dismissing the fact that the self-perception and curricula of continuation or vocational schools were never able to escape the dominance of the work place as the place of learning. It is therefore doubtful whether this rational addition to the traditional model of training actually had the modernising effect that was claimed during the period when it was first introduced (1870-1920).

Continuation schools, the addition of which to vocational training is still usually regarded today as the justification for the term 'dual system', were not created on strictly economic grounds (i.e. to teach occupational skills), but were intended primarily to promote the political integration of lower class (male) young people into the bourgeois nation-state by means of normative indoctrination and the imposition of political discipline (Greinert, 1975). It was not until the Munich Inspector of Education and educational reformer Kerschensteiner put forward his vision around the turn of the century that these schools had a real chance of consolidating themselves by offering social integration through vocational education and employment (Kerschensteiner, 1901). The organisational and educational realisation of this programme was only achieved step by step, however, during the subsequent development phase of the dual system (1920-1970).

The German system of vocational training to which these fundamental decisions led the way appears to be the least modern, even reactionary, by comparison with the consistently market-oriented English model and the school-based model in France. The shape and content of this training model were, according to its first historian, Heinrich Abel, not at first 'determined by the proponents of industrialisation but by forces thinking in terms of pre-industrial craft guilds' (Abel, 1963, p. 42). However, the words 'at first' should not be overlooked in this judgment. The next stage was the development of a more modern version of this model under the influence of 'major industries', which proved extremely effective, at least during the age of 'industrialism', and superior to its two competitors. When it was created it clearly had potential for development, but what was this potential?

The new German approach to training during the First Industrial Revolution which, particularly with hindsight, appears extraordinarily modern, can also be interpreted from the point of view of modern systems theory. The victory of the dual involvement of the state and society, using feudalistic structures of organisation and management (the restoration of intermediate bodies – the Chambers of Industry and Trades and reinvigorated guilds or *Innungen*), which vocational educationists such as W. Lempert and historians such as H. A. Winkler criticise from the standpoint of classical democracy theory, can be seen in terms of the theory of functional differentiation as the creation of an additional 'area of overlap between the spheres of meaning and functional orientations of the political and economic sub-systems of society' (Schriewer, 1986, p. 84). From the point of view of systems theory, the crucial question must therefore be whether the differentiation of this sub-system brought substantial benefits for society. In retrospect, the answer is yes: the reconstituted craft organisations not only set out to achieve a balance between individual, self-interested economic efforts and the need to shape an overarching policy, but they also succeeded. This principle of 'self-regulation' was then adopted by industry as well, together with the associated arrangement of training in accordance with the 'occupational principle'.

1.2. Production schools and course-based training – the first models of modern vocational training in 19th century Europe and their impact on the 'promotion of industry'

As stated in the preceding chapter, no standardised, 'typical' industrial vocational training model developed for the great majority of employees as a result of the First Industrial Revolution in Europe. Instead, the three 'classical' models of training described above essentially became established and – as has yet to be recounted – set the pattern for a limited number of other European states. The pattern-setting effect did not relate to the policy or 'system' level of vocational training, however, which was as yet not discernible as such. The adoption of new types of training occurred rather at the level beneath, the operational level, i.e. the level of immediate teaching and learning: there is plenty of evidence for the creation of a number of typical training plans for particular industries. However, the growth in these was not due merely to the explicit 'interconnectedness' of European nation-states; these methodological designs were adopted and widely applied in practice in nearly all European states as quasi-standardised training procedures.

The prototypes of these new methods of industrial training, which were adopted in the course of time more or less throughout Europe, were the production school and course-based training. Unlike the social origins of the European vocational training systems, the establishment and spread of these two vocational training methods reflected the shared experience of industrial modernisation – with its worldwide consequences. The fact that little attention has been paid to date to this issue is due to the traditional devaluing of non-academic vocational education and training in nearly all European countries. At a time when the age of industrialisation is drawing to a close, not only does a reconstruction of this extraordinary

process seem called for on historical grounds, but an awareness of tradition is also needed for the planning of future European vocational education and training policy.

The 'production school': an innovation in vocational education and training

The term 'production school' generally stands for the combination of education and productive work, or of vocational training and gainful production. The roots of the production school are to be found in industry in 18th century France, where an *École des métiers* was established by the Duc de la Rochefoucauld-Liancourt (1747-1827) in 1778. This was a school for military orphans, in which the sons of soldiers and the orphans of a regiment of dragoons were given training for employment in various crafts by the master craftsmen of that unit (Meyser, 1996). When he returned from England, the Duke managed to convince Napoleon Bonaparte of the need for technical training at a middle level of skills, in order to give effective support to the development of industry in the country. As a result, on 25 February 1803, the *École des arts et métiers*, the first production school, was opened at the instigation of Napoleon, in which *sous-officiers pour l'industrie*, *contre-maîtres pour le manufactures* and *chefs d'ateliers* were to be trained.

Figure 10: The founder of the Écoles des arts et métiers*: François-Alexandre Fréderic de La Rochefoucauld- Liancourt (1747-1827)*

Source: Meyser, 1996, p. 215-2.

Figure 11: Coat of arms of Liancourt wih the emblem of the Écoles des arts et métiers

Source: Meyser, 1996, p. 215-3

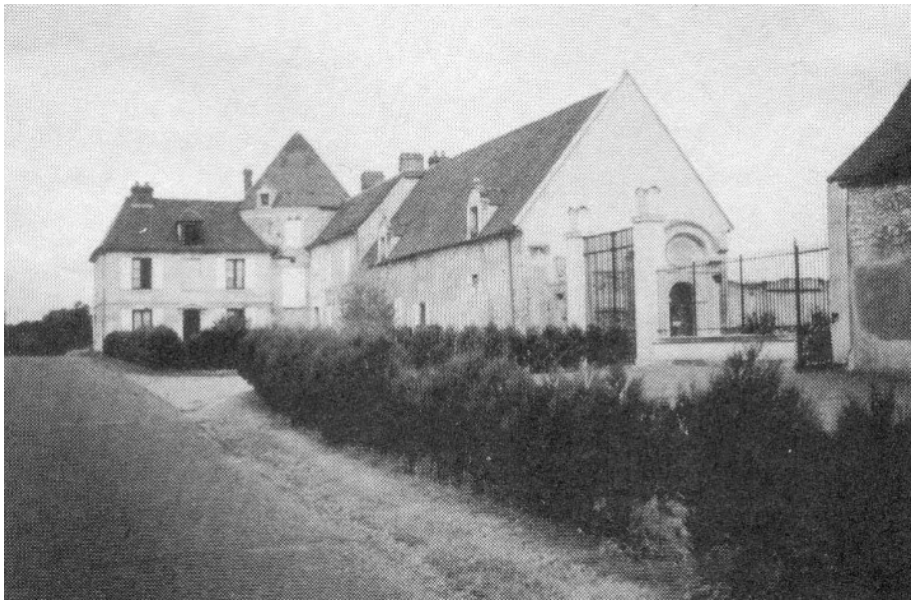
This school was not only an answer to the training needs of the military and expanding industry, but it also proved a necessary replacement for the training of master craftsmen, the requisite sponsors of which – the guilds – had been finally abolished in 1789 by the Revolution, as reported above. From an educational point of view, the *École des arts et métiers* was the transition from traditional vocational training to systematic school-based types of training.

While vocational training was still provided in the *École des métiers* after the traditional craft model – besides elementary education and military drill – the 'organisational plan' of its successor was an early attempt at systematic vocational training. Practical training was given in workshops set up for this purpose:

- smithies (including filing, lathe-work and fitting);
- a foundry;
- a carpenter's and joiner's shop (for furniture and machinery),
- a wood-turning and wheelwright's shop;
- and from 1807: an engraving shop.

These specialised workshops still used predominantly hand craft production techniques, and the work was organised accordingly, but the non-productive technical occupations of the former school were discontinued, and theoretical vocational education was given in the workshops alongside the practical training, in which representational geometry, drawing, reading of machinery plans and the principles of mechanics were taught. Production still followed the craft job principle. Up until the 1840s, most of what was produced was 'single items made to order' (e.g. furniture, civic and church tower clocks, bronze appliqué work), and it was only the turners who came close to mass production, building pack and box wagons for the army (Meyser, 1996, p. 48). Students worked seven hours a day in the workshop and five and a half hours in classrooms and drawing shops. The considerable costs of boarding were covered partly by school fees, but largely by sale of the goods produced in the workshops. The three production schools established by 1843 were able in 1851, for example, to earn a total of 40% of all the funds they required for themselves (Greinert and Meyser, 1996, p. 133).

Figure 12: The École des métiers in Liancourt on the estate of the Duc de La Rochefoucauld.



Source: Meyser, 1996, p. 215-1.

This example of a 'vocational training that was separate from but not unrelated to production, systematic, practical and pedagogically carefully arranged' (Grüner, 1977, p. 730), which was the first 'educational' model of vocational training in Europe, was the result of a highly complex historical process. From the standpoint of economic history, the idea first took shape on the eve of industrialisation in France, and was thus an integral part of the history of the Industrial Revolution in that country. In its early stages, this model of training was also strongly influenced by the humanist ideals and scientific world view of the Enlightenment. The notion of teaching people in a planned way to be 'useful to the common good' and 'industrious', as had been attempted in Germany, for example, by the Philanthropists, thus offered a guiding principle, as did the French (elite) schools of engineering, which had devoted their curricula solely to technical and scientific progress.

Another factor affecting the creation of the *Écoles des arts et métiers* can be traced back to the consequences of early liberal thinking and liberal economic policy in France – even under the *ancien régime* – the influence of which on power politics has already been mentioned: the fact that industrial development lagged behind that of England – historically the traditional enemy – clearly played a key role in the deliberate rapid industrialisation of France (Kennedy, 1991, p. 229f.). Against the background of all these factors, the *École des arts et métiers* was the first of a series of instruments which modernised vocational training in Europe and today still play an important development role when societies wish to 'catch up' (Greinert and Wiemann, 1997).

Figure 13: The Écoles des arts et métiers and the spread of the production school principle in the 19th century

Source: Meyser, 1996, p. 197

By the middle of the 19th century, a 'production school system' had developed in France that was both organisationally and educationally fully formed and targeted the metalworking and engineering industry. This completely school-based specialist training was then considered the most modern in the world; nowhere else was there such a highly regarded training for master craftsmen and works foremen. None of the industrialising countries, including England, which was way out in the lead, had produced a training model for elite workers that could compete with the French. But the greatest success of the new design of learning and its wide adoption outside its country of origin would only become apparent in the last third of the 19th century, when the production school principle was combined with course-based training. This form of systematic vocational training rapidly became the basic educational principle behind the expansion of European vocational schools (Meyser, 1996, p. 92ff.).

Figure 14: Production schools in France in the 19th century (metalworking, engineering, light engineering, clock and watchmaking)

Source: Meyser, 1996, p. 198.

Innovative vocational 'course-based training'

The creation of course-based training is closely associated with the name Viktor Karlovich Della-Vos (1829-1890), a Russian of Italian origin. His biography gives a clear picture of European 'interconnectedness' in the 19th century (Ploghaus, 2003, p. 15ff.). Della-Vos was born in Odessa on 12 February 1829 as the first child of a family whose forebears had migrated from Italy. After attending elementary and grammar schools in Odessa, he studied mathematics and physics at Moscow University (graduating as a Candidate of Physical and Mathematical Sciences, and later taking a further examination in Agriculture). Between 1854 and 1859 Della-Vos taught at an agricultural school and at the grammar school in his home town.

Figure 15: Viktor K. Della-Vos (1829-1890) (engraving)

Source: Ploghaus, 2003, p. 269.

In the wake of the adoption of a more open foreign policy following defeat in the Crimean War (1853-1856), Della-Vos spent five years taking further professional training in France at the behest of the Russian Government, studying modern technical and scientific developments in a number of European countries, and reporting on these to his Government. From 1859 to 1862 he then studied engineering in Paris and gained practical experience at his own initiative in a local engineering works. This was probably the motivation and source of his ground-breaking 'invention', the so-called 'Russian Method' of workshop training, known abroad also as the 'Della-Vos Method' in recognition of his part in it. By his own account, the unsystematic, haphazard way of inducting young workers and technicians into the production process worried Della-Vos, so that he started thinking about how to remedy the situation.

Having been appointed Professor of Mechanical Engineering at the 'Moscow Academy of Agriculture and Forestry' in November 1864, Della-Vos was promoted in mid-July 1868 to the post of Director of the newly established Imperial Technical College in Moscow, which he headed until 1880. This institution ranked as a university and was chosen as the centre for technical and scientific experimentation and research that would develop the engineering potential that Russia needed. His twelve years as head of this Technical College were Della-Vos's most productive period. He completely reorganised the training of the former Technical Institute, particularly by introducing compulsory training for engineers in practical skills. For this purpose he designed a special 'sequential' method, the practical courses of which he developed together with his workshop masters, notably D. K. Sovetkyn (Ploghaus, 2003, p. 77ff.).

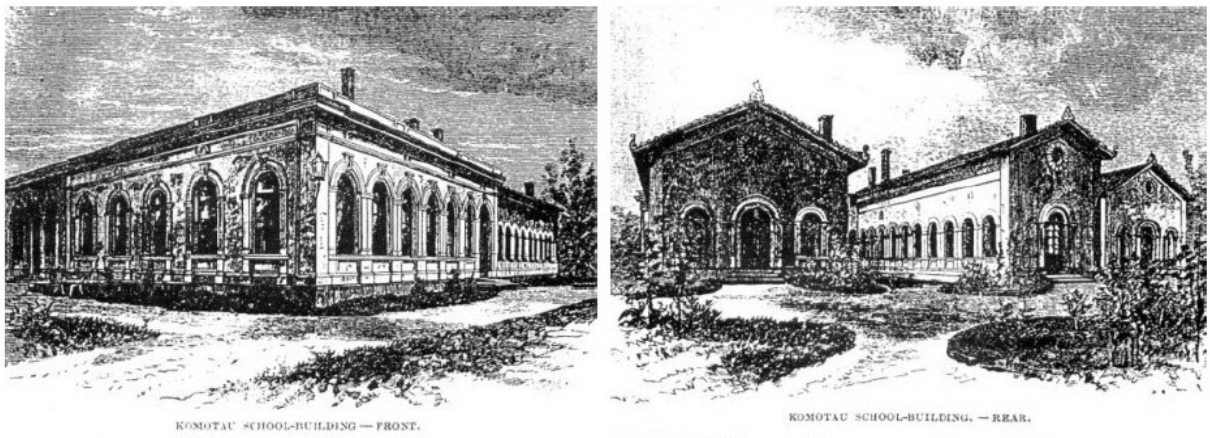
During this time he also became very involved in achieving wider recognition and adoption of his new training method. As early as 1870 he gave a presentation on the College and the course at the 'All-Russian Manufacturing Exhibition' in St. Petersburg, and in 1872 at the 'International Technical Exhibition' in Moscow, which he played a large part in planning. Della-Vos then presented his Russian Method to other countries at the World Exhibitions in Vienna (1873), Philadelphia (1876) and Paris (1878). He made a lengthy tour of Germany, France and Belgium in 1875. When he gave up his directorship in Moscow on health grounds, he became Deputy Director of the Training Department at the Ministry of Transport in St. Petersburg. From 1882, as Director of this department, he concerned himself particularly with improving the training colleges for railway and shipbuilding personnel, and frequently successfully introduced his Russian System in these colleges as well.

Under the 'sequential method' of practical vocational training developed for the first time by Della-Vos, complete procedures are broken down into individual operations (e.g. filing, assembling, fitting, riveting, reaming, bending, countersinking, drilling, cutting, sawing, scribing, measuring, thread-cutting, etc.), practised in ascending order of difficulty, and put together again in learning sequences to be worked through by learners in specified stages. There is no doubt that Della-Vos had been crucially inspired to develop such a training method in France, possibly through awareness of the training practised in production schools.

His ‘Russian Method’ was, however, a new type of ‘teaching’ workshop (then known as an ‘instructional workshop’) in which the training was no longer production-oriented – as in the *Écoles des arts et métiers* – but was arranged systematically from a teaching point of view (from the easy to the difficult, the simple to the complicated). Della-Vos combined both learning procedures in the Moscow Technical College: in the first part of their training, future engineers had to take courses in six instructional workshops, after which they transferred to production in the machinery works attached to the Technical College, where they learnt about the real application of technology at work. The teaching in vocational schools was subsequently organised in accordance with this principle of achieving the optimum combination of systematic and casual learning throughout Europe (Meyser, 1996, p. 93ff.).

A key role in the adoption of the new sequential method of training by professionals and its international recognition was played by the ‘School of Engineering’ that was newly established in Komotau, Bohemia, in 1874, and by its Director, Theodor Reuter (Ploghaus, 1991). It was the new industrial plant which opened in this up-and-coming district capital (now Chomotov in the Czech Republic) in the last quarter of the century that led to the creation of the school. The central position at the south-eastern foot of the Erzgebirge, a few kilometres from the border of Saxony and about 100 kilometres from the centres of Prague, Dresden and Leipzig, was ideal for the establishment in 1871 of an iron and steel foundry and engineering works, which was immediately followed by the opening of the vocational school. The existence of the latter in turn encouraged other industrial companies subsequently to open plants in Komotau, such as Kienzle, Mannesmann and Poldi-Hütte AG.

Figure 16: Komotau School of Engineering (views of the buildings)



Source: Ploghaus, 2003, p. 296.

The engineer Theodor Reuter was appointed head of the school in Komotau in 1874 and was instructed by the Imperial Government to create the first large vocational school in Austria. Reuter was the first person outside Russia to introduce the Russian System, of which he had learnt at the latest in 1873 at the Vienna World Exhibition, and he used it in an ordinary vocational school. Not only did he realise that the brilliant new method invented by Della-Vos could be used for practical vocational training, and rapidly adapted and improved the new method for general use in vocational schools, but he also made sure that it became better known elsewhere in Europe.

Following Reuter's pioneering efforts at the vocational school in Komotau, the Russian System was swiftly introduced into full-time vocational schools throughout Austria. In 1876, the Komotau curricula were taken from the World Exhibition in Philadelphia to Boston and used there to train engineers by the founder of American vocational schooling and leader of the *Manual Training Movement*, John D. Runkle, who also recommended that they be employed in general schools. In 1879, Reuter left Komotau and became Director of the Prussian Royal School of Engineering in Iserlohn. Here too, he immediately introduced his course-based system of practical training and worked to spread the ideas of Della-Vos further – to England for example, where he had worked as an engineer early on. In 1882 the Iserlohn teaching curricula were sent to London at the request of the Royal Commission on English Education, but unfortunately it is not known which experts were influenced by them or what became of them. At all events, Reuter spent his years in Iserlohn advocating course-based training more widely, chiefly in his capacity as a member of the Association of German Vocational Schoolmasters. In 1891, by then already the legendary Royal Director, he published a magnificent volume of students' exercises from his celebrated vocational school (Reuter, 1891).

The course-based training introduced by Reuter at his vocational school was thus the first systematic practical vocational instruction in Prussia. The aim of the new style of training was to train draughtsmen, modellers, model-builders, plaster-casters, moulders, bronze-founders, chasers, engravers, galvanisers and 'self-employed managers of engineering works'. Additional vocational schools for the engineering industry were set up in Prussia towards the end of the 19th century after the model of Iserlohn, for example in Remscheid (1882), Siegen (1900) and Schmalkalden (1902). In 1906, these were followed by Göttingen with a school of light engineering. In all of these schools, the principle applied was direct admission to training, that is, they had no requirement for previous practical work experience (Meyser, 1996, p. 153).

As mentioned above, John D. Runkle (1822-1902), Professor of Mathematics and from 1868 to 1878 President of the Massachusetts Institute of Technology, which was founded in Boston in 1862, quickly appreciated the importance of the course-based method for training engineers and developing educationally motivated craft work in general schools, and it was he who distinguished between the Russian System (combining practical training with theoretical studies at one and the same time) and the Russian Method (course-based practical training in teaching or instructional workshops). The development of vocational training in the last third of the 19th century in Europe can thus be described largely in terms of the spread of the Russian System: the establishment of vocational schools in France, Russia, Austria, Germany and Switzerland, in the last three of these countries albeit in competition with the 'dual' model of vocational training. However, the outstanding feature of this type of school is nonetheless the combination of the production school principle and course-based training.

The relationship between vocational training and the promotion of industry

To begin with, the early outbreak of the Industrial Revolution in England left all other European states lagging behind. Particularly after the Congress of Vienna power politics meant that it was vital to overcome this 'relative backwardness' since the European political

order rested essentially after 1815 on the political balance between the five competing great powers – Britain, France, Russia, Austria and Prussia – and on the shifting coalitions between these states. While the political power of a country had previously depended primarily on its size and population, as well as on its craft-industrial and agricultural output, industrial production began to assume increasing political importance in the first third of the 19th century. Economic expansion based on technological changes in production, and the modernisation of socio-economic conditions, thus became the main driving forces behind changes in political power in the 19th century (Kennedy, 1991).

Figure 17: Production schools in Russia in the 19th century (metalworking, engineering, light engineering)

Quelle: Meyser, 1996, p. 199.

Towards the end of the century, a rank order of European states had developed, the most significant indicator of which was economic power determined by industrial production. Britain, the pioneer, was followed by Prussia-Germany and Russia, and then France and Austria-Hungary. Switzerland occupied a special position. Austria, Russia and Switzerland may therefore be regarded as the second batch of European states which sought, after France but more or less at the same time as Germany, to introduce systematic technical training as a factor in production. While broad sections of the population were involved in the modernisation process in Britain, with the result that 'practical training' was regarded and

accepted from the outset as the predominant type of training in the industrialisation process, it proved necessary in the states that came later, where development was generally driven by a small elite of highly skilled workers, to use special training schemes to produce the technical personnel that were lacking. 'Promoting industry through training' thus became a feature of industrialisation in the European states where industrialisation set in later.

In the case of Russia, Austria and Switzerland, which may be regarded as the first successors to the countries that were the founders of technical and industrial training, it must be remembered, however, that they put forward no new organisational models of vocational training but were guided much more by the classical patterns that had developed in England, France and Germany, with the French example receiving the greatest attention. This is demonstrated by the numerous publications supposedly 'looking over the fence' and providing encouragement for the establishment of specific institutions of vocational education and training in order to support national economic development. The first publications concerned with so-called 'industrial education' for the purpose of domestic economic expansion and national industrial policy appeared around the middle of the century, using 'other countries as an argument' (Zymek). We discuss a small selection below.

In 1845, for example, Moritz Mohl – later a member of the Paulskirche Parliament – published a 'Memorandum on the purchase abroad of sample goods on behalf of the Royal Wuerttembergish Government which are to serve Wuerttembergish industrialists as models of how to achieve their intended aim and to enhance domestic productivity as a whole by means of appropriate establishments of industrial education and the abolition of the guild system'. This document sets out fully, although in a somewhat long-winded fashion, the programme of state industrial policy at that time, which was then guided almost exclusively by the French model.

As the outcome of his visit to France, Mohl's main suggestions related to improving industrial training; sample collections of foreign products might also stimulate domestic enterprises; above all, however, the competitiveness and innovativeness of the regional economy were to be strengthened through the establishment of 'industrial training institutions'. The 'esteemed, thrifty and hard-working' entrepreneurial class, the author stated, had very little knowledge of other countries, and would only realise when their turnover fell and the economy declined that others had overtaken them and that they could no longer satisfy current expectations (Mohl, 1845).

Mohl's attempt to stimulate domestic industrial policy by means of international comparison was backed by a detailed analysis of the local structure of industry and trade, and a comprehensive critical review of the goods produced. Ferdinand Steinbeis, the Director of the 'Central Office of Trade and Industry' in Stuttgart, adopted a similar point of view. In 1853 he published his famous work 'The Elements of Industrial Progress illustrated on the basis of Belgian industry'. In this thorough study, Steinbeis recommended among other things establishing public teaching workshops in the various regions of the country. He had discovered the appropriate model in Flanders, where the establishment of such institutions in the linen-weaving industry had not only helped to consolidate that sector economically, but had also facilitated the creation of new products (Steinbeis, 1853).

The documents produced by the head of the vocational education department of the Austrian Ministry of Education, Armand Freiherr von Dumreicher, were also directly concerned with industrial policy. In 1879 he published his paper on 'French national prosperity as a work of education'. The impetus for this study was no doubt the conspicuous performance of French industry and its place in the world market, which was seen at the time as unique in Europe. The cause and basis of this superiority, Dumreicher argued, was above all the long-standing support given to a culture of science and education by the state. The French Kingdom, Republic and Empire had all equally determinedly 'contributed to economic development through education' (Dumreicher, 1879, p. 191), and 'centuries' of industrial and artistic 'national education' were the true foundations of French performance. Comparison with France highlighted clearly the lack of culture and style in Austrian life – in the author's view, the French success was thus primarily a consequence of a long historical learning process.

Dumreicher's core demand resulting from these lessons was for vocational education and training to be expanded in Austria through an active state 'teaching policy'. The paper culminates in a call for an 'overall organisation' responsible for vocational training, which would plan continuation schools, vocational schools and schools for master craftsmen according to regional needs. The arts and technical sciences should, the writer argued, be encouraged in the 'industrial state of Austria' after the French model, as 'fundamental driving forces' for industry (Dumreicher, 1879, p. 63).

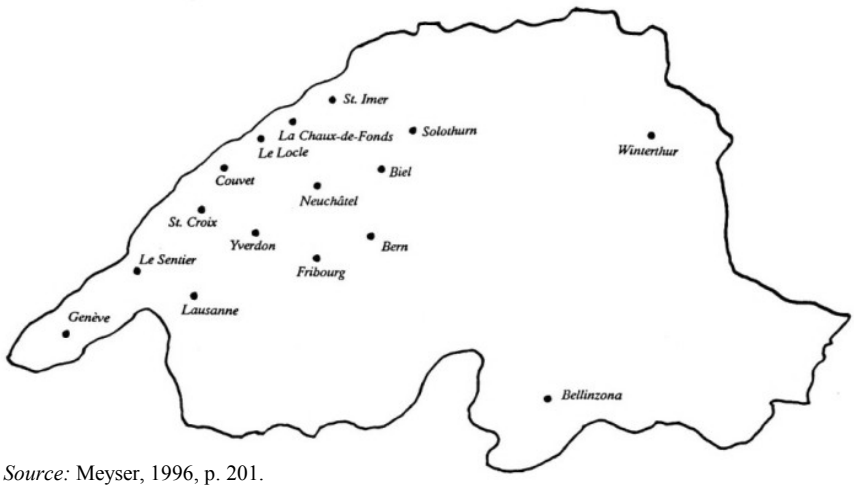
Karl Göck presented a comparative study of the development and situation of European continuing training in 1882. Inspired by von Dumreicher's 'epoch-making' analyses, the author attempted in his paper to describe the different types of 'Vocational continuation schools and similar institutions in Germany, Belgium and Switzerland' (Göck, 1882). In 1876, the Viennese commercial college teacher Eduard Hanausek had already provided a critical study of 'Institutions of vocational teaching' in Germany, Switzerland and Austria (Hanausek, 1876). And three studies by Carl Genauck on 'Vocational training in schools, teaching workshops, museums and associations' in Baden, Wuerttemberg and Belgium appeared in 1882 and 1887. Genauck also referred to Dumreicher's model and expressed the opinion that describing foreign arrangements would help to demonstrate the need to establish institutions of vocational training (Genauck, 1882 and 1887). In his comparative studies, Genauck nonetheless managed to come to the conclusion that Wuerttemberg ought in his day to be regarded as the Mecca of vocational training.

In 1877, Rudolf Nagel wrote a larger study for the Prussian Ministries of Education and Trade on vocational training in Germany in which he came to the conclusion that Prussia was lagging behind all other states in establishing this new type of school (Nagel, 1877). Nagel severely criticised the laxity of Prussia in matters of continuing education, which provided a striking contrast with such activities in southern Germany, Austria and Switzerland, not to mention France. In his paper he also called for the legislation governing the training of apprentices to be revised (Nagel, 1877, p. 77 und 120).

Figure 18: Production schools in Austria-Hungary in the 19th century (metalworking, engineering, light engineering)

Source: Meyser, 1996, p. 200.

Figure 19: Production schools in Switzerland in the 19th century (metalworking, engineering, light engineering, clock and watchmaking)



Source: Meyser, 1996, p. 201.

In Germany, observations and comparisons of vocational education and training in other European states were discussed primarily in the context of the lengthy process of amending the legislation on trade and industry, for example in negotiations with the 'Social Policy Society' and the reports which that body commissioned on the reform of the apprenticeship system and continuing education (Verein für Sozialpolitik, 1878 and 1879). Figures as well known as Lujo Brentano, Karl Bücher, Gustav Schmoller and Ferdinand Steinbeis continually

alluded to the 'other countries' argument in order to demonstrate the backwardness of conditions in Germany.

The best known German example of an international orientation in vocational training was without a doubt Georg Kerschensteiner's paper 'Civic education for German youth', which was published in 1901. This 'prize-winning publication', which is often hailed as the 'foundation of the *Berufsschule*', was reprinted ten times in Germany alone by the end of the 1920s. It can be regarded as one of the most influential German publications on education ever, and it was greeted with enthusiasm in nearly all the countries of Europe, as well as in the United States and Japan, for example. However, the work on which Kerschensteiner based his proposals for the reform of German general vocational schools, the report entitled 'Observations and Comparisons of Institutions of Vocational Training outside Bavaria', is far less well known.

This document is the published outcome of investigative journeys to Austria and Switzerland, and contains a detailed report on the vocational training system in these two countries, complemented by a description of institutions in Saxony, Prussia, Wuerttemberg and Baden (Kerschensteiner, 1901b). At the time when this publication appeared, Kerschensteiner had already travelled widely in France as well, and was planning a visit to England. These wide-ranging journeys were all undertaken with a view to the necessary reform of continuing education in Munich, a task entrusted to him by his predecessor among others. In compiling his survey, Kerschensteiner set out both to obtain a reliable assessment of the institutions devoted to vocational education and training in Europe 'for the benefit of trade and industry', and to 'raise the level of moral and civic education among the industrial and commercial class, and the broad mass of workers' (Kerschensteiner, 1901b, p. III). In his prize-winning paper of the same year, the Munich Inspector of Education then evaluated his experiences 'abroad' and proposed one of the most widely respected reforms of education of the 20th century (Kerschensteiner, 1901a).

1.2.1. Promotion of industry and expansion of vocational training – France and Germany

As described above, vocational schools were the model that generally guided the expansion of nationwide vocational training in the 19th century in Europe. This is of course best demonstrated by the example of France, the mother country and the pattern for this new instrument of education. Germany forms a complete contrast in that vocational schools expanded only hesitantly under the continuing influence of the guild-based training system. However, it was also impossible to escape the impact of the French model in the German states. The consequent establishment of disparate institutions, the U-turns and the constant attempts to start afresh offered a clear contrast to the French situation in this area of education.

The situation in France

The school-based vocational training landscape in France developed to some extent 'from the top down', with the founding of a number of schools of civil engineering – *École des ponts et chaussées*, *École des Mines* – and *Grandes Écoles* – *École polytechnique*, *Conservatoire des arts et métiers* – in the last third of the 18th century, and middle-level schools of vocational training were then established in the first half of the 19th century in the form of *Écoles des arts et métiers*. It was not until the end of that century that the schools crucial to the lowest level of vocational training in industry and commerce were first developed.

In respect of the middle level of training with which we are concerned here, once the location of the three *Écoles des arts et métiers* had finally been agreed (Chalons-sur-Marne, 1806; Angers, 1815 and Aix-en-Provence, 1843) and four organisational rearrangements had been made in 1817, 1826, 1832 and 1848, this specific type of school became in practice an elite school for the metalworking trades (Meyser, 1996, p. 52ff.). The three schools were designed for 300 students each, and the course eventually lasted three years, the age of admission having been raised several times and the entry requirements made more stringent. No further schools of this type were established until the 20th century (Lille, 1900; Cluny, 1901; Paris, 1912; Bordeaux-Talance, 1963).

However, other institutions were established during the 19th century at the middle level of training in addition to the *Écoles des arts et métiers*: the *École La Martinière* in Lyon set up in 1833 by a private foundation, for example, or the *Institut Livet*, which opened in Nantes in 1846 as a private school, and the local authority *École professionnelle* in Mulhouse, Alsace (1854). These schools included in their curriculum the workshop teaching that was typical of French schools, albeit to a far lesser degree than the *Écoles des arts et métiers*, and were therefore somewhat beneath these elite schools in terms of level and equipment.

Another wave of foundations occurred at the middle level of training after the defeat by Germany in 1871. The *École industrielle des Vosges* was set up in Epinal in 1871 to replace the school in Mulhouse that was no longer available to train young people in eastern France after the cession of Alsace, the *École supérieure de commerce et d'industrie* in Rouen in 1871, and the *Institut industriel, agronomique et commercial du Nord de la France* in Lille in 1872. This last grew out of the *École des arts industriels et des mines* that had existed since 1854 and now split its technical department into three sections: engineering, textile processing and chemical industry (all information taken from Meyser, 1996, p. 109ff.).

The situation at the lower level of training is less clear, partly because the Ministries of Education and of Industry and Trade spent twenty years bitterly competing for responsibility in this area. The basis for the dispute had been laid in 1833: the *loi Guizot* initially obliged the communes to open schools for boys. This was associated with the duty of communes with more than 5000 inhabitants to set up so-called *écoles primaires supérieures*, in which basic vocational training was also to be given. At the same time, secondary schools were established which, unlike the traditional *lycées* and *collèges*, included 'applied sciences' in their curricula, such as mathematics, commerce and economics, manual skills and drawing. These schools

were not expected, however, to take the place of an apprenticeship or a full vocational training course in the same way as the *Écoles des arts et métiers*.

The Ministry of Education tried to take over this area of training under the Primary Education Act of the 3rd Republic in December 1880, as is mentioned above in section 1.1. The *Écoles nationales professionelles* (ENPs) and the *Écoles pratiques de commerce et d'industrie* (EPCIs) were set up explicitly as 'apprentice schools', so that the ENPs, as state schools, expressly prepared pupils for transfer to the *Écoles des arts et métiers*. This incursion into the vocational training sector by the Ministry of Education was immediately met with bitter hostility from the Ministry of Industry and Trade, which was finally victorious in this dispute over areas of competence: the 20 *Écoles pratiques de commerce et d'industrie* that had been set up by then were placed under the Ministry of Trade in 1882, to be followed in 1900 by the four *Écoles nationales professionnelles* in Armentiers, Vierzon, Voire and Nantes (Meyser, 1996, p. 105).

The models for these vocational schools (which could be equated to German *Berufsfachschulen*) had generally been created in the private sector in the 19th century. The *Institut Delahaye*, the *Institut Springer* and the *Institut St. Nicolas* in Paris (1827) were among these early foundations. Institutions such as the *École professionnelle* in Reims (1875), the *Institut Notre Dame* in Nantes and the *École communale de la rue Tournefort* in Paris (1875) were added later. The last of these was an *école d'apprentissage* combining general technical skills with elementary schooling and providing training for model-makers, turners, carpenters, joiners, smiths and mechanics. It was organised as a production school, covered about 25% of its financial needs out of earnings in the early 1880s, and paid financial remuneration to students for their work (Bücher, 1878, p. 29f.).

As mentioned above in section 1.1.2, the best known of these 'apprentice schools' was the *École Diderot* in La Valette, Paris, which was founded in 1873. This provided between 5.5 and 7.5 hours of practical training per day in a number of jobs in the woodworking and metalworking industry, as well as sound elementary education. The design of the training developed by Octave Gréard, the 'French Kerschensteiner', directly influenced the legislation on the establishment of low-level vocational training schools in France, as has been said above.

By the end of the 19th century, France had thus created a three-tiered system of technical vocational training managed centrally by Government and extending from *écoles pratiques* and *écoles d'apprentissages* to *Écoles des arts et métiers* and the higher school of engineering, the *École Centrale*. Below this highest level, almost all students were taught according to the principle of fully school-based vocational training first introduced by the *Écoles des arts et métiers*. In other words, workshop teaching in line with the production school principle, and later with the Russian System, was a core element of the curriculum. It could be argued that the typically French notion of a *Université du travail* put forward in 1862 by Arthur Morin and Henri Tresca, who were both Directors of the *Conservatoire des arts et métiers*, had thus become reality (Meyser, 1996, p. 105).

The situation in Germany

In Germany, the increasing failure and decline of established class-based occupational training at the very end of the 18th and the start of the 19th centuries provided the stimulus for the establishment of new types of institution to complement, correct and replace the inherited model of socialisation. These so-called *Realschulen* were given a twofold task: on the one hand they were expected both to ease the choice of an occupation in the decreasingly stratified society of the 18th century, and to provide a theoretical basis for the growing crisis in craft training, thus making it more efficient in the light of technological change (Stratmann, 1966 and 1971).

The first *Realschulen* were opened in Halle and Berlin by Christoph Semler (1669-1740) and Johann Julius Hecker (1707-1768); they spread in the 18th and 19th centuries to Bavaria and Austria, for example, but this process was soon halted by the development of a new type of school: the existing establishments lost their vocational emphasis and became part of the pool of 'general schools' (Grüner, 1967).

The so-called 'schools of drawing and craft' established between 1770 and 1800 in the German cultural area by private, local authority and occasionally state agencies were a broad-based attempt to react to the increasing decline in guild-based apprenticeships (Lipsmeier, 1971, p. 80ff.). These schools differed in principle from the French vocational school approach: their aim was not to provide a complete replacement for apprenticeship, but to bring this traditional training model up to date by offering complementary systematic school education. They were therefore part-time schools designed to be attended during or after apprenticeship training by craft trainees.

The first schools of this type were established in Hamburg (1767), Karlsruhe (1768), Durlach and Weimar (1775), Eisenach (1784), Hanover (1791), Munich (1793) and Lübeck (1795). They became compulsory for trainee bricklayers and carpenters for the first time in 1768 under a General Decree issued by the Margrave of Baden, and this measure came to have exemplary significance for the creation of the German system of vocational training (Stratmann, 1967, p. 239ff.). Besides their immediate practical purpose, they were intended particularly to 'ennoble the taste of craftsmen', and both aims were targeted primarily at the building and allied trades, for which these schools had specially been founded. Although joiners, turners, fitters, brass-founders and saddlers, among others, attended the schools of drawing, it was generally only architectural drawing – principally ornamental or decorative drawing – that was practised after a basic course in geometry. One reason for this was that most of the teachers appointed to these schools were architects, and another was the conviction – which led later to the 'arts and crafts movement' – that the only way of saving craft trades was by successfully concentrating on products of 'good taste' (Lipsmeier, 1971, p. 223ff.).

In Prussia, this task was taken on by the (provincial) *Kunstschulen* and *Handwerkerschulen*, the prototype of which was established in Berlin in 1797 'for the greater perfection of all mechanical craft workers (professionists)'. Here too, drawing was the core of the training, although mathematics, geometry, architecture, perspective and optics also formed part of the curriculum. The 'School of Artistic Drawing' was under the aegis of the Academy of Art,

which opened additional institutes in the Prussian provinces in the next few years, for example in Königsberg (1790), Halle and Breslau (1791), Magdeburg (1793), Danzig (1803) and Erfurt.

Schools working according to the rotation principle – alternating training of apprentices and journeymen – served up to 30 occupations concerned with the 'tasteful processing of things' as varied as joiners, haberdashers, form-punchers, silk-workers, brass-founders, painters, locksmiths, chair-makers, sculptors, copper engravers, bricklayers and gold-workers (Lundgreen, 1975, p. 13). Ornamental and decorative drawing was naturally not the appropriate discipline to provide a theoretical basis for all crafts, especially not for the 'constructive occupations', which chiefly meant the building trades. Since these were of particular concern if only on safety grounds, however, an official correction was made to the curriculum of the Prussian *Kunstschulen* and *Handwerkerschulen* around 1800: analytical subjects such as arithmetic and geometry, as well as geometric drawing, mechanics and architectural drawing, all of which were important for building technology training, were added to free hand-drawing, modelling and wax-modelling (Lundgreen, 1975, p. 14f).

What subsequently became of these craft and drawing schools is not reliably documented. Traces of them are lost around the end of the 19th century, when continuation schools and the new *Fachschule* began to emerge as the standard structures of initial and continuing vocational training.

The situation in Prussia

Before this crucial final decade of the 19th century, there was one other ambitious attempt to introduce a broad-based system of training in trade and industry in the largest state in Germany, in the form of genuine *Fachschulen*, or full-time vocational schools. This project was inseparably associated with the most significant representative of Prussian industrial policy, Christian Peter Wilhelm Beuth (1781-1853) (Jost, 1982, p. 51ff.). The key element of his policy was the idea of establishing a complete system of *Gewerbeschulen* in Prussia. Beuth's crucial commentary on this plan dates from 1820. In contrast to an earlier proposal, Beuth was suggesting a general system of graded training as part of his practical reorganisation; this matched the hierarchy of building workers – building tradesmen, surveyors and master builders – to three grades of continuing education (for a discussion of the following arguments see Lundgreen, 1975, p. 44ff).

The typical *Handwerkerschule* was intended to cover only the lowest – the 'third' – class of this system. An example is the Berlin school for building tradesmen, which was the only former art school to be placed under the Department of Trade, in 1824. However, the design of this kind of school, which was also intended to provide continuing part-time technical training for trades other than building, had been rejected by the Ministry in 1821 in favour of a model of full-time schooling for tradesmen, a decision that resulted in a muddle but in fact permitted largely unregulated expansion of Prussian *Handwerkerschulen*, which were known from 1826 as *Provinzial-Gewerbeschulen*.

By 1850, 20 *Provinzial-Gewerbeschulen* had been established in Prussia, with a capacity for some 800 students. These schools varied so widely before they were reorganised that they fell into no fewer than five different types (Lundgreen, 1975, p. 51):

- evening and Sunday part-time schools;
- one-class, two-class and three-class full-time schools;
- industrial craft schools associated with *Realschulen*.

The Prussian Department of Trade was decisively in favour of the full-time model, even though this obviously implied social selection because of the fees demanded. However, it was only after 1850 that a two-year form of this type of *Provinzial-Gewerbeschule* became the general norm. In the early stages of development, the schools were also equipped very differently: they only offered around four hours' teaching a day in geometry, combined with drawing and modelling, free-hand drawing, mathematics (especially calculation of area and volume), and natural science (the main principles of mechanics and chemistry).

The prior education of the students at these craft schools was that required for admission to the Berlin building school, namely simple elementary education, although this criterion for recruitment had already been found to be too low in 1823. In the statute of reorganisation of 1850 it was then openly admitted that elementary school attendance was not sufficient for admission to a *Provinzial-Gewerbeschule*. New continuation schools for craft trades were to be established as a solution. Attendance at a higher civic or city school or *Gymnasium* up to the age of fourteen was recommended as an alternative.

In the capital, Berlin, there was no *Provinzial-Gewerbeschule*, but instead a so-called 'technical school' was set up instead in 1827, to be renamed a *Gewerbe-Institut* in 1827. This was the second departure from the original 1820 plan, following the decision to adopt full-time schooling. It allowed for the establishment of second and third-stage *Handwerkerschulen* in 'a few places in the Monarchy'. But the only one created was the Berlin Institut, which threw the carefully designed system of stages into disarray by officially designating its two courses, which actually corresponded to stages two and three, 'second' and 'first' (Lundgreen, 1975, p. 54ff).

This obvious mismatch in the curriculum subsequently led to the *Gewerbe-Institut* exercising huge pressure to conform on the *Provinzial-Gewerbeschulen*. It eventually succeeded in making them dependent on it, so that they were legally defined as having a 'supply function' in the 1850 legislation. While the *Provinzial-Gewerbeschulen* merely had to notify Berlin before 1850 of their best students, who were then admitted to either the lower or the higher class, admission to the *Gewerbe-Institut* now required as a general rule a certificate of satisfactory completion of an examination course at a recognised *Provinzial-Gewerbeschule* or a *Realschule*. The *Provinzial-Gewerbeschulen* became in practice second-class full-time schools supplying students for the *Gewerbe-Institut*, which lost its lower course but extended its two-year 'higher' course to three years (Schiersmann, 1979, p. 194ff.).

The reorganisation imposed was the result of a compromise between two very different views of the future role of the *Provinzial-Gewerbeschule*: on the one hand it was to be a middle-level vocational school (*Fachschule*) providing technicians with complete training for 'skilled work', and on the other, it was to provide preparation for entry to the Berlin *Gewerbe-Institut* (timetable of classes reprinted in Grüner, 1967, p. 32f.). In this second role, the *Provinzial-Gewerbeschule* found itself involuntarily in competition with the *Gymnasium* and the *Realschule*, which ultimately were to decide its fate.

The growth in the numbers of vocational schools in Prussia between 1850 and 1879 meant that a solution had to be found to this structural problem:

(a) At the latest by the introduction of freedom of conscience in teaching in 1860, the *Gewerbe-Institut* had achieved the status of an academy; in 1866 it was officially renamed the *Gewerbe-Akademie* accordingly. The constitutional statute of 1871 described this academy as a *technische Hochschule*, likening it very closely to the far older *Bau-Akademie* (academy of building), which enjoyed certain privileges. From 1876, graduates of the *Gewerbe-Akademie* could therefore be admitted to the civil service administrative grades as 'engineers'. In the same year, the Prussian lower house of Parliament proposed combining the *Bau-Akademie* and the *Gewerbe-Akademie* under the name *Technische Hochschule Charlottenburg*. This took place in 1879.

(b) The two-class *Provinzial-Gewerbeschulen* struggled for 20 years with little success to fulfil the double role with which they had been saddled. In order to counter growing criticism, the reorganisation of 1870 brought their two functions to a head: the *Provinzial-Gewerbeschulen* became three-year institutions, the two lower classes being expected to teach a shortened *Realschule* curriculum. The upper class was split into four specialist departments: one providing preparation for the *Gewerbe-Akademie*, and three specialist technical classes taught building, engineering and chemistry. But this design and its inadequate implementation caused the criticism to become even more severe. In 1878, a final solution was imposed: the majority of the *Provinzial-Gewerbeschulen* opted to become nine-class *Oberrealschulen* not teaching Latin, while a small number decided to turn themselves into six-class *Realschulen* with two additional years of vocational education. Twenty-five schools were simply abolished (Lundgreen, 1975, p. 74f).

Gustav Holzmüller, the head of the school in Hagen and a watchful observer of the development of technical education in Europe, was right when he commented that 'Beuth's entire creation, and all that had been done under his successors, was destroyed, the ruin was complete' (Holzmüller, 1902, p. 306). And yet, out of the wreckage of this arbitrary 'reform' grew the modern vocational training system of Prussia-Germany.

Only five towns had decided to restructure their *Provinzial-Gewerbeschulen* as six-class *Realschulen* with attached vocational classes rather than as *Oberrealschulen* – the equivalent of general *Gymnasien*. Until the 1890s, the *Technische Mittelschulen*, as the former were renamed, had little further impact. During a period of social instability, however, it appeared

advisable to create a new and more attractive career path for the commercial urban middle class seeking social advance.

The first impetus came from the Prussian Ministry of Trade. At Bismarck's instigation, this had taken over the administration of middle and lower-level vocational training in 1885 and began by expanding lower technical schools for social reasons. The first Prussian 'Royal School for Master Machine-builders, Fitters and Smiths' was founded in Dortmund, in the Ruhr, in 1890 after the model of the successful 'School for Master Craftsmen' in Chemnitz and imitating the latter's two-year course. The entry requirements were a certificate of completion of *Volksschule* (extended elementary) education and four years of workshop practice. Evening and Sunday continuation courses to train unskilled workers were also attached to the school. Over the next ten years, the positive development of this school inspired the creation of a further eight schools for training master craftsmen in Prussia (Schütte, 2003a, p. 29ff.).

The second impetus for the reorganisation of middle-level vocational training in Prussia came from the Association of German Engineers (*Verein Deutscher Ingenieure*, VDI). At its 30th annual general meeting in Karlsruhe in 1889, this had adopted guidelines for the establishment of technical middle schools, doubtless as a response to the dire situation in Prussia. According to the VDI proposal, the technical middle schools were intended to train the managers and senior staff of technical enterprises, and support staff for building companies. The schools would be run by private sponsors independently of the state and focus on training in the field of engineering. The entry requirements proposed were entitlement to one-year voluntary service and two years of practical work experience, and the training was to last two years.

In accordance with these guidelines, the city of Cologne decided in 1890 to convert Department A of its *Fachschule*, the engineering school, into a *Technische Mittelschule*. The additional costs were to be borne for six years by the VDI. Inspired by the success of this school, the Prussian Ministry of Trade supported the establishment of a similar school in Dortmund, where the first successful school for master craftsmen was already located. The technical middle school newly organised in Dortmund in accordance with the VDI proposal then acted as the model for the conversion of two-year vocational engineering courses in Hagen (1896), Breslau (1897), Barmen (1898) and Aachen (1902).

From the point of view of declared Prussian policy on vocational training, 1891 was actually the turning point, when the State Government of Prussia indicated its willingness to accept responsibility for this sector after years of indecision. This was complemented by the publication of the 'Discussion paper on the development of continuation schools and vocational training schools in Prussia between 1833 and 1890', which also contained a recognition of the need to expand vocational education. The subsequent increase in the *Fachschule* budget was then the decisive policy indicator.

The differing perceptions of the Prussian Ministry of Trade and Industry (PMHG) and the VDI as to the further expansion of *Fachschulen* resulted essentially from divergent interests. While the VDI pushed for a clear organisational and curricular demarcation between the

various technical schools – from continuation schools to technical higher education – chiefly in order to achieve a reliable definition of the (social) status of graduates of such institutions, the PMHG was pursuing a totally different kind of complex double strategy. On the one hand, it was naturally seeking to fulfil the training needs of the major players in an expanding industrial society, and on the other, it was also aiming to use the new technical education to take the pressure off the institutions of academic education, which were regarded as 'overfull' and needed to be relieved for social reasons. This was openly stated by the politicians responsible, most pointedly perhaps by the Prussian Minister of Finance, von Rheinbaben, during discussions on the budget. The granting of additional funds for technical middle schools was justified, he argued, 'in order to relieve the *Gymnasien* and to promote technical progress in the fatherland in all spheres' (cited in Schütte, 2003a, p. 74).

On 7 and 8 May 1898, the PMHG held a sumptuous conference in Berlin on the future organisation of lower and middle-level vocational training in Prussia. The main items on the agenda were the VDI proposals to reduce the length of training and considerably to simplify the curriculum of the schools for master craftsmen, i.e. to set the level of the technical middle schools somewhat lower. Although the conflict of interests between the PMHG and the VDI could not be resolved, agreement was reached to rename the various types of school. The schools for master craftsmen (*Werkmeisterschulen*) were now to be called schools of engineering (*Maschinenbauschulen*), while the technical middle schools were to be known as higher schools of engineering (*Höhere Maschinenbauschulen*). The same length of training for both establishments – two years – was to remain as it was, but the entry requirements – O-II matriculation – were to be eased in order to attract suitable students who had only completed the *Volksschule*. These regulations were put into legal effect in two decrees of 11 June 1898 and 12 February 1899.

The further development of vocational training in Prussia-Germany belongs to the history of the 20th century, but its 'golden era' (Schütte, 2003a) lay in the afterglow of the 19th. With the reorganisation of schools for the building trades between 1906 and 1908 and of the schools of engineering between 1906 and 1911, technical training in the largest state in Germany had acquired its modern institutional shape by the eve of the First World War. This final phase of reorganisation in the old Empire of the Kaisers, which ended with the PMHG decree of 1 April 1911, established a new horizontally and vertically divided education system with a curriculum structured by subject and economic sector, to complement the schools providing 'general education'. The core of this new system – schools of building, engineering and metalworking – was joined in specific locations by schools of textiles, arts and crafts, mining and navigation, and by non-technical Fachschulen teaching commerce, agriculture and social work. The frenzied expansion between 1903 and 1913 was reflected not only in rising numbers of students and graduates and rapid differentiation between the different types of *Fachschule*, but also in a new status of teacher and a new teaching methodology for technical subjects, and in a large number of architecturally impressive new school buildings (Schütte, 2003a, p. 63-125).

Figure 20: Production schools in Germany in the 19th century (metalworking, engineering, light engineering, clock and watchmaking)

Source: Meyser, 1996, p. 202.

However, vocational training in Germany did not really follow the French model. The Prussian *Provinzial-Gewerbeschulen* did not work according to the production school principle, for example, with one exception: the school in Trier, with which a workshop had been associated since 1834 and where practical mechanical engineering was taught, although the great Beuth reputedly did not think much of this school (Meyser, 1996, p. 151). The new *Fachschulen* established after 1890 did not provide initial training but vocational continuing training. They assumed some practical experience and did not therefore teach the basics of an occupation. As has been said, there was a limited number of production schools in Prussia, but these had a strictly limited regional role in industrial policy. There was a larger number of production schools in central and southern Germany, i.e. in Saxony, Thuringia, Bavaria, Wuerttemberg and Baden (Meyser, 1996, p. 156-164).

1.2.2. Development of vocational training after the strict French model – Russia

Until the closing decades of the 19th century, Tsarist Russia showed little interest in industrialisation, and was therefore all the more concerned with the state of its political power in Europe (Kennedy, 1991, p. 266ff.). It is estimated that the number of factories or industrial enterprises rose between 1804 and 1860 from around 2400 to an astonishing 15 000, but the output from these enterprises was largely confined to goods for everyday domestic consumption, such as textiles or sugar. The businesses were clearly very small; most employed fewer than 16 workers and were barely mechanised (Kennedy, 1991, p. 269).

The great turning point in Russian history in the 19th century was the abolition of serfdom in 1861. This 'Great Reform' led to considerable growth in the population and the economy. While Russia had around 74 million inhabitants in 1860, before the 'freeing of the peasants', this figure had risen to some 164 million by 1913. Between 1860 and 1913, Russian industrial production (processing, mining, manufacturing and craftwork) rose at an average annual rate of 5%. The construction of railways, which had begun around 1850, provided the country with a constantly growing network: in 1860 there were 1600 kilometres, but ten years later there were already 10 700, and in 1880 22 900 kilometres (all data from Grossmann, 1977, p. 405f.).

The Industrial Revolution in Tsarist Russia did not really begin, however, until the mid-1880s. From that date, a qualitative leap can be observed in the economy, with the state taking on the key role in industrialisation, as in Germany. This was associated with a shift to heavy industry. From around 1885, industrial progress was determined by coal-mining, oil production, extraction of ferrous and non-ferrous ores, and extensive support for the iron and steel industry. By 1913, Russia had the fifth largest industrial potential in the world, after the United States, Germany, the United Kingdom and France (Grossmann, 1977).

Nonetheless, Russia had fallen a long way behind these four states economically and technologically in the course of the 19th century. Progress was simply much faster in the Western countries. While income per head in Russia was about half that in England in 1830, it had fallen to a quarter of this benchmark by 1890. Iron production showed a similar pattern: within two generations, Russia had moved from being the largest producer and exporter of iron in Europe to increasing dependency on imports of Western industrial goods. Russia's key problem in this decline was its agricultural economy. The rate of population growth after 1861 was particularly high in rural areas, and if industrial expansion between 1860 and 1913 is set off against agriculture, the result is only very modest: because of the average rise in population of 1.5%, industrial growth is reduced to 3,5%, but if the crucial rate of expansion in agricultural production is taken into account – 2%, representing a per-head increase of just 0.5% – real annual growth in gross domestic product falls to a mere one per cent over the period 1860 to 1913. The other industrialised states, on the other hand, were showing two or three times as much real growth (Grossmann, 1977, p. 405).

In his well-known investigation of the *Rise and Fall of the Great Powers*, Paul Kennedy sums this situation up as follows: 'Lack of capital, low consumer demand, a tiny middle class, huge distances, extremes of climate and the heavy hand of an autocratic, mistrustful state, made the prospects of industrial "take-off" far dimmer in Russia than in any other country in Europe' (op. cit., p. 269).

Russian vocational training

Nonetheless, Russia made extraordinary efforts during this period to expand and reform its previously neglected education system: while only 22% of recruits could read and write in 1880, this proportion had risen to 68% by 1913 (Grossmann, 1977, p. 407). The expansion of a national system of vocational training was pursued from the 1880s even more consistently.

In 1888, for example, the Government issued a 'Basic Order for Industrial Schools', restructuring existing training facilities into three types of school. The Order distinguished between:

- 'middle technical training institutions' to train technicians or assistant engineers; the entry requirement was completion of five classes at a secondary technical school;
- 'lower technical schools' to train master craftsmen, engine fitters and machinery operators; the entry requirement was satisfactory completion of education at an urban or village school;
- 'craft industrial schools' to train craftsmen and skilled workers; the entry requirement was completion of elementary education.

In 1893 and 1895 decisions were taken to introduce two new types of school. 'Craft apprentice schools' were intended to provide prevocational education, while 'lower craft schools', to be set up in rural areas, were to deliver purely practical training 'to raise the level of domestic industry among the rural population'. However, the great mass of factory workers at this time received no formal training – as in France – but were instructed at the work place (Meyser, 1996, p. 118).

Russia based this programme of purely school-based vocational training very closely on the French model, partly because it faced similar problems in expanding vocational training facilities. As in France, the elementary education of broad sections of the population had been neglected and the illiteracy rate was therefore very high. There being no possibility of building on the tradition of guild-based training, it was felt necessary, also as in France, to establish new institutions of vocational education. The only difference between the two countries was that the whole structure of organised crafts had been swept away by a decision of the Revolution in 1791, while such traditional bodies had never developed in Russia and were therefore totally lacking as potential models (Anweiler, 1964, p. 26).

The schools that were introduced were not organised according to a standard pattern since they were managed by different Ministries. The Ministry of Education, the Ministries of Finance and the Interior, the Ministry of Highways and Transport, the Ministry of the Imperial Household, the Ministry of Crown Lands, the Naval Ministry and the Imperial Chancellery had each set up their own types of school, for example, headed by the technical colleges of higher education such as the Imperial Technical School in Moscow, the *Institut des ingénieurs des Ponts et Chaussées* in St. Petersburg and the *École polytechnique* in Riga. The institutions in Moscow and St. Petersburg were essentially high-level 'production schools', training engineers and senior technicians after the model of the *Écoles des arts et métiers*.

The middle technical schools also followed the French model. It was clear to interested contemporaries that Russia had adopted the 'method of practical training from the French', and the *Écoles des arts et métiers* were referred to as the actual model (Wilda, 1879, p. 18; Grothe, 1882, p. 34).

In 1900 there were 18 'middle technical schools' in Russia, most of which taught engineering and worked as production schools. Twelve of them were established before 1898 and the other

six, in Alexandrovsk, Vilna, Novosybkovk, Rostov on Don, Saratov and Taganrog were set up between 1898 and 1900. The largest of the middle technical schools, the 'Kommissarov School' in Moscow, had 766 students, taught in seven parallel classes and four workshops by 30 teachers. As in the French schools, this also had a boarding house which could accommodate 260 students (Meyser, 1996, p. 122). The *École des métiers de Césarowitsch Nicolaus* in St. Petersburg was better known, at which cabinet-makers, model-makers, turners, wood-carvers, locksmiths, metal-turners, plumbers, smiths and machine-builders were trained. As in the Moscow technical school, learning took place through both systematically arranged courses and production. The annual costs of the school and the way in which these were covered are known: total cost 95 000 rubles, funded as follows: 3 000 from the 'Grand Duke Heir to the Throne' (hence the name of the school), 25 000 from the Government, 25 000 from the City of Moscow, and the bulk of the remainder – 42 000 rubles – covered by the earnings of the school and the *société de l'asile* (Wilda, 1879, p. 16f.).

In 1900 there was a total of 20 lower technical schools. Of these, 11 had an engineering department, two a chemistry department, one was agricultural, and one concentrated on building. Training in these schools was also production-based. The school in Baku, for example, had workshops for locksmiths, turners, smiths and joiners; the schools produced equipment exclusively for other schools: teaching models and other teaching materials, furniture, wooden frames for lathes, etc. In the agricultural school in Kologriv there was even a tannery, a dairy which made cheese and a workshop processing flax (Meyser, 1996, p. 123).

Particularly at the lowest level of training, in the apprentice and trade schools teaching crafts, the production school principle was used. Around 1900 there were 19 such establishments, together with 13 craft apprentice schools founded by that date and another 13 or so lower craft schools. There were also 57 schools in this category run by private sponsors, such as the Steamship Company in Odessa, the Craft Association in Riga and the Charitable Society in Vladimir (Holzmüller, 1902, p. 371f.). The expansion plan for the Russian vocational training system at this time was as impressive as these figures: it was proposed to establish up to three lower and middle schools each year, five or six craft industrial schools and ten lower craft schools. In view of these activities on the part of the Russian Government, Eduard Wilda, a committed vocational educationist and the most important adviser to Dumreicher, was convinced that 'Russia [is] on the way to overtaking all other states in vocational education' (Wilda, 1879, p. 18).

1.2.3. The *Fachschule* and dual training model – Austria and Switzerland

The European great power Austria-Hungary also followed the French rather than the German model in developing vocational training facilities in the 19th century. Given the political situation in Europe after 1815, it appeared particularly important in this multi-ethnic empire for the state to encourage industrialisation as a new factor in power politics, if only to ensure that the 'five-sided stalemate' of the European great powers functioned (Kennedy, 1991, p. 256ff).

The dynastic, 'supranational' structure of the Habsburg Empire was an anachronism in 19th century Europe. During this period it became increasingly difficult to hold it together against a

background of growing nationalism. The so-called 'state of many peoples' contained within its borders 8 million Germans, 16 million Czechs, Slovaks, Poles, Ruthenians, Slovenes, Croats and Serbs, 5 million Hungarians, 2 million Italians and 2 million Romanians. The political restructuring of the Empire in 1867 as the 'twin' state of Austria-Hungary did little to change the fact that the Habsburg Empire was in the 18th and 19th centuries made up of differing geopolitical blocks with quite different historical and cultural traditions. This situation hardly favoured dynamic economic growth (Gross, 1977).

The state had to defend the 'status quo' against both Germany, pan-German nationalists and Prussian expansionists, and French ambitions in Italy. It had also to try to keep pace with the rest of Western Europe and to counter Russian influence in the Balkans. While Austria was naturally extremely concerned, given its political weakness, to preserve the balance of political forces in Europe so laboriously created at the Congress of Vienna, Prussia, France and Russia were interested in changing this power structure to their advantage (Kennedy, 1991, p. 259).

The attempts to check social revolution and suppress nationalist movements were an increasing drain on the country and constrained its industrial and economic development. The first half of the century saw the beginnings of industrialisation in western areas such as Bohemia, the Alpine region and Lower Austria around Vienna, but the majority of the Habsburg Empire remained untouched by this process of modernisation. 'Austria itself developed, but the Empire as a whole fell behind the United Kingdom, France and Prussia in level of industrialisation per head, iron and steel production, steam power capacity and so on' (Kennedy, 1991, p. 260). Industrial development in Austria is unique in that it did not follow the trend discernible elsewhere for increasing political stability to accompany industrial expansion – as in Prussia-Germany and Switzerland, for example (Gross, 1977, p. 207).

The Austrian Staats-Gewerbeschule

Although there was no dynamic economic expansion as a result of industrialisation, Austria was among the five states in Europe taking the lead in setting up technical education. At the instigation of Franz Josef Ritter von Gerstner, the 'Guild Polytechnic Institute' was set up in Prague as early as 1806 on the foundations of an older institution – the first example of technical higher education in the German cultural area. The 'improvement of national industry through scientific education' – particularly the then quite substantial Bohemian textile industry – was also the motive behind the establishment in 1815 of the 'Imperial and Royal Polytechnic Institute' in Vienna, from where K. Karmarsch and F. Redtenbacher went on to be the main promoters of technical training institutions in Hanover and Karlsruhe. Subsequently, similar establishments were created in Budapest, Brno, Graz, Lemberg (Lviv) and Cracow (Grüner, 1987, p. 4f.).

By around 1850, Austria had a network of technical schools providing advanced training, although they were not formally equated with universities, as in Germany. A number of *Realschulen* had already been established to prepare staff at a middle level of training, and these were divided by an Imperial Ordinance of 1851 into two-year lower and a three-year higher sections. These *Realschulen* were burdened, like the *Provinzial-Gewerbeschulen* in

Prussia, with a double task of providing training for an occupation and preparation for attending the Technical Institutes, which ultimately led to their failure: in 1867 the *Realschulen*, which had until then been managed centrally, were converted by local *Land* legislation into seven-year general schools, the only aim of which was henceforward to lead to 'higher education of a technical nature' (Grüner, 1987, p. 6).

Against this background, the beginnings of middle-level technical education in Austria must be attributed to the activities of the 'Imperial and Royal Ministry of Trade' created in 1848: as part of a strategy of 'educational promotion of trade and industry' numerous two-year *Fachschulen* were established in the 1860s and '70s as a complete replacement for work-place apprenticeship training. These schools, which were explicitly intended to foster industrial growth, especially in the textile industry, were also the cause of a lengthy dispute over responsibility between the Ministries of Education and Trade. In order to resolve this, a 'Standing Ministerial Committee on Vocational Education' was set up in 1872, to which the Lower Austrian Financial Secretary Dumreicher, the 'practical planner', was appointed secretary (Grüner, 1987, p. 108-123).

Dumreicher is regarded – like Beuth in Prussia – as the true creator of vocational training in Austria. By skilfully managing the negotiations within the Committee, on which both Ministries were represented, and more particularly by putting forward a convincing discussion paper, Dumreicher succeeded in creating his 'systematic scheme of technical and vocational education in Austria' in the form of so-called *Staats-Gewerbeschulen* (state vocational schools). This significant outcome of liberal education policy in the old Danube monarchy led both to the reorganisation under one roof, from 1876, of four-year higher vocational schools, two-year schools for master craftsmen, *Fachschulen* and continuation schools, and to the allocation of administrative responsibility for these vocational comprehensive schools from 1832 to the Ministry of Education. As a section head in Department IXa of the Ministry of Education, Dumreicher managed step by step to establish an extended 'industrial school system': in the 1890s, there were already 16 *Staats-Gewerbeschulen* in Austria. He had collected information abroad, especially in France, on how to organise these vocational schools externally and internally. His most prominent expert adviser was the North German head of the Brno vocational building school, Eduard Wilda (1838-1907), who was the first head of a vocational middle school to be granted the much coveted title of *Hofrat* (Grüner, 1987, p. 128-139).

By 1883, the foundation stage of the Austrian vocational school system was complete. The *Staats-Gewerbeschulen* in Vienna, Salzburg, Graz, Prague, Pilsen, Reichenberg, Brno, Bielitz, Lemberg and Czernowitz were 'systematised', and a central college for the *Land* had been opened in Wiener Neustadt. Dumreicher could begin to expand the network of schools, which so far only covered a few towns in the large country. However, when Paul Freiherr Gautsch von Frankenthurn became Minister of Education in 1885, the German liberal era of Austrian education policy came to an end. Clerical and Slavophile tendencies gained the upper hand. The Czechs in particular turned against central control of vocational education throughout the monarchy by Dumreicher, who had always regarded and used the extension of the vocational education system as a way of containing Slavic expansionism. After serious disagreements he

left the Ministry on 31 May 1886. On the very day of his resignation the Klagenfurt Chamber of Commerce selected him in protest as its representative in the Austrian lower house of Parliament (Grüner, 1987, p. 110f.).

The beginnings of the so-called 'dual system'

The *Staats-Gewerbeschulen* system was designed as a decidedly elite model, although vocational continuation schools, which were important for mass vocational training, were often added on the same sites. As in Germany, these were regarded as complementing apprenticeship training and were thus part of a quite different training model, which was more in line with the guild model of vocational training. In the same way as in Germany, the liberal economic gains of the French Revolution – notably freedom of occupation – were implemented much less strictly, which favoured reinvigoration by the state of the traditional form of training. After initial attempts to restrict the rights of the guilds and to grant greater economic freedom, ushered in by the 'Edict of Tolerance' issued by Joseph II in 1781, 'industrial diligence' was once more curtailed in favour of the old middle class by the Trade Regulations of 1859, once it became obvious that the craft trades would lose out in the economic competition with industry (Schermaier, 1970, p. 28ff.).

These Trade Regulations were marked by divergent principles: they contained, for example, relatively open provisions on the training of apprentices, but restored the old craft guild privilege of compulsory membership, which was eagerly taken up by the German craft movement and incorporated into its list of demands in the form of obligatory membership of an *Innung*. The next reform of industrial law occurred through an amendment of 1883. This further improved the legal position of the craft trades, especially through the initial introduction of a 'certificate of competence', which required a so-called 'certificate of teaching' to be acquired from the trade body through an examination not provided for in law, in addition to various other general conditions and one or more testimonials from work, in order to practise a craft independently (Schermaier, 1970, p. 34).

This continuing stabilisation of craft trades and craft training reached some kind of conclusion in the amended Trade and Industry Act of 5 February 1907, in which the following provisions proved to be of far-reaching significance:

- Admission to an occupation was made more difficult for a larger number of trades, and freedom of occupation was further restricted, building on the development begun in the amendment of 1883;
- The provisions on the training of apprentices were extended (para. 97ff), entitlement to apprenticeship training was restricted, and provisions on withdrawal of this entitlement stiffened (paras. 98 and 133a);
- The journeyman examination became compulsory for all apprentices in craft trades, even if these were performed in a factory environment; proof of passing the legally required journeyman examination was now obligatory in order to practice a craft independently (paras. 14 and 104b; in: Schermaier, 1970, p. 33f.), although Austria still lagged far behind

the demands of the German craft trade movement, which wished to see this entitlement restricted to approved master craftsmen.

In Austria too, a particular part-time school had developed to complement work-place vocational training, the roots of which can be traced back to the 18th century. Sunday schools for those in work, spinning and industrial schools, Sunday and evening schools in teacher training colleges and *Realschulen*, Sunday classes in association with *Volksschulen*, and drawing and craft schools, were the widely varied forerunners of 'continuation schools' (*Fortbildungsschulen*). The first articles compulsorily governing this conglomerate of continuing education and training for apprentices and young workers were set out in the '1st Land law on the development and maintenance of industrial continuation schools', promulgated on 28 November 1868 in Lower Austria. This law, which was amended several times, became the pattern for the development of continuation schools throughout Austria and also gained attention in other countries in Europe (Schermaier, 1970, p. 45ff.).

The further development of Austrian continuation schools was governed by the Ministry of Education Order of 24 February 1883 – 'General principles for the organisation of industrial continuation schools' – which built on the Lower Austrian law. Under paragraph 1 of this Order, industrial continuation schools were intended to 'give workers (apprentices and assistants) in industry theoretical and as far as practicable practical instruction in the knowledge and skills required to perform their occupation' (Schermaier, 1970, p. 47). It was to be given on Sunday mornings and at least two evenings a week.

This role of the continuation schools, which was still not entirely clear, was also reflected in their articles: a distinction was drawn between 'general industrial' and 'special or specialist continuation schools', the former being purely additional tuition given by a *Volksschule*. Among the specialist industrial schools were a number of 'continuation schools for clerical workers' and 'agricultural establishments'. Despite their specialist role, these continuation schools were generally attached to middle schools (i.e. *Realschulen* or *Realgymnasien*) or elementary schools (*Volksschulen* or *Bürgerschulen*) and therefore made use of their premises, staff and teaching materials.

In a similar way to Germany, the development of an independent continuation school system proceeded somewhat slowly in Austria in the 19th century. By 1900 few establishments were as yet organised separately. It was only after the turn of the century that this development occurred, clearly under the influence of Kerschensteiner's ideas. As in Germany, one factor in its favour was the improvement of apprenticeship training as a result of industrial legislation. Once again, the 'Duchy of Austria below the Enns' proved to be the forerunner and model: the Lower Austrian Continuation Schools Act of 30 November 1907 – slightly amended in 1909 – set out the definitive organisational structure, curriculum and public nature of continuation schools for the period before and after the First World War. While there were 78 preparatory courses, 55 general industrial and only five specialist continuation schools in Vienna in 1907, three years later there were only three general but 135 specialist continuation schools (Schermaier, 1970, p. 54).

The role of the specialist continuation schools was now 'to promote the industrial training of apprentices through scholastic education and vocational instruction'. In accordance with the Bavarian vocational school model designed by Kerschensteiner, the Austrian continuation schools were also intended to incorporate practical workshop tuition in their curriculum, which caused considerable difficulties on account of the uneven economic development throughout the vast country. Under this Act, however, the continuation schools were now public compulsory schools for craft and trade apprentices, and thus a component of a training model which was later given the name of the 'dual system' (Kielhauser, 1931; Schermaier, 1970, p. 50ff.).

Switzerland – a unique case in Europe

In many respects, the small country of Switzerland was the exception in the process of European industrialisation, particularly in relation to the home of industrialisation, England. Since the end of the Napoleonic wars, Switzerland had developed into the most feared competitor of the English cotton trade, not only in the Swiss domestic market but also in the European and world markets (Biucchi, 1977). The causes of this astonishing fact lie in the Swiss 'industrious tradition': even in the 17th and 18th centuries, other fields of economic activity were already important – silk and watchmaking, foreign trade, international banking and agriculture. At the start of the 19th century, the Swiss cotton industry was in fact more advanced technically than the English. The Industrial Revolution can therefore be described at least as proceeding in parallel in Switzerland and England, with the former in the lead in some respects. 'Were mechanisation not the essential feature of the "Industrial Revolution", it could be said that the Swiss Industrial Revolution took place before the English' (Biucchi, 1977, p. 44).

Like England, Switzerland was among the first Western countries to be, so to say, 'free-born'. It was certainly no accident that the introduction of mechanical spinning in 1798/99 accompanied the invasion by revolutionary France, which forced the Republics of the Confederation to adopt a whole series of innovative ideas and institutions, even though they were only understood by an elite. These achievements ran counter to the traditional democracy in Switzerland, which took the form of an aristocratic oligarchy in the urban cantons but was dominated by bourgeois peasant farmers in the rural. But the imposition of the 'Helvetic Republic' between 1801 and 1803, even though short-lived, accelerated the integration and unification of the 23 cantonal economic areas, so that by 1848, a federal constitution could be drawn up as the basis for a federal, democratic and economically united state (Biucchi, 1977, p. 46).

If the core period of industrialisation in Switzerland is regarded as 1800 to 1830, it is clear that England came first with the mechanisation of spinning and weaving through Jenny Crompton's mule and Cartwright's mechanical loom. On the other hand, Switzerland met 90% of the worldwide demand for clocks and watches in the 18th century. Of the 1.8 million inhabitants of the country, 150 000 were working in the cotton industry in 1780, and while England accounted for 58% of world cotton production after 1815, Switzerland still produced 23% (all data from Biucchi, 1977, p. 47). But there were fundamental differences between the two countries in respect of the side effects of industrialisation. For example, work in Switzerland was not concentrated in large factories but predominantly in small and medium-sized enterprises.

Industry remained outside the few large cities, antagonistic social classes and severe social tensions did not generally develop, and the old middle class was not proletarianised.

Industrial development in Switzerland not only occurred at the same time as it took off in England, but it was also marked by a relatively rapid change-over to a modern industrial system which tied in all branches of the main sectors of the economy. In the 19th century Switzerland was already in the front rank of European countries in terms of technological development. 'Without abandoning certain fixed principles of its centuries of development or its equilibrium, the Swiss economy absorbed the new functions of production in all sectors [...] industry, trade, agriculture and finance expanded concurrently. It could be said that the pace of development was fully synchronised in Switzerland even at that time' (Biucchi, 1977, p. 50). One Swiss peculiarity may be regarded as the main factor in this almost archetypal process of industrialisation, namely an intellectual middle class, which was influenced both by the ideas of the French Revolution and by English utilitarianism.

The development of a dual training structure in German Switzerland

The development of vocational training institutions in Switzerland in the 19th century was closely connected to these specific socio-economic and political factors. The collapse of the old Confederation in the wake of the French Revolution led, for example, to the abolition of the guild system and the introduction of revolutionary innovations such as freedom of occupation and residence. But even during the period of so-called 'mediation' (1803 to 1814), and to an increasing extent during the political reaction which set in right across Europe, the guilds regained their former rights, the extent of which varied from canton to canton. It should be pointed out in this context that only the few larger cities in central Switzerland, such as Zurich, possessed an influential guild system, while in western Switzerland, with the exception of Geneva and Fribourg, and in the mountain cantons of the east, bodies such as guilds had essentially little impact. This situation was the decisive reason for the differences in vocational training in the various parts of the country, especially in German-speaking and western Switzerland (Landolt 1977).

When the federal constitution was revised in 1874, explicitly liberal Trade Regulations were introduced throughout Switzerland. As in Germany, these brought about almost the complete collapse of the apprenticeship system, while spurring skilled craftsmen to express their particular political interests very forcefully. The 'Great Depression', which affected Switzerland from 1873/74, also caused the Swiss middle class severe worry as to their livelihoods. Their protest movement was given a lasting structure (at the fifth attempt) in 1879, when the Swiss Trade and Industry Association was founded at federal level. Many occupational associations became sections of it, and devoted themselves primarily to drafting and applying rules of apprenticeship which built on the traditional close link between craft work and craft training. However, these rules did not provide for 'appropriate, methodical and progressive training' (Wettstein, 1987, p. 5).

Essentially, the Swiss Trade and Industry Association and its sections, such as the Association of Swiss Master Cabinet-Makers or the Swiss Printers' Association, set out to achieve the following in order to stabilise the training of apprentices:

- to create a binding contractual relationship between training master and apprentice by introducing a standard training contract and issuing additional rules of apprenticeship;
- to promote theoretical training, especially in drawing, in order to complement the teaching in part-time schools (continuation schools);
- to introduce compulsory examinations at the end of apprenticeships;
- to give masters and journeymen further training by compiling collections of samples and patterns in museums of trade and industry, and exhibiting them temporarily.

The Trade and Industry Association achieved rapid political success: in 1882 the *Nationalrat* debated the economic and social situation of trade and industry, and in 1884 Parliament approved a 'Federal Resolution on vocational training in trade and industry'. This had been preceded by a lengthy investigation of trade and industry, which had complained to Parliament of the effects of free trade. Article 1 of the Federal Resolution more or less adopted the findings of the investigative report, which led to an improvement in the situation of the sectors of the economy affected, and in vocational training. It promised the various institutions providing training in crafts and industries financial support from federal funds, and from 1891 institutions providing training in commerce could also apply for this aid. This support is still provided today (Wettstein, 1987, p. 17ff.).

In order to stabilise apprenticeship training it was of course crucial to reintroduce appropriate examinations, which could not easily be controlled centrally in view of the division of responsibilities between the federal and cantonal governments. The Federal Government declared in 1888 that it was prepared financially to support the conduct of 'apprentice examinations' in all cantons; in order to guarantee a degree of standardisation, the examination procedure developed in St. Gallen was proposed in 1889 as a general guideline, but the holding of state-recognised examinations initially remained a goal and did not become compulsory. By 1902 the proportion of Swiss apprentices who sat an examination on completion of their training was still only around 20%.

Unlike the situation in Germany, where the Chambers of Trades and the *Innungen* had an examinations monopoly in industrial vocational training that was approved by the state from 1897, the conduct of examinations in Switzerland was then in the hands of the 'Central Examinations Committee' established by the Trade and Industry Association in 1891, which was renamed the 'Swiss Apprenticeship Committee' in 1919. The work of these central bodies was soon hindered, however, by the introduction of cantonal apprenticeship legislation which, among other things, laid down differing rules for examinations. In western Switzerland, where the Trade and Industry Association had been slow to recruit sections, the cantons began conducting examinations themselves. It was not until 1930, when the first federal law on vocational training was passed, that the conduct of examinations was centrally regulated: overall

supervision was entrusted to the federal authorities, and the examinations were to be conducted either by the cantons or the occupational associations (Wettstein, 1987, p. 7f. and 104f.).

Slow progress was made with the creation of vocational part-time schools in Switzerland, as in Germany. There were two reasons for this, one educational and one social. The educational angle can be seen in the drawing and craft schools that had been set up privately since the mid-18th century but could generally offer no further progression. The social reason lay in the general continuation schools which had been founded from about 1840 to complement the 'all-day schools' introduced in 1830 to exercise social control of lower-middle class young people. The 'recruitment examinations' introduced in 1854 were of significance for their further development, since these revealed the ability of future members of the Swiss national army to read, calculate and write a letter, and their so-called 'knowledge of the fatherland'.

At roughly the same time as general continuation schools were expanding, 'vocational' continuation schools were also developing in Switzerland, such as the 'Trade and Industry School' in Chur (1841) and similar schools in Oberwyl-Aargau (1844), Carouge (1845), Frauenfeld (1846), Bischofszell (1848) and Lenzburg (1850). The reason for the foundation of additional schools of this type was the policy of customs tariffs imposed by neighbouring states, which badly affected Swiss free trade. The schools could be attended by apprentices and journeymen on Sundays and weekday evenings, which did not particularly encourage attendance. According to a head-count carried out in 1905, only 37.5% of apprentices at that time were attending the vocational continuation schools, which concentrated on the graphic trades, provisions and fine foods, and clothing and millinery.

The federal resolutions on vocational training issued between 1884 and 1895 merely permitted the central government to provide financial support for continuation schools and other establishments. The Swiss Constitution contained no legal basis for the comprehensive regulation of trade and industry, or of vocational training, and indeed this was expressly rejected in a referendum in 1894. The consequence of this was that the cantons issued their own 'apprenticeship laws' from 1890. The first of these laws, from the Canton of Neuenburg, laid down that training contracts had to be made in writing, set maximum working hours including instruction at continuation school, and gave responsibility for inspection to the communes. This shows that the first apprenticeship laws were designed to offer protection (*lois sur la protection des apprentis*), while later versions of them, and the laws issued after the turn of the century in the German Swiss cantons, especially Zurich and Basel (1906), also aimed to improve vocational training itself by making attendance at vocational continuation school and final examinations compulsory. By means of these cantonal training regulations, German Switzerland in particular thus largely restored the traditional apprenticeship system before the First World War (Wettstein, 1987, p. 44f.).

The development of vocational training institutions in western Switzerland

In western Switzerland, which looked more to France, and in the southern part of the country, influenced by Italy, the development of vocational training took a rather different course in the

19th century. Unlike central Switzerland, there were no powerful trade and industry associations, or their subsidiary bodies, to exercise an influence on the economic and industrial policy of the cantons and communes. In the absence of the influence of the old middle class, it was more or less inevitable that the new French training model would be taken up more enthusiastically in the Romance-language areas of the country than the attempt to reinvigorate traditional patterns of training for master craftsmen.

Early on, the watchmaking industry, which was established largely in the west, was clearly influenced by the *Écoles des arts et métiers* opened in France. Technological changes in production, associated with the replacement of craft work and outworking by machines and factory organisation, left the traditional training for master craftsmen looking outmoded even in the first quarter of the 19th century. The need for more theoretical and systematic training therefore led very quickly to the establishment of 'producing workshops' after the French model, such as the *École d'horlogerie* set up in Geneva in 1824, and to similar institutes in La Chaux-de-Fonds (1865), St. Imer (1866), Le Locle (1868), Neuchâtel (1871), Biel (1872), Solothurn (1884) and Le Sentier (1901). These institutions ensured the continued worldwide reputation of the Swiss watchmaking industry, not only then but even today (Meyser, 1996, p. 137).

The development of 'public learning workshops' in Switzerland

The French production school model generally appears to have been very successful in Switzerland, in complete contrast to Germany. There are still around 50 such establishments training about 4000 apprentices each year, around 2% of the total, chiefly in electrical engineering, dressmaking, mechanical engineering, light engineering, graphics and gardening (Gonon et al., 1982, p. 3f.). In many occupations these production schools even account for the major part of the overall training capacity: watchmaking (60%), micromechanics (70%), ceramics (85%) and violin-making (100%). Numerous production schools only survived for a limited time, however, especially in German Switzerland, where the trade and industry associations were only willing to accept such establishments as temporary 'emergency solutions' to train an elite of master craftsmen until such time as the regenerated craft system recovered its original position in the economy and society. This applied, for example, to the weaving and basket-making schools in Winterthur, St. Gallen and Wattwyl.

Other schools have continued operating until the present day, for example the school for cabinet-makers, locksmiths, shoemakers and tinsmiths in Bern, established in 1888, which particularly impressed Kerschensteiner on his journey of investigation on account of its educational and economic effectiveness (Kerschensteiner, 1901, p. 111ff.). Like this school in Bern, the school of joinery in Zurich (1888), the school for women in Zurich (1889) and the metalworking school in Winterthur (MSW, 1889), which is also well known outside Switzerland, have survived as production schools to this day (Specht, 1989).

The rise of mechanised industry and the availability of federal funds for vocational training establishments from 1884 led to a wave of further foundations of production schools as 'public learning workshops'. New schools and workshops were established, for example, for

mechanics in Couvet (1893), Fribourg (1896), Ste. Croix (1907), Yverdon (1912), Bellinzona (1915) and Lausanne (1916). Departments of mechanical engineering were added in 1890 to the schools mentioned above in Bern and Winterthur. The production school principle was also applied on a number of occasions in the traditional building and woodworking sectors (all data from Meyser, 1996, p. 137f.).

While completely school-based vocational training for skilled workers largely took the form of 'public learning workshops' or *Écoles des arts et métiers* in Switzerland, at the middle and higher level of technical training, vocational schools known as *Technika* were established. In 1855, for example, the *Eidgenössisches Polytechnikum* – the forerunner of the *Technische Hochschule* – was established in Zurich 'as the highest school of trade and industry' shortly after the founding of the *École d'ingenieurs* at the University of Lausanne. The first *Technikum* for middle-level training was founded in Winterthur in 1874, followed from 1890 by *Technika* in Biel, Burgdorf and Fribourg. The vocational schools of this type also reveal the typical split in the Swiss vocational training landscape between the French and the German areas: while the *Technika* in western Switzerland provided comprehensive practical training in training workshops in addition to theory, the German establishments in central Switzerland assumed fairly broad practical experience of work or practical training before entry to the school (Wettstein, 1987, p. 23ff; Meyser, 1996, p. 136).

In view of these achievements in vocational education in Switzerland by the end of the 19th century, it is difficult to agree with the complaint made by Eduard Riniker in 1884, that 'Switzerland, which strives for freedom, where a thousand factors work towards the education of the people in the freest way possible' was in the field of vocational training far behind Austria, the old enemy, 'the land of slow progress, the land of feudal aristocracy, the land of creeping, sclerotic clerical influence at school and home, the land that fiercely resists all progress'. The author of such a thorough description of vocational training in Austria, Wuerttemberg, France and Switzerland was presumably influenced by the rigid centralised administrative culture that Dumreicher had created for the industrial vocational schools in the neighbouring country (Riniker et al., 1884). But the network of Swiss production schools could at least fully withstand comparison with the pride of the Austrian training model, the *Staats-Gewerbeschulen*.

An interim overview

We shall end the history of European vocational training in the 19th century at this point. Our investigation reveals no original overall concepts to add to the three classical models. But this is of course no more than a hypothesis, which it will be the task of subsequent historical research in vocational training to disprove. If the further development of what we have termed the 'classical' models of vocational training in England, France and Germany, which we describe in Part 2, could be complemented by a history of mass vocational education and training in the other states of Europe, this would bring us a good step nearer to testing that hypothesis.

2. Second Industrial Revolution

2.1. The impact of mass production and Taylorism on vocational education and training in Europe

From an economic perspective, the concept of 'Europe' added little before the First World War to an understanding of the relationship between European countries and the world economy at that time. This was largely because most European states then had very loose relations with the world outside Europe. Their economic orientation was primarily determined by close ties to the industrial areas of north-western Europe. More specifically, they were under the influence of the states that had by then become the industrial powers: the United Kingdom, France and Germany (Pinder, 1980). It was essentially these three countries alone that determined the place of Europe in the world economy.

Let us take the position in 1913 as an illustrative example, which was widely regarded by politicians and business leaders after the war as the 'norm' which needed to be re-established. At that time, the United Kingdom, France and Germany dominated the world economy. The influence of each of these states far exceeded that of any other country, with the exception of the United States of America. In 1913 – and to an even clearer extent in the 1920s – the world economy ultimately revolved around these four modern industrial economies. The United Kingdom, France and Prussia-Germany, which accounted for something under half of the population of Europe, turned out around three quarters of its industrial production. Only the United States was comparable with these three industrial powers, or to be more precise, the United States was at this time already on the way to overtaking the European Big Three. American steel production, for example, was in 1913 already as great as that of the three European competitors combined (Pinder, 1980, p. 377).

This leading industrial position of North America was apparent above all in the development and almost universal application of a completely new way of organising work in industry – 'Taylorism', which saw itself as a 'science of industrial operations'. However, its 'inventor', Frederick W. Taylor, refused to acknowledge the terms 'Taylor's system' or 'Taylorian method' and insisted on the expression 'scientific management' (Friedmann, 1952, p. 32). It was based on the principles of the classical economy and the assumptions of psychology and the psychology of work that were then current. Taylor defined the role of scientific management as breaking down all industrial work into its smallest elements in order to discover the 'one best way' of performing it. The core of such analyses was time and motion study. The results of this were fed into a system of rules to be followed by each worker in order to make the optimal contribution to overall performance. The aim was to achieve the following detailed goals: speeding up the work of the individual by eliminating 'dead time' and correcting wrong movements, integrating all individual steps in the work into a space-time continuum, and developing an 'objective' basis for calculating wages as a performance incentive. It was ultimately an attempt to reduce the complexity of work processes in order to

achieve as secure as possible control over the overall operation, organisationally and technically, by managing it scientifically (e.g. Littek, 1973, p. 20; Etzioni, 1964, p. 20ff.).

The social and economic situation in the United States in the last two decades of the 19th century was crucial to the development and adoption of Taylorism. 'A growing economy, changes to the structure of the economy and society, urbanisation, the shifting pattern of immigration, a population explosion, industrialisation and acceptance of increased productivity as the dominant goal of individual businesses – these were the features of a societal development that more or less turned the whole situation "inside out" over the next thirty to forty years' (Schmidt, 1974, p. 65f.).

The 1890s were dominated by a social crisis, however, which had its roots in the economic depression between 1893 and 1897. The fact that territorial expansion in the West was complete by the end of the 19th century is often taken as a symbol of the internal crisis in American society, and of the need for a re-orientation of entrepreneurial effort and national self-perception. Between 1865 and 1900 the United States turned into an 'industrial society'; 'the watershed of the nineties' is commonly viewed as a 'qualitative leap' (Commager, 1950, p. 54).

'It was by no means an accident that the birth of the first large system of scientifically organising labour coincided with the time – the closing decade of the 19th century – when capitalism was entering a new phase and needed this essential support in order to achieve order and to overcome its internal contradictions' (Friedmann, 1952, p. 25). The social issue of increased production facing individual entrepreneurs should strictly be perceived as a phenomenon of the transfer from liberal to organised capitalism. With growing competition, an increasingly organised working population and rapid mechanisation of large sections of industry, which required specially trained workers, it became more and more difficult to make best use of labour as a factor in production while applying capital effectively and maintaining authority in individual enterprises. Besides product development and marketing, the organisation of production and labour – recruitment, training and exploitation in the work place – became variables that employers needed to influence (Schmidt, 1974, p. 82).

The preservation of the social and economic foundations of the system – a formally free market economy, the power of individual entrepreneurs to decide how to employ capital and labour, and so on – required a radical role change on the part of the state. Liberal ideology held out for another few decades, but even in the United States 'liberal capitalism' became susceptible to political influences and modifications at the end of the 19th century. In order to preserve the basic structure of capitalism, the state had now to become a power outside the system (Habermas, 1973).

Even before 1914, Taylorism had been taken up as a challenge in Europe, but it was not until the 1920s that the basic notion of Taylorism – making technology the arbiter of social policy – was pursued consistently. Applying the machine-based discipline of technical science to industrial working relationships ultimately meant simply that employers and employees no longer had any reason to argue over remuneration, working hours or conditions of work since both parties could appeal to the arbitration of science (Maier, 1980, p. 190).

As might have been expected, the supposedly impartial findings of scientific management led in practice to a further strengthening of the position of management. Taylorism can therefore be interpreted as a hugely influential ideology which is fascinating from a socio-political point of view because it promised to do away with the existing conflicts of interest between employers and employees – the precondition for class warfare – and to offer a way out of the harmful zero-sum conflict in which profit for one party automatically fed on a loss to the other.

2.1.1. The Anglo-Saxon cultural area – the split between 'vocational education' and 'vocational training'

With the increasing adoption of Taylorism, the United States of America emerged as the initiator of a new model of training, which had a considerable influence on the design of training in the European industrialised countries. The internal structure of the German system of vocational training in particular changed under the influence of scientific management – one might almost say, spectacularly.

When reporting to the Society for the Promotion of Industry on his visit to the World Exhibition in Chicago in 1893, the Berlin City Inspector of Education H. Bertram was still able to state that there were 'generally' no apprentices in the United States. Just 20 years later, in June 1913, the Managing Director of the General Electric Corporation in West Lynn (Massachusetts), M. W. Alexander, gave a widely respected address to the German Committee for Technical Education (DATSCH) in Berlin on the 'practical training of skilled workers and technical supervisors in the engineering industry of the United States of America'. One of the main factors behind the extraordinary explosion in the company training of apprentices in the United States at the beginning of the 20th century was contemplation of the reasons for the high quality of German goods at the World Exhibition of 1893 in Chicago on which Bertram had reported.

Alexander argued that when the immigrant population changed around 1900 and, instead of skilled workers from Central Europe, increasing numbers of unskilled arrived from the East, a new system of recruiting and training skilled labour began to be developed, from 1902, by private initiative. This system clearly reflected the requirements of the new production methods; the Berlin company Loewe AG, and AEG, subsequently adopted much of it in their own new style of training (Hanf, 1987, p. 176f.). At around the same time, a year before the outbreak of the First World War, reports appeared from C. Matschoß, the General Secretary of DATSCH, and a number of VDI delegates, who had investigated 'the intellectual means of technical progress' and the 'education of workers and apprentices' in the United States. The issue of vocational training was thus from the outset an important part of the rationalisation of industry inspired by Taylor immediately after the turn of the century (Hanf, 1987, p. 177).

The development of the liberal training model in the United States

There was an extremely lengthy and complex public debate about the training requirements of industry and their effects on public education in the United States. In general, the period 1876-1926 is regarded as the crucial phase of modernisation – the Golden Age – of American

education (Butts, 1978, p. 163). Over these 50 years the system of public education – especially its core, secondary education, colleges and universities – developed from a somewhat heterogeneous mixture of private academies, colleges and universities into a vast government-controlled, secular, academic organisation. By 1926, the public high schools, state universities and colleges had overtaken the private sector in both quantity and quality. It was only logical that the process of academic and social modernisation taking place alongside brought with it at this time of upheaval the call for reform of education, particularly secondary education, to take account of the practical demands of the world of work.

In the mid-1870s, the so-called 'manual training movement' became established in both the Northern and the Southern states. The main protagonists of this movement were professors at technical universities, such as the President of the Massachusetts Institute of Technology, John D. Runkle, and the Dean of the Polytechnic Institute at Washington University in St. Louis, Calvin M. Woodward. Both were concerned to create a reasonable balance between the teaching of cognitive and practical skills in the curriculum of public schools (Butts, 1978, p. 210). In this first phase of the so-called vocational drive – the struggle to institutionalise vocational training as part of the public education system of the United States – the display of high-quality products from the 'Moscow Vocational School' at the Russian stand at the US Centennial Exposition of 1876 in Philadelphia attracted widespread attention. Its influence on the reform of the American education system was certainly comparable to the impact of the so-called 'sputnik shock' of the 1950s (Loose, 1987, p. 9f.)

In the mid-1890s, after the depression of 1893/94, the phalanx of reformers was reinforced by further educational initiatives, but what was crucial was the foundation in 1895 of the powerful National Association of Manufacturers (NAM), which came out in favour of a radical reorientation of public schools. NAM set up a Committee on Industrial Education, whose 1905 and 1912 reports gave the signal for a fundamental vocationalisation of American schools. In addition to this programme, NAM argued for special 'industrial schools' after the German pattern to be run separately from the regular public secondary schools as private or public institutions for a specific clientele.

The trade unions, represented by the American Federation of Labor (AFL), joined the campaign for the vocationalisation of the curriculum of public schools, but objected in principle to the idea of separate industrial or continuation schools with their own administration. The AFL mistrusted the motives of NAM – especially the notion of vocational intensive courses in private schools – and argued for a unified public school system that did not separate out the children of the working class in 'second-class schools', as in Europe. The unions wanted better vocational training for their clientele as the basis for raising the standard of living, but they also had an interest in the advantages of social mobility, which the liberal American public school system appeared to guarantee.

In the 1870s, the National Education Association (NEA) had already reacted to demands from its members for vocational curricula in schools, with the creation of the Department of Industrial Education. But at the meetings of the NEA, the argument centred on a greater

vocational orientation in the traditional content of education that would not extend beyond the prevocational level of work. The prevocational focus of the Association's activities was seen particularly after 1890, when 'vocational educationists' increasingly lost influence to the social wing of reformers. In 1917 the Department of Industrial Education was significantly renamed the Department of Vocational Education, but was not consulted when the 'Cardinal Principles of Secondary Education' were approved in 1918. These expressed a clear preference for the principle of including vocational courses in the curriculum of comprehensive schools. To the dominant majority of the NEA, special schools to train the working class were nothing less than the sign of a class society, which was irreconcilable with the principles of free democracy (Loose, 1987, p. 12f.).

The groups making up the social alliance of the 'vocational drive' thus varied considerably in their conception of the purpose and aims of vocational education. It was only when the National Society for the Promotion of Industrial Education (NSPIE) was set up in 1906 to co-ordinate the various initiatives of employers, trade unions, vocational educationists and agricultural associations, that there was a combined struggle to protect vocational education in law. Under the effective leadership of Charles A. Prosser, who became Secretary of NSPIE in 1912, the Society succeeded in 1914 in establishing the Commission on National Aid to Vocational Education, whose report published in the same year acted as the basis for the Smith-Hughes Act (Loose, 1987, p. 13 f).

These activities of NSPIE were not enough to prevent a massive public argument over the adoption of the Smith-Hughes Act in 1917, the first federal law to promote vocational education, which nonetheless had the support of Congress and President Wilson. The 1914 Report of the Commission on National Aid to Vocational Education more or less followed the arguments put forward by NAM, namely that vocational training was an excellent means of developing and maintaining national resources, preventing wastage of labour, meeting the rising demand for skilled workers and increasing the purchasing power of the working population. The report stated that vocational education was 'a wise investment of capital and a stimulus to national prosperity' (Lazerson et al., 1974, p. 116 ff).

The so-called 'Kerschensteiner episode' clearly illustrates the conflict surrounding the fight over this Act and can be seen as part of the background to the Smith-Hughes Act. The celebrated Munich Inspector of Education Dr. Georg Kerschensteiner travelled the United States from 28 October to 16 December 1910, putting the case for vocational continuation schools. He was greeted with great interest since there was in the American education system as yet no school which specifically addressed a clientele that was not seeking higher education and entered employment straight from 'common school'. Forty years earlier, as has been mentioned, American educationists and professors had called for changes to the American education system in favour of vocational education, and the concept behind the Munich continuation schools had been known in the United States since 1905. However, there was a widespread misconception that continuation schools were full-time rather than part-time establishments. It was not until 1910 that Kerschensteiner was able finally to dispel this misunderstanding (Knoll, 1993, p. 132 ff; Kantor, 1988).

His visit was also a political breakthrough. In 1911, the National Society for Promotion of Industrial Education, NAM and the AFL adopted resolutions calling for the introduction of continuation schools in the United States. In the same year, the first effective network of vocational education was approved in Wisconsin. Among other things, this obliged communities with more than 5000 inhabitants to establish continuation schools in which 14-16 year olds were to receive at least five hours of tuition in general and vocational subjects. Two years later, New York, Massachusetts, Pennsylvania and Indiana adopted similar legislation.

Hence, the Smith-Hughes Act can also be regarded as a success for the supporters of Kerschensteiner in the United States. It set out in detail that the federal states could receive up to USD 7 million from federal funds to promote vocational education in crafts, domestic science and agriculture at secondary school level. The Act also accorded a key place to continuation schools by stipulating that at least a third of all moneys should be allocated to 'part-time schools for working young people over 14 years of age', as long as they delivered a minimum of 144 hours of tuition per year. The rest of the funds was to be received by evening schools, high schools and teacher training establishments providing their students with programmes and courses in vocational guidance, vocational preparation and vocational practice.

A Federal Board of Vocational Education was established as the administrative body to oversee the allocation of funds, an institution which functioned independently of the United States Bureau of Education. The individual states retained the power to decide whether they wished to introduce the 'dual' or the 'unified' system of administration. In the event, only eight of the 48 states voted to split the supervision of schools (Knoll, 1993, p. 141 f).

The future of continuation schools in the United States seemed secure: between 1918 and 1928, their number of students rose from 50 000 to 400 000, thus occupying first place among the vocational education and training programmes supported by the individual states and the federal authorities. But this expansion did not indicate that continuation schools were decidedly successful in the United States. It soon became clear that these schools were not greeted with enthusiasm by young people or their parents; and when the world economic crisis resulted in widespread unemployment, continuation schools were finally sidelined, while the student population of high schools rose steeply. Since unemployed young people were compelled by the social schemes introduced in many states to attend school for at least 20 hours, parents and students found it a simple matter to opt for full-time schools. This brought about the final end of the 'German solution' in vocational education in the United States (Knoll, 1993, p. 141).

The crucial reason for the failure of specifically vocational public education in the United States was, however, the massive resistance to any such programme by the Progressive Education movement under its leading protagonist, John Dewey. Dewey began his counter-campaign after vocational or continuing education acts had been adopted or were in preparation in a number of states, as described above. In 1913 he made a dramatic appeal to the teaching body 'to prevent what can be described without exaggeration as the worst evil now threatening the interests of democracy in education', namely the introduction of a vocational training system after the German model separate from the general education system (Dewey, 1985).

The convinced democrat Dewey had realised that the Kerschensteiner type of continuation school meant the – maybe not explicit – establishment of a two-class education system to support the maintenance of the bourgeois capitalist economic and social order. As a committed social reformer he was concerned to overcome the class system and bring about a 'social democracy'. When translated into an education system, this meant priority for general education, comprehensive schools and equality of opportunity. He regarded Kerschensteiner's emphasis on the vocational as a narrowing of social opportunities, arguing that it was necessary to 'work towards a form of vocational education which first changes and ultimately transforms the existing industrial system' (Knoll, 1993, p. 140), an obvious illusion which the pragmatic reformer Kerschensteiner dismissed out of hand. For all his declarations of esteem, he regarded Dewey as an idealist whose educational ideas seemed to him 'unobjectionable in theory […] barely realisable in practice' (Knoll, 1993, p. 141).

The Smith-Hughes Act marked a compromise in the contest between general and vocational education, promoting the introduction of both continuation schools and 'differentiated' courses in high school, i.e. general as well as vocational. However, in relation to the dispute between the proponents of the democratic comprehensive school and the defenders of a separate 'vocational education system', the Smith-Hughes Act represented in retrospect a decisive turning point in favour of comprehensive schools. Indeed the Act still reflects to this day the legal basis of the American vocational education system, which allows the federal government minimal influence while the individual states and cities enjoy a high degree of autonomy.

The funding framework created by the Smith-Hughes Act was modified between 1917 and the 1950s by the addition of funds under four complementary Acts. A crucial change was made in 1933, when the federal Board of Vocational Education was abolished and its responsibilities were transferred to the federal Department of Internal Affairs. A few months later, these responsibilities were passed on to the Department of Education (Loose, 1987, p. 20ff.). Until the early 1960s, vocational education therefore played a subordinate role in high schools. Even today, vocational courses are found in the compulsory curriculum in fewer than a third of all states; the number of so-called vocational or technical high schools is small. Generally, it can be said that the vocational education offered by high schools is largely a general preparation for employment, or at any rate is no way comparable to the German model of training for skilled workers (Münch, 1989, p. 37ff.).

In his investigation, Gert Loose divides the educational dimension of vocational preparation in high schools into three phases:

(a) 'prevocational' introduction to the world of work (mid-19th century to 1917),

(b) teaching of functional 'vocational skills' (1917-1963), and

(c) relating of both these concepts of 'lifelong learning' (since 1963).

However, we feel that this is to look at things in terms of an ideal typology. In practice, the first two phases meant nothing more than a slight shift in emphasis from a general vocational orientation to the teaching of specific isolated skills. However, given the complexity of the

teaching goals, operationalising the model of lifelong learning, which has been in vogue since the 1960s, will continue to pose a challenge to curriculum researchers and developers for the foreseeable future.

The achievement of a general monopoly on education by high schools had a disastrous impact on vocational education, splitting it into 'vocational/technical education' and 'vocational/ technical training'. Schools claimed to deliver the former, while the latter was left to industrial and other enterprises, i.e. the market. Vocational/technical training, the area in which vocational skills of relevance to the labour market can be acquired, remains a disorganised mixture of different skills courses in the United States. The main segments of the market are:

(a) Apprenticeship training, which is both an important and at the same time a neglected source of potential training. As indicated at the beginning of this chapter, modern industrial apprenticeship training schemes were set up before the First World War at the private initiative of a number of major companies. Between 1911 and 1913, some states then passed vocational training legislation, as has been mentioned, with Wisconsin in the lead, which had a high proportion of immigrants of German origin. It was followed in the 1930s by Oregon, Kentucky, California and Vermont (Münch, 1989, p. 97f.). A distinction is drawn in the United States between 'registered' and other apprenticeship schemes, the aims and content of registered schemes complying with the requirements of recognised training occupations. Registration is granted at either federal or state level.

    Despite the considerable number of schemes, apprenticeship is not widely known in the United States, frequently being described as the 'best-kept secret' of the training sector. In quantitative terms, 'registered apprentices' account for only 0.24% of the American population in work (compared with 6.3% in Germany), and this figure is at most doubled by the addition of unregistered apprentices (Münch, 1989, p. 146). In recent years, the importance of apprenticeship has tended to decline in the United States as the influence of those trade unions actively committed to it has waned.

(b) Two-year 'junior colleges' provide vocational training and act as a bridge to higher education. Alongside private companies, junior colleges are now the main institution of vocational training in the United States. Their provision is intended primarily to meet the economic, political and cultural needs of their immediate surroundings (city or region). However, their courses can also be counted towards four-year university courses. The students are usually young adults who are or have been employed, and the average age is around 30 years. Junior colleges have no admission hurdles and can therefore also be attended by high-school leavers with no qualifications. Many junior colleges specialise in technical, commercial or administrative occupations and provide courses especially for local employers (Münch, 1989, p. 68ff.).

(c) In the training field there is also a vast and impenetrable array of vocational adult education courses, run by specialised technical and/or business schools, private companies, distance learning institutions, trade unions, local authorities, the armed forces and numerous radio and television channels.

The role of the federal government in all of this is laid down essentially in the Vocational and Applied Technology Education Act. The programme provided under this Act is managed by the federal Department of Education and grants financial aid to both state and local government agencies. However, the situation of vocational education and training courses is marked by excess rather than paucity because of the countless overlapping and sometimes conflicting federal, state and local guidelines and targets. The General Accounting Office identified 154 federal programmes in 1994 alone that provided some USD 25 billion for vocational training and support measures (Rist et al., 1994, p. 331).

In summary, it can be said that the American vocational training model is a market system which is determined largely by chance and is very inefficient. The unemployment rate among young people in the United States is generally approximately three times the national average; many young people simply do not meet the requirements for admission to vocational training; the social costs of young people dropping out of high school or leaving with inadequate qualifications now amount to USD 10 billion a year (Rist et al., 1994, p. 330).

Further developments in the United Kingdom

The above outline of education and training in the United States is necessary in order to understand further developments in the United Kingdom. Around the turn of the century, British education policy was influenced by a desire to imitate the educational policy of Germany and the United States (Sadler, 1908, p. 13). The so-called continuation schools, many of which were set up as evening schools in the closing years of the 19th century, played a key role in this. It soon became apparent that these schools were only successful if attendance was compulsory and the subject-matter taught had a direct link with practical training at the work place. However, neither of these aims was subsequently achieved in England.

Considerable insight into this issue is offered by the recommendations of the Samuelson Commission (1884), which studied vocational training on the ground in eight European countries and established that these countries – with the exception of Russia and Italy – were far more advanced than England. The Commission nonetheless still argued that places of work were ‘the best technical schools’ in England and that there was therefore no need to expand complementary theoretical training. Instead, the Commission regarded vocational preparation in schools, i.e. incorporating vocational content into the curricula of general schools, as likely to make an important contribution – as in the United States – to bridging the gap between England and the more advanced countries in continental Europe (Deißinger, 1992, p. 360f.).

In consequence, the Government contented itself with adopting the Acland Code in 1894 for the opening of ‘evening continuation schools’ of adult education. These could therefore only be attended by those aged over 21 years, while work-place training remained expressly unaffected by this provision: it was to continue being a separate, non-public system bound by ‘freedom of employment’ and the ‘independence of the individual employer’. The 1901 census revealed the unfortunate consequences: of the 12-17 year olds in England and Wales,

17.7% were attending an elementary school, around 6% a secondary school (grammar school or 'public school') and only 6.9% an evening school (Sadler, 1908, p.105ff.).

In 1902, the evening continuation schools were formally separated from elementary schools under the Balfour Education Act and made part of 'further education', which covered the traditional secondary schools and the many different strands of 'technical education', such as the Mechanics' Institutes. Attendance remained voluntary, and the English continuation schools were still isolated from work-place training, thus differing quite fundamentally from their German counterparts, especially Kerschensteiner's reform model. British experts were naturally familiar with the strengths of the 'Munich model'. It was noted, for example, that unemployment among young people was remarkably low in Germany, where vocational continuation schools were established, while in London alone, the proportion of workers who were unskilled was 68% (Deißinger, 1992, p. 392). Michael Sadler in particular, a keen observer of the situation in Germany and a close friend of the Munich Inspector of Education, admired the integration of social and educational elements in Kerschensteiner's concept of continuation schools and urged his native country to copy it (Higginson, 1990, p. 247).

Scotland, however, which Kerschensteiner visited in 1908 to give a series of lectures (Metz, 1971), did react in its own Education Act of that year by making attendance at continuation school compulsory for those over 14 years of age, and handed responsibility for enforcement not to parents but to School Boards. In 1909, the Acland Committee was then instructed to examine whether similar legislation should be adopted in England and Wales. Interestingly, the report produced made reference to Kerschensteiner's continuation school model, but 'the English education system still lacked a structure that might have sensibly and effectively consolidated and combined the different paths and types of education' (Deißinger, 1992, p. 393). English education policy clearly still adhered to the principle uttered by the Conservative Member of Parliament Lord Lyttleton in 1868, namely 'that speaking generally the schooling of the workman ends at about the age of twelve at best' (Deißinger, 1992, p. 393).

The attempt in 1918 under the Fisher Education Act to introduce compulsory continuation schools, organised according to the 'Munich model', with a similar curriculum, and attended by apprentices and young people in employment during the daytime, also proved a failure. The first 22 of the compulsory continuation schools provided for under the Act were opened in London in 1921, but outside the capital scarcely any notice was taken of the scheme. The only local authorities which applied the recommendations of the Act were Birmingham, Swindon, Stratford-on-Avon and Rugby. And most of these continuation schools closed again after one or two years, partly because employers objected to releasing apprentices and young employees during working hours.

It is interesting to note in this context that the Labour Party regarded the introduction of compulsory continuation schools with mistrust. It was said that it was wrong to let continuation schools take the place of the 'good general education' then denied to the lower classes, thereby reinforcing the class division in the education system (Deißinger, 1992, p. 395). This opposition, which in essence identified vocational training with underprivileged

education for the working class and would rather see no institutional provision in that field, was remarkably similar to the position of the American Progressive Education movement headed by John Dewey.

It should be pointed out that even the recent attempt to introduce compulsory continuing education nationally under the major educational reform brought about by the Butler Education Act of 1944 was a failure. The 'county colleges' provided for in this Act, which were intended to prevent the majority of 15-18 year olds being all but excluded from all continuing education, were never established; this Act too therefore remained a 'dead letter' as regards continuation schools, as Deißinger puts it concisely.

The remains of guild training had by 1900 become nothing more than a trade union tool for regulating the labour market in England, and were only to be found in a few occupations. This meant that the unions extensively used training, which had become subject to negotiations on wage settlements, to restrict employment opportunities in the heavily segmented labour market. The aim of this policy was to keep wages high and competition low by limiting the numbers of apprentices – the labour force of the future. The few apprentices thus 'privileged' often received a poor quality of training, however; they merely 'served' their apprenticeship, often without any check on their occupational skills at the end of the period (Deißinger/Greuling 1994, p. 193).

R.H. Tawny describes the situation of vocational training at this time by using the image of a dichotomy between 'boy learners' *a*nd 'boy labourers', with the majority of arrangements in the industrialised northern English counties often falling into the latter category of relationship. According to Tawny's data, in Liverpool in 1901 only 3.4% of 14 year olds were in an apprenticeship, while 5.5% were in 'non-educational employments' (Tawny, 1909).

It was not until the Industrial Training Act of 1964 and the Employment and Training Act of 1973 that the United Kingdom showed any public interest in influencing and fundamentally reforming vocational training. Against a background of rising youth unemployment, a framework was then created in the 1980s for standardisation of training by the state. In summary it can be said that the British vocational training system was until the 1980s a loose combination of historically differing strands of development. 'It comprised, in addition to traditional apprenticeship and training at further education establishments, general training courses offered by private and public training providers, single-company on-the-job training, and opportunities for work experience through the state training programme' (Deißinger, 1998, p. 220).

The particular features of this model may be regarded as:

(a) lack of integration between the school and work-place training sectors,

(b) absence of a formal legal framework for work-place types of training;

(c) want of educational principles to act as a guide for the content of training.

At least until that date, the predominant perception of mass vocational training excluded the prescription of legal, organisational and educational principles to govern work-place training. Even at this relatively recent date, the British model of vocational training was marked by

'inherent faith in the market economy' and a concept of training that did not extend beyond training on the job (Euler, 1988, p. 126ff.).

A few figures from the 1970s will illustrate the level of performance of this training model, an issue which Arthur Shadwell had already addressed in 1909 in a wide-ranging study on the economic decline of the United Kingdom relative to the United States and Germany (Shadwell, 1909). In 1974, 44% of 16 year olds went straight into jobs after completing compulsory education, and only 17% began an apprenticeship or on-the-job training with complementary college attendance. Apprenticeship was exposed to a massive process of erosion in the economic crises of the 1970s and '80s: while around a third of school-leavers entered an apprenticeship in the 1950s, and 236 000 trainees were still counted in processing industries in 1968, the number of apprenticeship contracts fell in the early 1980s to below 100 000. The decline is particularly striking in comparison with the situation in Germany: between 1964 and 1986, the number of apprentices in the United Kingdom (England, Wales, Scotland and Northern Ireland) fell by 74; over the same period, the number of trainees in the German dual system rose by 19% (Deißinger/Greuling 1994, p. 130).

2.1.2. The Romance cultural area – the quest for a lost tradition

Just as it is necessary to bring the United States into a discussion of the liberal model of vocational training in the era in question, it is appropriate to look at the Romance cultural area as a whole, or at least at the situation in France, Italy and Spain, when describing the further development of the bureaucratic training model. In the last two of these countries, no decision was made to introduce a specific model of mass vocational training (Anweiler et al., 1996). There was nonetheless a discernible tendency to opt for the school-based pattern. The French example therefore still offers the best insight into the typical implementation and problems of this training model, partly on account of the greater social and economic progress made there, and also because of the attention traditionally given to questions of education and training in France. France can therefore still be regarded as the clearest example of bureaucratic school-based training, so that the typical features and development pattern of this model of training can best be studied in that country.

The period 1905 to 1931

The legislation introducing *écoles manuelles d'apprentissage*, as described in the last chapter, which were the precursors of the present-day technical upper secondary schools (*lycées technologiques*), was only a partial solution right from the outset, being intended solely for an elite group of workers. The results of the investigation by Charlot and Figeat of training among industrial workers in France at the beginning of the 20th century were not therefore particularly encouraging. Of the 875 000 or so trade and industrial workers under 18 years of age surveyed, around 3.5% were receiving school-based vocational training, and 8.5% formal training at both school and the work place, but the vocational courses (*cours professionnels*)

that complemented the work-place training displayed numerous shortcomings in both content and organisation.

The approach taken to the mass training of ordinary workers remained traditional on-the-job training, although repeated attempts were made to modernise this in subsequent decades.

Table 1: Training in trade and industry 1906/1910

Type of school	Numbers of students
EPCI + ENP + *Écoles de la ville Paris*	18 000
Section professionnelles des EPS	6 000
Écoles privées	5 000
Cours professionnels	45 000
Total	75 000

Note.: EPCI = *École pratique du commerce et de l'industrie* (three years)
ENP = *École nationale professionnelle* (three years)
EPS = *École primaire supérieure à sections professionnelles*
Cours professionnels = school-based courses to complement in-house training
Source: Charlot et al., 1985, p. 161

The *loi Astier* had a lengthy prehistory: in 1901, the *Conseil supérieur du travail,* which had been established in 1891, decided to investigate the situation of work-place training and set up an inquiry. The main finding of this inquiry was the need to revise the law of 1851 which restricted the working hours of apprentices, prohibited night work and allowed little free time for the learning of simple cultural techniques. After the first attempt at amendment failed in 1904, the Ministry of Trade put forward a proposal in 1905 that contained the core of the later *loi Astier*, the introduction of *cours professionnels et de perfectionnement* (vocational training and improvement courses). Despite committed support for the bill form Placide Astier, the chairman of the parliamentary trade and industry committee, the Government rejected the proposal. Before the First World War, there were therefore only two main innovations in the field of vocational training:

(a) the introduction of the certificate of vocational skills (*certificat d'aptitude professionnelle,* CAP) in 1911;

(b) the establishment of regional committees on technical education (*comités de l'enseignement technique*).

The experience of an inadequate supply of labour suffered by the arms industry in the First World War led to renewed efforts at apprenticeship legislation after 1918, with the result that the draft of the Astier bill, which had been laid before the Senate in 1913, largely at the instigation of the engineering industry, was eventually approved by the *Chambre des députés* on 4 July 1919 (Charlot et al., 1985, p. 237ff.). The law is widely regarded as 'the Charter of technical education'. The *loi Astier*, Charlot and Figeat argue, 'is of historic importance. For the first time, it laid down the principle of free, compulsory mass technical education'

(p. 249). But only in principle: in practice there was a lack of government will to enforce the obligations of local authorities, Chambers of Commerce and Industry, employers and apprentices set out in the law. In short, the opportunity was missed to establish a control system or appropriate penalties in the law. Despite certain formal similarities with the German model of vocational training, the French version failed because the state was afraid to abandon its liberal attitude towards private enterprise, at least in the area of vocational training for the majority of citizens.

Despite increasing rationalisation in the French economy and faster growth in the 1920s, the majority of employers offered passive resistance to the *loi Astier*. The general opinion was that it was quite unnecessary to provide compulsory vocational courses for the broad mass of workers, which only interrupted their work. This lack of interest in training derived from the purely individualistic way in which entrepreneurs looked at the issue of training, which had become traditional among French *patrons* since guild training had been swept away in the Revolution (see section 1.2). In view of this situation, the state was still afraid to make vocational training entirely its own; it was only in the field of vocational training for the elite that a clear decision had been made in favour of the school-based training model.

Although education policy largely stood still in the 1920s, a few important decisions were taken for the further development of vocational training. In July 1925, an apprenticeship tax (*taxe d'apprentissage*) was introduced. This was set at 0.20% of a company's wage and salary bill and was to be used to expand vocational schools and courses and to support financially any project of vocational teaching and preparation. Also in July 1925, a law was passed on the creation of Chambers of Trades (*Chambres de métiers*). This project – like the 1897 legislation in Germany – which had been under discussion by the *Chambre des députés* since 1921, was intended to stabilise craft trades economically (or at least what was left of them in France). As in Germany, the French Chambers were expected to take on some responsibility for organising work-place training. However, despite the relatively rapid implementation of the Chambers project and considerable effort, the influence of the French Chambers of Trades on vocational training in subsequent years was very limited.

The apprenticeship law of 20 March 1928, which finally replaced the outdated provisions of 1851, was a long time in the making, like the *loi Astier*. In 1904 the *député* Henri Michel had introduced a draft bill intended primarily to compel parties to set down the exact obligations of apprenticeship contracts in writing. In 1925, in view of the new legal situation, he put forward an amended draft of his apprenticeship law. Of his demands, the following became law:

(a) apprenticeship contracts to be in writing;

(b) apprentices to be obliged to attend vocational courses;

(c) training masters to be obliged to give complete and methodical training in the relevant occupation;

(d) regional committees to have the right to limit the numbers of apprentices in enterprises and temporarily to withdraw the right of training from enterprises;

(e) apprentices to be obliged to sit an examination at the conclusion of training.

But even this law, with its far-reaching provisions, remained largely a paper exercise. All that happened was that a growing number of employers declined to take on young people as 'apprentices', thereby making themselves subject to the new law. Since employers were under no legal obligation to provide training, however defined, and the tradition of training had been broken for over 100 years in France – unlike Germany, where it still obtained – the mass of young workers were simply refused apprentice status in the self-interest of employers (Charlot et al., 1985, p. 258ff.).

France had been making considerable efforts since the start of the 20th century to breathe new life into a modern form of the traditional model of vocational training, as has been described, so that it is particularly relevant to examine how French training ultimately came to develop along school-based lines. In the view of Jürgen Schriewer, this process began with the establishment of the *écoles manuelles d'apprentissage* in the 1880s and '90s. The first generation of vocational schools were intended by their founders not only to teach occupational skills and knowledge, but they were also expressly thought of as tools to correct and counter the influences affecting socialisation in the world of work. The consequent conflict of aims between political and educational concerns on the one hand, and economic and skill demands on the other, led to ten years of open political rivalry over responsibility and planning between the Ministry of Trade and the Ministry of Education, in which the latter eventually gained the upper hand.

In 1920, technical education (*enseignement technique*) became a semi-autonomous department of state, a short while later it was placed under the Ministry of Education as a separate school department, and it was finally abolished as an administratively separate sub-system, and the schools which it managed were structurally and administratively attached to the general school education system (Schriewer, 1982, p. 260). Schriewer regards this process as a 'breach in the system, through which revised outside expectations of training governed by the "logic" of the general education system were able to gain a foothold' (p. 253). Empirically, it was a process whereby the new vocational schools drew successively closer to the central norms of the French tradition of education.

This tradition is represented principally by the educational ideal of the 'primacy of rhetoric, abstraction and theory' (Grignon) embodied in the *lycées*, focusing in practical terms on intellectual and linguistic development, individual judgment and rational and moral living – which are closely related to the educational principles of German neo-humanism (see e.g. Cousinet, 1954). This perspective offers only one systematic approach to teaching in vocational training: the theoretisation and intellectualisation of patterns of occupational action, and hence also of vocational training itself. This approach quickly reaches its limits, however: only in 'higher', i.e. largely theory-based, occupations can the intended integration of intellectual education and the demands of skills training be achieved, and it must fail in the case of 'lower' occupations based on pragmatic patterns of action. For students with 'limited intellectual capacity', who generally enter these simpler occupations, all it can offer is

therefore at best some extra occupational specialisation and relatively unrevealing or arbitrary 'complementary' school subjects. This is a problem besetting traditional teaching in German part-time *Berufsschulen* to this day.

As a result of the definitive transfer of responsibility for vocational training to the Ministry of Education, it was only natural that such training would become increasingly influenced by the school ethic in France. This development was seen above all in two phenomena: a shift in teaching method towards an increasingly theoretical, general curriculum, and the so-called 'escalator effect'. This can be described typically as a process whereby the level of admission requirements, subject-matter taught and qualifications gained in vocational schools successively rise. It is caused and guided both by the expansion of the education system as a whole, but also by school curricula that are fixated on treating everything theoretically. These tendencies are yet further strengthened by teachers' interest in raising their professional status and by students' and graduates' desire to see their qualifications become more valuable socially and in the labour market.

The first schools to follow this clear pattern were the *Écoles des arts et métiers* founded as early as 1803 by Napoleon I, schools for foremen and master craftsmen which, after going through a number of intermediate stages, were raised in 1940 to the level of higher education colleges of engineering (*Écoles nationales supérieures des arts et métiers* – ENSAM). In around 1900, the *écoles manuelles d'apprentissage*, which had been established under 1880 legislation, also began to move: there had been two variants, one higher than the other (EPCI + ENP), but they soon turned to training master craftsmen, technical supervisory staff and technicians. After several extensions of the length of training, diverse changes of name, and the introduction of their own form of upper secondary leaving examination (*baccalauréat*), they were completely assimilated into the upper secondary education sector as part of the educational reforms of the 5th Republic, and even made inroads into the higher education sector by offering special courses (Schriewer, 1982, p. 256f.).

The end of liberalism

In their comprehensive overview of the 'history of workers' education' in France, Bernard Charlot und Madeleine Figeat describe the period 1931 to 1940 as the 'end of liberalism'. The world economic crisis, social tensions and disputes, and preparations for a possible war, forced the state to intervene increasingly in the economy and in the training sector. The end of this period marked the beginning of what Vincent Troger calls *la scolarisation de l'apprentissage*, i.e. the definitive move to school-based initial vocational training in France and a quantitative and qualitative decline in the status of work-place training.

In view of the continuing problems in the labour market, which were becoming more acute on the eve of the Second World War, France turned once more to the school-based training model. In December 1939, the *Direction de l'enseignement technique* and the Ministry of Labour were instructed by Government decree to establish *Centres de formation professionnelle* (CFP), which were intended initially to be an emergency measure to cope with

the many young people who were unemployed. In June 1940 there were over 40 such centres (Charlot et al., 1985, p. 292ff.), which became a tool of genuine mass training under the Vichy regime. By 1944, the year of the liberation of France, there were 850 establishments with around 50 000 students. De Gaulle regarded the centres as useful resources for the reconstruction that was needed, renamed them *Centres d'apprentissage* (CA) in 1944 and made considerable funding available to support their further expansion. By 1949 the *Centres d'apprentissage* had 100 000 students and received by law the status of public institutions of technical education (Troger, 1993). This brought initial vocational training in France finally into the school arena, completing the move away from the German model, which had always been regarded as a point of comparison (Troger, 1993).

The *Centres d'apprentissage* replaced the first generation of vocational schools, which had been transformed into *Collèges techniques* at almost the same time (1941/1945); from the point of view of their curriculum structure and educational aims, they were in essence a replica of the schools created under the 1880 legislation. It is therefore not surprising that they were caught up in the same 'escalator effect' as their predecessors: during the wide-ranging education reforms of the 5th Republic they moved up to become *Lycées professionnels* (vocational upper secondary schools) and today form part of the secondary-level provision of the system.

By the end of the 4th Republic, the secondary section of the French education system was in practice divided into three – like the present German system – and the types of school described above were largely isolated vertically. The series of reforms carried out one after the other in the 5th Republic (1959, 1963, 1966, 1968, 1971, 1975, 1989; Hörner, 1996) were intended to turn this construct into an integrated system permitting simplified state control of 'streams of students'. The driving force behind this policy was, on the one hand, the demand for continuing education that had risen sharply since the Second World War and was reinforced by demographic expansion, and on the other, the skills requirements of the national economy, which was explicitly aiming at growth and industrialisation, together with a massive shift of the working population from the primary and secondary to the tertiary sector (Schriewer, 1982, p. 261).

Besides creating sustainable planning, decision-making and consultation forums (*planification*), the reforms

(a) extended compulsory education to the age of 16;

(b) established integrated lower secondary education; and

(c) incorporated vocational courses almost seamlessly into upper secondary education and linked them with enhanced work-place apprenticeship training (Hörner, 1996).

It could be said that the promotion and improvement of vocational education was one of the fundamental principles from the *réforme Berthoin* of 1959 to the Educational Orientation Act of 10 July 1989. This law defined education as the 'first national priority' (Art. 1.1) and laid down the national goals of providing all young people with training to at least skilled worker level (CAP) by 2000, and raising 80% of each age cohort to '*baccalauréat* level' (Art. 3,1).

Integration of apprenticeship into the overall system

As part of *planification*, a differentiated system of six levels of training was developed in the 1960s so that the educational status of the working population could be classified effectively for the purposes of economic planning (see Figure p. 123). This planning instrument gives an excellent impression of the hierarchical structure of the French training system. The French education system essentially distinguishes between three vocational training routes: vocational upper secondary education (*second cycle professionnel*) provides training to skilled manual/non-manual worker level, while technological upper secondary education (*second cycle technologique*) is a variant of the general *lycée* that offers both a technological qualification and university preparation. The two routes, *professionnel* and *technologique*, have different histories, different teaching staffs and different curricula. The third route today is apprenticeship (*apprentissage*).

Until 1985 the *cycle professionnel* was in greatest demand. This is a three-year lower secondary course taken immediately after year 7 of education at a *lycée professionnel* and leading to a relatively narrowly defined qualification, the *certificat d'aptitude professionnel* (CAP). The CAP covers some 235 nationally recognised training occupations. When the technological section of lower secondary education expanded, the number of students going directly into vocational training after year 7 fell rapidly. Since 1985, the *cycle technologique*, which requires completion of lower secondary (9 years) and leads to a broader qualification at skilled worker level, the *brevet d'études professionnelles* (BEP), has attracted increasing numbers. Over 20 years the number of students taking a CAP fell from 475 000 (1970) to 63 200 (1992), while the number taking a two-year BEP rose over the same period from 170 300 to 485 100 (Hörner, 1996, p. 95).

This rapid expansion of BEP courses was the precursor to the growing popularity of the *baccalauréat professionnel* (*Bac Pro*) from the mid-1980s. The two-year course leading to the *Bac Pro* builds on skilled training – normally the BEP – and grants access to higher education, but is also intended to offer preparation for direct entry to employment. By 1994, the *Bac Pro* accounted for 13% of successful *baccalauréat* passes, in 43 subjects for which demand varied widely. In 1993, for example, 92% of those taking the *Bac Pro* chose commerce and office automation (Hörner, 1996, p. 96).

Since basic legislation was passed on vocational education and training in 1971 (since amended several times), apprenticeship has once again been one of the popular training routes in France. In 1993/94, there were 218 300 apprentices in France, 74% of whom were working towards a CAP. In 1991, by comparison, about 10% of all 17 year olds had an apprenticeship contract, 57% were in *lycées*, and 32% in vocational schools. However, the failure rate in state examinations for skilled workers among apprentices is very high (1991: 49.1%), which indicates that state and private vocational schools set the examination standards (1991 failure rates: 26.6% and 21.1% respectively). Nonetheless, increasing numbers of students with secondary qualifications are taking up apprenticeships, aiming at middle-level qualifications or even the *Bac Pro*, which is now possible thanks to the equivalency established between school education and training at the work place (Hörner, 1996, p. 97).

Work-place training is backed by teaching at a training centre (*centre de formation d'apprentis* – CFA). Most of these part-time schools are not publicly sponsored – in contrast to Germany. Almost half of sponsors are private commercial associations or groups of industrialists, around a third are Chambers of Trades, Industry or Commerce, and the remainder are other local bodies, continuing training institutions managed jointly by unions and employers, and public educational establishments. The CFAs do not have their own teaching body but use part-time and permanent teachers at vocational *lycées*. Apprentice training centres are funded out of a training tax and regional subsidies.

Apprenticeship is generally confined to traditional craft trade and commercial occupations. For example, 98% of butchers and 92% of bakers are trained via the apprenticeship route in France. In the commercial and service sectors, 84% of apprentices are concentrated in three occupational groups: retailing (31%), hairdressing (29.4%) and catering (23.2%). These occupations are of course the realm of women, whose structural training disadvantage is thus made apparent. Despite much support from the state, equivalency of qualifications, access to continuation courses, etc., apprenticeship in France is still not an integral part of the general education system, or indeed the training system, the links between which mean that the *baccalauréat* is the universal standard (Hörner, 1994, p. 296).

In all its puzzling complexity, the French vocational training system reflects a social hierarchy rooted in specifically school-based training courses, in which apprenticeship occupies the lowest rank. The resultant order is as follows:

- work-place training;
- training of skilled workers at a vocational school following Class 7 of lower secondary education and leading to a CAP qualification;
- vocational training at a vocational school after completion of lower secondary education, leading to a BEP qualification;
- vocational *baccalauréat* (upper secondary leaving certificate, *Bac Pro*) at the end of vocational school or in the alternating (block release) system;
- technical *baccalauréat* (*Bac Tn*) at a technical or polyvalent *lycée*.

Recruitment of skilled workers by French employers is thus based, with mounting force, on negative selection at school. This must necessarily result in the stuff of social conflict.

2.1.3. The German-speaking cultural area – the integration of traditionalism and Taylorism

As described in this report, the ‘dual system’ is the typical form of vocational training in the German-speaking cultural area, so that developments comparable to those in Germany – see Part 1 – can also be demonstrated in Austria and (German) Switzerland. Dual ‘partial systems’ can also still be found in Denmark and the Netherlands. In the 20th century, however, the effective further development of this training system took place largely in Germany, where the economic

collapse of 1900/1902 revealed for the first time the ineffectiveness of traditional ways of organising industry and trade. This led the Association of German Engineers (Verein Deutscher *Ingenieure*, VDI) to take a fundamental look at issues of industrial organisation and to put forward largely American solutions. Among German engineers, the first stage of the debate, from 1902 to 1908, centred on 'American methods', and more particularly on performance incentives: the piece-work system that predominated in Germany and Taylor's new American schemes of bonus payments and differential piece-work rates (Homburg, 1978, p. 174).

Individual German employers had already considered these 'American methods' 30 years earlier. One example was 'Ludwig Loewe & Co., Partnership Limited by Shares for the Manufacture of Sewing Machines' in Berlin, which had set out the principles for the 'scientific systematic method' of building machines in its annual report for 1870. Loewe AG, which became a leading manufacturer of armaments soon after it was founded, and later of machine tools, stated in this report that machines were to be built with 'mathematical precision […] strictly excluding all manual labour', and that manufacturing equipment was to be so constructed 'that it is in reality completely automatic' (Hanf, 1987, p. 159).

Werner Siemens, who complained of shortage of workers in the industrialisation boom and was increasingly disturbed by the 'dilatory handicraft approach' of his machine operatives, bought American milling, drilling and planing machines through the good offices of Ludwig Loewe, and set these up in 1870/71 in the so-called 'American Hall'. The success of these confirmed his opinion 'that our future salvation lies in the use of the American method of working' (Kocka, 1969, p. 126). This method essentially embraced the following goals: 'specialisation of production, detailed internal costing for the individual production stages by the accounts office and hence specification and checking of performance, and standardisation of exchangeable parts by the technical department, making them "fit", that is, establishing tolerances which serve as the basis for accurate working instructions and product acceptance' (Hanf, 1987, p. 161).

The industrial city of Berlin provides an excellent illustration of the fundamental changes brought about by 'scientific management' not only in the organisation of the production process, but also in the vocational training of the work force (Hanf, 1987). Even before the First World War, the leading electrical and engineering manufacturers located there had put in place and improved the essential elements of a new training model: the works school (Loewe), teaching workshops (Siemens) and course-based training (AEG). But let us look first at the general situation of training policy in Germany after the turn of the century.

Training in industry

The attempt by industry to distance itself from manual craft work, in the wake of the eventual political decision in 1897 to amend trade and industry legislation, came into sharper focus when the 'special provisions' of the amendment imposing journeyman examinations came into force in 1901, and those on certification (*Kleiner Befähigungsnachweis*) in 1908. The craft trades, which were now fighting hard for their survival, tried to make use of the monopoly of

examinations granted to the Chambers of Trades by these amendments to gain some influence over industrial training, and to make financial demands on industry on the basis of their privileged position in industrial training (Ebert, 1984, p. 195ff.; Schütte, 1992, p. 17ff.).

The engineering industries of Berlin and southern Germany, which were particularly affected by the demands of the craft trades, went on the counter-offensive in 1908. The Association of German Engineering Works (*Verein Deutscher Maschinenbau-Anstalten*, VDMA) took advantage of the initiative of the Association of German Engineers (VDI), which set up a German Committee for Technical Education (DATSCH), to create its own forum to represent its interests in the design of typical industrial apprenticeship training. DATSCH, which made apprenticeship training one of the main points in its programme in 1909, became the focus for the training concerns of German industry as a whole, a position which it retained for more than 30 years. In its heyday, it had a membership of over 50 organisations (Ebert, 1984, p. 221ff.; Herkner, 2003).

By 1911, with explicit reference to the demands for funding from the craft trades and the drafting of a Prussian Continuing Education Bill, the fourth annual general meeting of DATSCH put forward its own programme for the development of industrial apprenticeships: the first part of an apprenticeship would take place in a department separate from production, with 'appropriate teaching' and a 'training plan'. There was an unmistakable call for the theoretical instruction to be given where possible in companies' own schools. This meant a clear rejection both of traditional craft training and of the compulsory continuation schools that were not yet established (Ebert, 1984, p. 226ff.).

After the end of the World War, the argument between industry and the craft trades about training at first focused principally on the question of examinations. The disagreements that had arisen around 1903 between the sponsors of the predominant type of industrial training centred chiefly on the proposal by industry to hold its own journeyman examinations for its specially trained apprentices. However, behind this lay huge conflicts between Chambers of Commerce and Chambers of Trades over the boundaries of their spheres of influence, which ultimately meant over power and money.

Although the Chambers of Trades were responsible in Prussia under legislation passed in 1870 and 1897 for supervising the training of young people, they did not use this facility mainly in the context of industrial training. Some employers' associations, chiefly the powerful Association of Berlin Engineering Companies (*Verband Berliner Metallindustrieller*), therefore concluded agreements in the early 1920s with local Chambers of Trades on the creation of joint journeyman examinations committees, but such compromise solutions were not the rule. A series of industrial companies conducted their own examinations for their apprentices, and then tried to involve the Chambers from the mid-1920s in order to overcome the lack of official recognition. Gradually, the examinations offered by the associations in agreement with the Chambers of Trades, and those offered purely by the Chambers, gained general acceptance (Ebert, 1984, p. 301ff.). The Government tried to mediate in these sometimes bitter disputes but was unable to reach any clear resolution. In consequence, the

argument over examinations between industry and the craft trades was not settled until the National Socialists came to power.

The link between the craft trades and examinations for industrial apprentices was further weakened from 1926 by the efforts of DATSCH to create a legal framework. After the war, DATSCH had paid increased attention to the development of courses and teaching materials, and published the first curriculum for fitters in 1919 (Ebert, 1984, p. 328ff.). Direct co-operation with industrial training companies such as AEG, Borsig, MAN and Siemens led in 1925 to the establishment of the Vocational Training Committee (*Arbeitsausschuss für Berufsausbildung*, AfB), which in 1926 became a member of the German Industrial and Trade Association (*Deutscher Industrie- und Handelstag*, DIHT) along with the National Association of German Industry (*Reichsverband der Deutschen Industrie* and the Union of German Employers' Associations (*Vereinigung Deutscher Arbeitgeberverbände*) (Muth, 1985, p. 375ff.).

One of the urgent tasks for AfB set by its members was to differentiate between and systematise the bewildering plethora of industrial occupations. For the purposes of employment policy it appeared advisable to distinguish between occupations horizontally and vertically, to improve the collection of employment statistics and to rationalise vocational guidance and training. Through AfB, DATSCH drew up the first 'Breakdown of occupations in engineering, shipbuilding and the chemical industry' in 1926, which set out a series of definitions distinguishing between skilled, semi-skilled and unskilled workers, established job profiles, laid down the subject-matter to be taught in training occupations and standardised occupational designations and lengths of training (Heilandt, 1926). This scheme was further developed in subsequent years, and the work was extended to other branches of the economy; at the same time, procedures were adopted for the general use of the – the introduction by Chambers of Industry and Commerce of a definition of the role of apprentices and standardised training contracts (Benner, 1987; Ebert, 1984, p. 337ff.).

It was not until 1935 that conditions were favourable for the settlement of the dispute over examinations: the rearmament programme had strengthened the role of industry, while the craft trades were busy with their own training and examinations system following the introduction of full certification (*Großer Befähigungsnachweis*) in January 1935. As a result, the industrial associations were gradually able to ensure that the Chambers of Industry and Commerce acquired sole responsibility for examinations for skilled workers and that these achieved parity with the journeyman examinations of the craft trades (Kipp, 1987, p. 229f.; Pätzold, 1980, p. 34ff.). The dispute over parity was officially settled when the Reich and Prussian Ministry of Science and Education issued a decree on 15 June 1938 establishing parity between examinations for skilled and clerical workers, and those for journeyman apprentices. The examinations monopoly of the craft trades was broken; more importantly, however, the industrial training model had gained general acceptance – skilled work had led to a new kind of training, and the skilled worker had become a new 'social type' (Burkart Lutz).

Along with DATSCH, it was largely the German Institute for Technical Training (*Deutsches Institut für technische Arbeitsschulung*, DINTA) which played a significant part in the design

of separate training for skilled workers from the mid-1920s (Seubert, 1977, p. 61ff.; Bunk, 1972, p. 204ff.). DINTA was founded in May 1925 by the Association of German Iron-founders (*Verein Deutscher Eisenhüttenleute*), and was thus originally an institution of heavy industry. The main reasons for its establishment were the complex effects of rationalisation in post-war German industry. Once the purely technical measures were in place, it was swiftly realised that human resources also needed to be involved in the process if the desired goals were to be reached.

DINTA's efforts 'in the struggle for the soul of our workers' were largely directed at:

(a) re-establishing the worker's place as a player in the production process,

(b) removing the confrontational attitude between workers and employers, and thereby

(c) creating a work force that was 'economically peaceful' and had overcome the 'harmful notion of class struggle' (Muth, 1985, p. 356).

In the opinion of those responsible at DINTA, the main means of achieving these goals was to educate apprentices. The expansion of teaching workshops, works schools and company youth care schemes in branches of industry which had previously had no systematic vocational training – mining, building industries, rubber, paper and wood pulp, and textiles – was one of the major achievements of DINTA. Between 1926 and 1928, DINTA established 71 teaching workshops and 18 works schools; by 1930, 300 companies were found to be using the DINTA method. Besides organising special training for apprentices, this included publishing works newspapers for workers, appointing works nurses, and setting up kindergartens, schools of housekeeping and facilities for old people and invalids (Muth, 1985, p. 355ff.).

It was not the range of these activities that caused problems for DINTA but their more or less publicly stated objective: a move towards corporatism in opposition to the trade unions, an emphasis on the '*Führer* principle' in the work of DINTA engineers, and the borrowing of military principles and images in works training, which largely coincided with the ideology of up-and-coming National Socialism and forms the basis of the current definitive view that DINTA was a forerunner of totalitarianism.

After January 1933, DINTA quickly and easily became part of the National Socialist system: by July 1933 it was an independent institute of the German Labour Front (*Deutsche Arbeitsfront*, DAF), which was controlled by the NSDAP, and it did its best subsequently to support DAF's attempt to take over responsibility for all vocational education and training as the 'Department of Vocational Education and Enterprise Management' (Seubert, 1977, p. 96ff.). But the NSDAP failed in its planned take-over of vocational training: in a series of stubborn and sometimes dramatic disputes, employers – represented in and by the Reich Ministry of Economic Affairs and the Chambers of Industry and Commerce, which continued to exist – succeeded in further extending the responsibility for vocational training given them under the Weimar Republic. One example of this is the fate of DATSCH under National Socialism.

In 1935, DATSCH was appointed an advisory body to the Reich Ministry of Economic Affairs on all issues of technical education and training; who would be given exclusive responsibility for initial and continuing vocational education and training was at this time still an open question. It was only resolved in the course of the first 'Four Year Plan', which was the preliminary to the so-called 'defence economy', the effect of which was considerably to strengthen the role of the economy vis-à-vis the Party. 'Duplication' in the field of vocational training was increasingly abolished in favour of the Reich Ministry of Economic Affairs: from 1939, DATSCH, which was transformed into a 'Reich Institute of Vocational Training in Trade and Industry', co-ordinated all 'measures for the improvement of performance' (Seubert, 1977, p. 115).

Two years later, in May 1941, the Department of Vocational Education and Enterprise Management of DAF – the former DINTA – was incorporated into the new Reich Institute, and the joint organ of trade and industry and the German Labour Front thus created was placed under the control of the Reich Ministry of Economic Affairs (Pätzold, 1980, p. 191ff.). The result was the creation of a central body to guide all of vocational training, for which there had been constant calls, but subject to the crucial influence of 'the economy', i.e. employers. Even after 1945, the key strategic goal of employers' training policy was still to secure this monopoly of vocational training, which had been won against stiff opposition (Greinert, 2003, p. 108ff.).

The modern rational model of industrial training

Typical industrial training for apprentices is usually described simply in terms of 'teaching workshops'. However, this encapsulates only one element of the training model that has been taking shape since the mid-1920s alongside traditional craft trade training. A complete description needs to take three aspects into account: the institutional (teaching workshops and works schools), the methodological (psychological selection procedures, standardised courses and teaching materials), and the systematic ('schemes' such as job profiles, training plans and examination requirements). Of these structural elements, teaching workshops can look back on the longest tradition. These new training establishments, which began in France after the Revolution as state institutions (*Écoles des art et métiers*), were successfully tried out in Germany first as *Fachschulen*, and then in larger numbers by the state railways during the 1870s (Scheven, 1894; Schwarze, 1918).

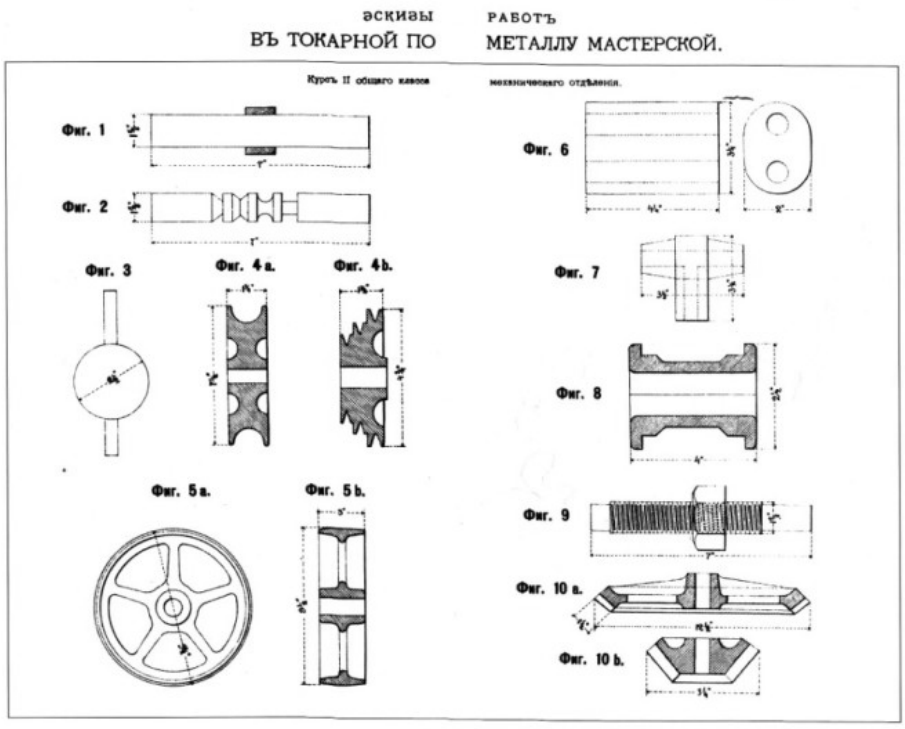
Industry accepted teaching workshops as the 'industrial training institution of the future' (Bücher, 1877, p. 63) relatively late. In 1890, the major electrical company Elektro-Großbetrieb Schuckert & Co. opened the first in Nuremberg, followed by the large engineering company MAN in Augsburg in 1892. Then came MAN in Nuremberg in 1895, Borsig in 1898 and Siemens & Schuckert in 1903 in Berlin, Hartmann & Braun in Frankfurt/Main in 1905, Siemens & Halske in Berlin in 1908 and Bosch in Stuttgart and AEG and Ludwig Loewe in Berlin in 1913 (Behr, 1981, p. 41). This wave of openings coincided more or less with the last phase of the economy before the First World War (1895-1913). The pioneering engineering and electrical companies had already become major concerns and had

entered a period of rapid growth, fuelled by rising demand for capital goods. The new scale called for new methods of production, the models for which had been developed in the United States, as indicated at the beginning of this chapter.

This rationalisation was aimed ultimately at cutting out the subjective will of the worker and bypassing the subjective assessment of the outcomes of work by master craftsmen. Individual manual work was, in the words of the head of AEG's equipment factory in 1912, to be replaced through a process of universal competition by the principle of anonymous mass production, the success of which rested on a rapid flow of materials, efficient use of materials and constant precision (Hanf, 1987, p. 113; Kipp, 1987). Those organising and controlling this process were no longer master craftsmen but engineers.

The drive by industry to create its own vocational training thus resulted not only from changed demands for skills, which traditional craft trade training could no longer supply, but also, and possibly more critically, from the fact that a large proportion of 'craft practitioners' simply withdrew from the new restrictive working conditions or, as at Siemens in Berlin, rebelled against them (Kocka, 1969). The intention was therefore to escape dependency on craft mechanics and to replace them – to borrow the unfortunate term once used by Carl Siemens – by 'menials'.

Figure 21: Working drawings for a 'turning' course (Fig. 1-10b)



Source: Ploghaus, 2003, p. 283.

Industry attempted this at first through its own apprentice training centred on drill, discipline and precision, before DINTA came out with its standardised methods in the 1920s. While there were 11 teaching workshops in Germany in 1912, there were 39 by 1919 in the private

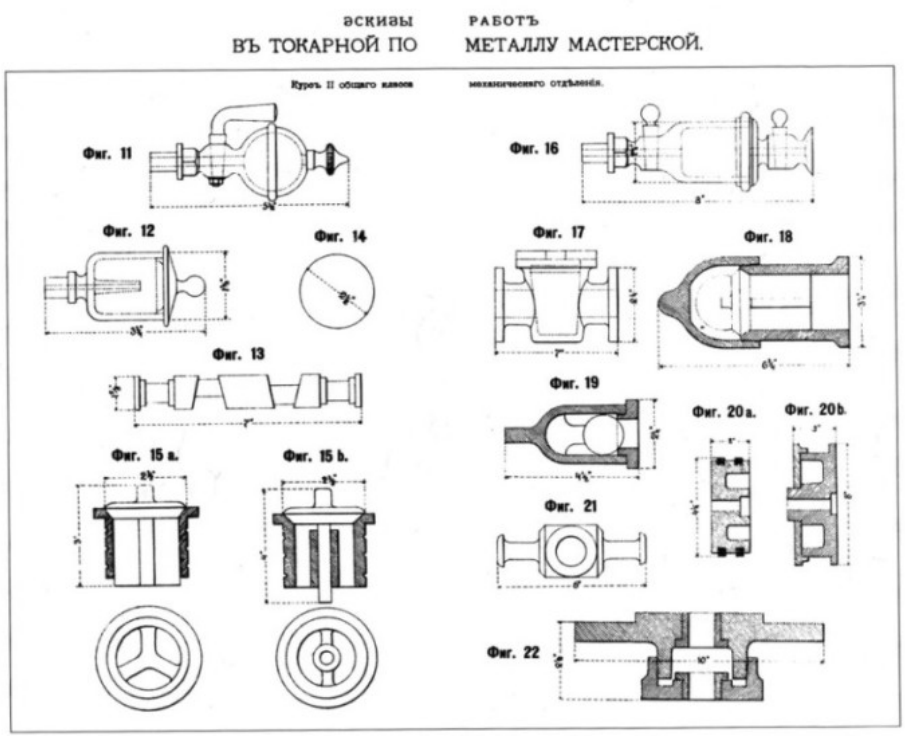
economy, according to a DATSCH survey. In 1926, 175 were recorded, 67 of which were in private industry – mostly engineering – and 108 belonged to the state railways. Towards the end of the 1920s, thanks to massive campaigns by DINTA, there were probably more, but the world economic crisis reduced the number sharply, so that were again around 170 in 1933 (Muth, 1985, p. 336f.).

When the National Socialists seized power, there was a rapid expansion in teaching workshops: the 'symbol and image of National Socialist vocational education' increased from 170 in 1933 to over 1550 in 1937 and 3304 in 1940 (Eichberg, 1965, p. 47), a number which was not sustained in the Federal Republic after the war. The last comprehensive count in 1974 produced a figure of 1720 training workshops, of which engineering accounted for the largest number, 1151.

A key feature of industrial teaching workshops was doubtless the use of course-based training. In vocational training, this means that complete working procedures are broken down into individual operations (e.g. filing, measuring, turning, hardening) and arranged in learning sequences with increasing levels of difficulty and using special practice pieces, which trainees have to work through within prescribed periods of time (Wiemann, 1989; Greinert, 1997b, p. 111ff.). The pioneer of such systematic practical learning was the Russian Viktor Della-Vos, who presented an 'engineering course' for the first time in 1870 at the Manufacturing Exhibition in St. Petersburg (Ploghaus, 2003). After the World Exhibition of 1873 in Vienna, the course idea spread extraordinarily rapidly throughout Europe and even to the United States. German industry took its time, however, to adopt this method: it was not until 1912 that G. Lippart, a manager for MAN in Nuremberg, outlined training courses for nine industrial occupations (Ebert, 1984, p. 329), although he did not succeed in persuading the Association of German Engineering Works (VDMA) – an active supporter of DATSCH – to take the idea any further. The Allgemeine Elektricitäts-Gesellschaft (AEG) in Berlin thus became the pacemaker of course-based training in Germany. From 1913, the 200 regulations and drawings for the first year of training in the AEG Works School in Brunnenstrasse were given a standard layout. The head of AEG apprentice training, A. Heilandt, spread this training design further: in 1918 he took over the chair of the Apprentice Training Committee of DATSCH, and after slight modifications, the AEG course for fitters became in 1919 the first official DATSCH course and was very soon widely taken up by German industry (Hanf, 1987, p. 175f.).

In the 1920s, DATSCH then produced courses for model-joiners, moulders, smiths, mechanics, tool-makers and turners, and course training for skilled workers expanded to other fields of occupation from engineering. From the 1930s, joint basic courses were developed for related occupations, and this measure led after the war to the establishment of a system of stages (Pätzold, 1991, 43ff.). Besides DATSCH, it was DINTA in particular that contributed to the development and spread of course-based training, promoting from 1935 its famous and infamous basic course entitled 'Education in Iron', probably the most striking mixture of Nazi ideology and corporatist thinking (Seubert, 1993; Wolsing, 1977, p. 22ff.). The working drawings shown in Figures 21 and 22, which were used in training courses at the Imperial Moscow Technical School, once again demonstrate the Russian origins.

Figure 22: Working drawings for a 'turning' course (Fig. 11-22)



Source: Ploghaus, 2003, p. 284.

The courses, particularly for engineering occupations, form one of the few consistently documented traditions of practical training. In institutional terms, they extend from DATSCH and DINTA via the Reich Institute for Vocational Training in Trade and Industry and the Reich Ministry of Aviation to the Centre for Work-Place Vocational Training (*Arbeitsstelle für Betriebliche Berufsausbildung*, ABB) and the Federal Institute for Vocational Training (*Bundesinstitut für Berufsbildung*, BiBB) (Greinert, 1997b, p. 113f.). When training assistance for developing countries was introduced in the 1960s, this means of training was then spread right throughout the world – a truly universal success for German vocational training practice.

On the other hand, there was far less success over the general implementation of works schools –private vocational schools (*Berufsschulen*) established and maintained by mostly private companies (Fenger, 1968). Both DATSCH and DINTA supported the introduction of works schools, with DATSCH seeking to create a veritable works school movement through its journal *Technische Erziehung* (Tollkühn, 1927). Interest in these schools on the part of industry was divided: on the one hand, there was a desire to keep as much control as possible of apprenticeship training as a whole, but on the other, there were objections to the high costs involved. The world economic crisis therefore largely finished off the works school movement, and in its wide-ranging 1932 discussion paper entitled 'Economy and School', the German Industrial and Trade Association (DIHT) in effect accepted public *Berufsschulen*, which were outside the control of the employer, as the second place of learning (Schule und Wirtschaft 1932). Over the period 1929 to 1938, the number of works schools fell in consequence from 126 to 38, and the works school movement finally collapsed completely when employers were freed, from 1 April 1942, from the obligation to pay fees to

Berufsschulen, which had until then been the norm (Kipp, 1987). In the Federal Republic after the war, the number of works vocational schools stagnated at around a dozen.

Attention has already been called to the work done by DATSCH from 1926 to create a schematic list of occupations for AfB. The paper which A. Heilandt published in this connection in the journal *Technische Erziehung* (see p. 106) contained a list of 53 training occupations in engineering, shipbuilding and the chemical industry, as well as examples of designations and definitions of the subject-matter to be learnt by semi-skilled and unskilled workers (Pätzold, 1980, p. 134ff.). This schematic arrangement, which DATSCH developed further in subsequent years, did not achieve its final form, however, until the mid-1930s. When the new model of the standard training contract was published in 1935, the job profile became an integral part (Pätzold, 1980, p. 107ff.), and the adoption of separate skilled worker and journeyman examinations required the development of new examination requirements. In 1936, DATSCH approved the first guidelines for its scheme, and in the same year it began developing vocational training plans so that the skills and knowledge mentioned only in the form of headings in the job profiles could be fleshed out in practical terms in work-place training. The scheme was finally complemented by the development of occupational aptitude requirements, for which DATSCH set up a separate committee in 1937. As the work progressed, a particular method or procedure was developed to differentiate, systematise and recognise skilled occupations (Pätzold, 1980, p. 175f.; Benner, 1977 und 1987).

After 1945, the economic sections of the Allied authorities immediately set out to ensure 'the necessary standardisation of vocational training for future industrial workers'. They were assisted in the task by the Chambers of Industry and Commerce, which agreed in sectoral committees to continue using the occupational scheme and only to accept training contracts in recognised training and semi-skilled occupations (Kieslinger, 1961). On 1 July 1947, the Chambers set up a Centre for Industrial Vocational Training in Dortmund, and shortly afterwards a similar centre for commercial training in Munich, both of which were to carry on the tasks of DATSCH. In 1951, the two centres were combined into the 'DIHT Centre for Vocational Training', based in Bonn. Finally, in 1953, the sponsorship of this institution was broadened with the addition of the Federal Association of German Industry (*Bundesverband der Deutschen Industrie*) and the Federal Union of German Employers' Associations, and its name was changed *to the Centre for Work-Place Vocational Training (Arbeitsstelle für Betriebliche Berufsausbildung*, ABB). In its organisation, role and methods of working, ABB was very similar to DATSCH, and the return to a private-law constitution leant strength to the traditional claim by employers that vocational training was a matter for 'the economy' (Krause, 1961).

In the light of this development, the craft trades saw themselves obliged also to rationalise their training since, despite the numerous regulations contained in the many amendments to industrial legislation, by the end of the Weimar Republic there was still no legally binding definition of trades and no control over the content of craft training. After the failure of the attempt to introduce a 'Reich Craft Trades Code' in the 1920s (Muth, 1985, p. 280ff.), in 1934 the National Socialists set about giving the craft trades a new centralised legal structure. When full certification (*Großer Befähigungsnachweis*) was introduced in 1935, vocational training

in the craft trades was further expanded and regulated consistently throughout the country (Wolsing, 1977, p. 397ff.; Pätzold, 1980, p. 253ff.). A start was made on developing specialist rules for the master craftsman examinations, and ground rules were drawn up in 1937 for apprenticeship training and journeyman examinations (Pätzold, 1980, p. 287ff.).

The craft trades had thus largely adopted the principles by which industrial training was arranged, but this rapprochement left the traditional core of craft trade training generally unaffected. The craft trades still kept to their backward-looking training objectives and antiquated training methods, and the rational, scientific approach typical of the industrial training model remains foreign to craft trade training to this day. Since the 1930s at the latest, the 'skilled worker' has been the guiding image of German vocational training; since that time the 'scheme' developed by industry has been the rational heart of the dual system, the effectiveness, prestige and adaptability of which are no longer based on the craft trade learning model but on the new industrial model. Its traditional occupational basis and self-regulation have been retained, however, justifying the statement that industrial training for apprentices in Germany combines traditional craft trade training with the principles of 'scientific management'.

The second place of learning: Berufsschule

Let us in conclusion look at the development of the second place of learning in the dual system, and the process by which it became established in law. Continuation schools, known from about 1920 as Berufsschulen, developed only slowly and erratically into recognised places of learning, unlike work-place training (Kümmel, 1981). In the Weimar period, despite all the publicity given to their programme, they became generally irrelevant as educational tools for the regulation of the labour market and the maintenance of the working morale of unemployed young people, especially during the so-called stabilisation crisis of 1923-1926 and the world economic crisis of 1930-1933. There was agreement across all interest groups that the 'new *Berufsschule*' needed primarily to be devoted to promoting suitability for employment, but the rising numbers of unemployed young people still subject to compulsory attendance at *Berufsschule* forced the authorities to use these schools chiefly as a social safety net. This socio-political instrumentalisation threatened to destroy the educational purpose of the schools, the notion of the occupational principle, and thus also their material basis (Schütte, 1992).

It was only after the end of the Weimar Republic, when the education departments of the different *Länder* were subsumed into a 'Reich Ministry of Science and Education' in 1934 that the foundation was laid for the unification of the fragmented public *Berufsschule* system – albeit also for its ideological control by the National Socialists (Seubert, 1977). In 1937, the various names by which vocational schools were known were standardised, in 1938 compulsory attendance became the same nationally, and in 1940 the length of *Berufsschule* courses was standardised by decree. From 1937 central government also set about aligning work-place training and *Berufsschule* teaching more closely by creating joint standardised syllabuses for use throughout the Reich; in the same year, the important issue of who should sponsor and fund *Berufsschulen* was resolved nationally in law (Kipp, 1987).

By the late 1930s, therefore, the shape of the classic compulsory *Berufsschule* was fixed in law, thanks to the centralising policies of the National Socialists: three years' compulsory attendance, eight hours of teaching a week, sponsoring bodies (cities and rural districts) responsible for enrolment, standardised syllabuses, close alignment between *Berufsschule* and work-place training, *Berufsschule* advisory boards, and permanent civil servant status for *Berufsschule* teachers. The National Socialist education authorities did not succeed, however, in turning such schools into reality, partly from shortage of time and money, and partly out of lack of interest. It was not until after the war, in the Federal Republic, that a broadly based public *Berufsschule* system could be established, which largely followed the legal structure laid down in the 1930s (Grüner, 1983), but now with a federalist flavour.

Doubts were expressed early on over the inclusion in the amendments to industrial legislation of 1897 and 1908 of the right to vocational training, and it was not until 1919, when the trade unions were recognised as having the right to negotiate wages, that political attempts began to draw up special legislation to provide comprehensive regulation of apprenticeships, and to give the unions the right to play a part in implementing vocational training (Pätzold, 1982). It was another ten years, however, before the central government brought such a bill before the Reichstag, although it never came to a final reading or a vote because of the upheavals caused by the world economic crisis. Even the National Socialists could not get a whole series of bills passed into law, largely because of the fierce struggle for influence over vocational training between the German Labour Front (DAF) and the Reich Ministry of Economic Affairs.

After the war, these efforts to produce special standardised legislation on apprenticeships were continued, although the craft trades did not succeed in obtaining comprehensive regulations covering their concerns until 1953, in the form of the Craft Trades Code (*Handwerksordnung*, HWO). The discussion was reopened in 1959 as a result of a trade union initiative, but it was only in the late 1960s that the two main parties, SPD and CDU/CSU, agreed on a joint bill, which then passed into law on 14 August 1969 as the Vocational Training Act (*Berufsbildungsgesetz*, BBiG) (Nolte et al., 1979). This Act was in fact the 'keystone' that completed the 'dual system' of vocational training in Germany.

The structural elements of the 'dual system'

While the training models and approaches that can be identified during the first phase of the Industrial Revolution may be described as very provisional answers to the final decline of the class-based model of socialisation, during the Second Industrial Revolution they proved to be remarkably stable, i.e. to be designed to last. The reaction to the impact of the new American production methods differed widely, however. In the country of origin of Taylorism, vocational education and training split in two under pressure from political and ideological thinking and influences, and responsibility for the Taylorian pattern – vocational *training* – was ultimately left to the market and private enterprise. While there was little change to the arrangements established in the 19th century in England until the 1960s, school-based vocational training had forged ahead in France by that date and was scarcely affected by the new forms of production.

It was only in Germany that there was a truly productive debate about the principles of 'scientific management' with a view to the possible impact on the vocational training system. And here, industry proved to be the spearhead of the process of economic modernisation, from which decisive action flowed. In retrospect it can be said that this did not take the form of a radical break with tradition, but rather that the new elements of industrial apprentice training contributed by scientific management gradually became incorporated into the reinvigorated pattern of traditional craft trade training. The end result was not a fundamentally new training model but nonetheless a new kind of training, for skilled work, and a new social type, the skilled worker.

A closer look reveals that two traditional fundamental principles of the seemingly antiquated training model were re-established by the middle-class policy of the Empire of the Kaisers, and were never questioned by industry: the occupational basis of training, and self-regulation by the bodies representing the interests of the sponsors – the employers. The promotion by industry of the 'social generalisation of occupation as the wisest means of establishing and reproducing training structures was the historical prerequisite for the distinct development in Germany of a self-referenced vocational training system that was (relatively) independent of the school system and of the individual employer' (Georg, 1998, p. 181). From the point of view of modern systems theory, the notion of 'self-referencing' means 'that occupation provides the typical individual perspective on social and economic issues that is systemically constantly reproduced, and that it is no longer merely a subordinate part of other systemic contexts' (Harney et al., 1994, p. 355). To put it more plainly, by means of the category 'occupation', a training model acquires the capacity to 'translate' social and economic issues into a logic proper to the system.

The chapter on France shows clearly the mechanisms and typical structural and hierarchical patterns of procedure within school systems to which organised vocational training is necessarily exposed: it is governed by a quite different 'logic', now generally known as the 'meritocratic principle'. The lack of its own logic and self-referencing is more marked in market-oriented and liberal training models than in the school-based model. The statement that 'the purposive context of training measures [results] increasingly from the company-specific reproduction of labour resources' (Georg, 1998, p. 182) sounds relatively harmless, but it glosses over the shocking extreme of child labour, a sin for which this particular training system has to answer historically.

The impact of 'occupationality' as the principle behind the organisation of social labour is evident above all from the results of a series of international comparative research studies using the theory of *effet sociétal* (societal effect). This industrial sociology approach is particularly concerned with the 'mutual effect of the structure and operational logic of the national education and training system on the one hand, and the forms of division of labour and work organisation in enterprises, on the other' (Lutz, 1991, p. 103). The training system, which is determined by national tradition and cultural practice, is viewed in this context as the macro level, and the enterprise and the people in it as the micro level (Deißinger, 1998, p. 150ff.).

By advancing this thesis of a complex and dynamic interdependency between these two levels – the training system and the labour policy of employers – the theory of *effet sociétal* seeks to counter over-simplified explanations which posit the one-sided dependency of labour force structure, work organisation and skills demands on the state of production technology (Lutz, 1976, p. 90f.). In his studies carried out in the 1970s, Burkart was already able to show that French enterprises demonstrated a significantly higher degree of bureaucratisation and hierarchy than German enterprises comparable in size and performance. The number of management posts and levels of control in French industry was far higher in French than in German industry, and the dividing line between management and operatives was drawn far more sharply (Lutz, 1976).

The comparative studies of industrial sociology in France and Germany carried out by Marc Maurice and associates deepen this insight by revealing a specifically social logic among those involved in enterprises:

(a) the studies find striking differences in forms of occupational socialisation and training;

(b) they identify a significantly differing organisation of work and a starkly divergent structure of power and control functions in French and German enterprises;

(c) they find widely differing ways of resolving and settling conflicts (Maurice et al., 1980, 1982).

From the results of these studies it can be concluded with some certainty that national education and training systems may have greater importance in shaping the way which an enterprise is organised and uses its staff than so-called technological and organisational forces. Enterprises evidently base their production methods on the skills structure produced by the education and training system; the relationship of causality posited by earlier theories is thus seen in mirror image, or has at least lost some of its categorical quality.

Besides this fundamental insight, the particular impact of 'occupationality' on the culture of work in a country is revealed by the studies based on the theory of *effet sociétal*. The principle of skilled work, for example, forms the basis for a specific segmentation of the labour market characterised by 'specialist sectoral labour markets'. The trading relationships in these markets are governed by a system of generally accepted certificates based on a tradition of professional standards (Georg and Sattel, 1995, p. 127ff.).

The potential contractual partners in the labour market therefore know more or less what they are about: the employer can work out what technical skills and social behaviours can be expected from a potential staff member from possession of a skilled worker's certificate, and the skilled worker seeking employment knows roughly what income, working conditions, freedom of movement, chances of participation and career opportunities are promised by that certificate (see also Beck et al., 1980, p. 132ff.). This relatively stable labour market contrasts, for example, with a situation in France that Maurice and associates describe as the 'Balkanisation of the industrial labour market' (Maurice et al., 1979, p. 306). Such instability is explained partly by the more general use of relatively unskilled labour at operative level by

employers, and partly by their dependence on the selection and stratification inherent in the state education system, the logic and dynamics of which follow laws quite different from those of commercial economic rationalism.

Unlike semi-skilled workers, who are trained rapidly, skilled workers are employed flexibly and given their own room to make decisions and solve problems, i.e. they are granted a relatively high degree of occupational autonomy. Specialist skills and work experience make skilled workers largely independent of narrow working instructions and direct supervision. The assumed ability of skilled workers also gives employers greater freedom in the use of labour and relieves them of the need to organise wide-ranging and costly retraining.

'Skilled workers', according to Kern and Sabel in their critical discussion of the German production model, 'develop [...] the ability to carry out a whole series of tasks by applying their fund of knowledge to changing demands and thus constantly restructuring it – a targeted reorganisation of knowledge which follows no scheme but leaves room for judgment and decision-making by the worker, i.e. for the development of his or her own style of working' (Kern et al., 1994, p. 614). The learning conditions for acquiring this ability, which culminates in mastery, are to some extent embodied in the dual system:

(a) basic knowledge and practical experience of the theory and practice of work are linked continually from early on, and

(b) the learning process is embedded in the community of the competent – i.e. of the 'occupation'; mastery can only be acquired with the help of those who are already masters, as Kern und Sabel put it.

The standardisation of vocational training also gives individual employees relative independence from the individual place of employment, a situation which fosters the mobility of the labour force and exchange between employers, while reducing the grip on the person and input of the individual employee.

In summary it can be stated that both the recruitment and employment policy of employers, and the labour market and social policy of trade unions and the state, are marked overall in Germany by the specific principle of 'occupationality' (Georg, 1992, p. 46ff.). According to the vocational educationist Wolfgang Lempert, the basing of work around defined occupations has a political impact – it affects the structure of society for a variety of related reasons:

- as a special form of the social division of labour;
- as a medium for the exercise of authority and control by the employer; and
- as a particular way of dealing with social problems (Lempert, 1981, p. 522ff.).

It should also be pointed out that occupation has a direct impact on the person, the way of life and the personal development of the worker (Beck et al., 1980, p. 199ff.). A large number of empirical findings show that workers identify to a large extent with their occupation and realise that others identify them also by this criterion. This means, at least in the European cultural area, that occupation is generally the primary source of self-awareness, the guiding

framework of the image which working adults have of themselves and through which they present themselves to their surroundings, their fellow human beings.

For historical and structural reasons, occupation is a central vector of social relations in many cultures, i.e. its 'role-bearing character' is critically important for the establishment and regulation of relations between the members of a society. The development of individuals' self-awareness is therefore closely connected with the adoption of specific occupational roles. From this finding it could be concluded that a training system based on occupationality must have an appreciable homogenising and stabilising effect on the socio-economic system.

This is confirmed by the statements of outsiders, who have the benefit of observing from a distance. The British commentator C. Lane, for example, sees advantages in such 'social effects' for employees' career progression, relatively high job security and especially the presence of an 'occupational ethos', as well as pure economic benefits (Lane, 1993). The relative nature of these advantages obviously refers to comparisons with conditions in other countries (see also Müller et al., 1998).

The performance capacity of the German vocational training system still rests on the occupational principle, which is distinct from those underlying both the education system and business. The 'occupational principle', like the 'educational principle', has an almost universal quality, at least in German intellectual and cultural history, i.e., while individual occupations may undergo constant change, occupationality has so far proved to be a constant (Manz, 1998; Hesse, 1972). Nietzsche's remark in *Human, all too Human* (Vol. 1, Point 575) therefore still applies: 'An occupation is the backbone of life.'

At a time when nations are engaged in the process of uniting, however, it would appear sensible to reconsider critically the close links between the concept of occupation and the specific conceptual and institutional history of work and education in Germany. One reason for doing so is the proposal to introduce the European Credit Transfer System for Vocational Education and Training (ECVET) throughout the territory of the European Union, the conceptual basis of which largely ignores the occupational principle. The extent to which the German system will be able to accommodate, or may indeed reject, this transnational vocational education and training policy is not an easy question to answer.

List of abbreviations

ABB	Arbeitsstelle für Betriebliche Berufsausbildung
AEG	Allgemeine Elektricitäts-Gesellschaft
AfB	Arbeitsausschuss für Berufsausbildung
AFL	American Federation of Labor
Bac Pro	Baccalauréat professionnel
Bac Tn	Baccalauréat technique
BEP	Brevet d'études professionnelles
BiBB	Bundesinstitut für Berufsbildung
CA	Centres d'apprentissage
CAP	Certificat d'aptitude professionnel
CFA	Centre de formation d'apprentis
CFP	Centre de formation professionnelle
DAF	Deutsche Arbeitsfront
DATSCH	Deutscher Ausschuss für Technisches Schulwesen
DIHT	Deutscher Industrie- und Handelstag
DINTA	Deutsches Institut für technische Arbeitsschulung
ENP	École nationale professionelle
EPCI	École pratique de commerce et d'industrie
MIT	Massachusetts Institute of Technology
NAM	National Association of Manufacturers
NEA	National Education Association
NSDAP	Nationalsozialistische Deutsche Arbeiterpartei
NSPIE	National Society for the Promotion of Industrial Education
PMHG	Preußisches Ministerium für Handel und Gewerbe
VDI	Verein Deutscher Ingenieure
VDMA	Verein Deutscher Maschinenbau-Anstalten
VDMA	Verein Deutscher Maschinenbau-Anstalten

Bibliography

Abel, H. *Das Berufsproblem im gewerblichen Ausbildungs- und Schulwesen Deutschlands* (BRD). Braunschweig: Westermann, 1963.

Alt, R. (ed.) *Kinderausbeutung und Fabrikschulen in der Frühzeit des industriellen Kapitalismus*. Berlin: Volk und Wissen, 1958.

Anweiler, O. *Geschichte der Schule und Pädagogik in Russland*. Berlin, 1964.

Anweiler, O. et al. *Bildungssysteme in Europa. Entwicklung und Struktur des Bildungswesens in zehn Ländern: Deutschland, England, Frankreich, Italien, Niederlande, Polen, Russland, Schweden, Spanien, Türkei*, 4th ed. Weinheim: Beltz, 1996.

Artz, F.B. *The development of technical education in France 1500-1850*. Cambridge MA: MIT Press and SHOT, 1966.

Baethge, M. Abschied vom Industrialismus: Konturen einer neuen gesellschaftlichen Ordnung der Arbeit. In: Baethge, M.; Wilkens, I. (eds.) *Die große Hoffnung für das 21. Jahrhundert?* Opladen: Leske und Budrich, 2001, pp. 23-44.

Beck, U.; Brater, M.; Daheim, H. *Soziologie der Arbeit und der Berufe. Grundlagen, Problemfelder, Forschungsergebnisse*. Reinbek: Rowohlt, 1980.

Behr, M.V. *Die Entstehung der industriellen Lehrwerkstatt. Materialien und Analysen zur beruflichen Bildung im 19. Jahrhundert*. Frankfurt a.M.: Campus, 1981.

Bildung und Erziehung, 1997, Vol. 50.

Lisop, I; Greinert, W.-D.; Stratmann, K. (eds.) *Gründerjahre der Berufsschule*. Berlin: BIBB, 1990.

Benner, H. *Der Ausbildungsberuf als berufspädagogisches und bildungsökonomisches Problem*. Hanover: Schroedel, 1977.

Benner, H. Arbeiten zur Ordnung der Berufsbildung vom DATSCH bis zum BiBB. In: Greinert, W.-D. et al. (eds.) *Berufsausbildung und Industrie*. Berlin: BIBB, 1987, pp. 269-293.

Bercusson, B; Mückenberger, U.; Supiot, A. *Application du droit du travail et diversité culturelle en Europe*. Paris: Ministère du Travail, 1992.

Biucchi, B.M. Die industrielle Revolution in der Schweiz 1700-1850. In: Cipolla, C.M.; Borchardt, K. (eds.) *Europäische Wirtschaftsgeschichte. Bd. 4: Die Entstehung der industriellen Gesellschaften.* Stuttgart: Fischer, 1977, pp. 43-61.

Blankertz, H. *Geschichte der Pädagogik. Von der Aufklärung bis zur Gegenwart*. Wetzlar: Büchse der Pandora, 1982.

Bönig, J. Technik und Rationalisierung in Deutschland zur Zeit der Weimarer Republik. In: Troitzsch, U.; Wohlauf, G. (eds.) *Technikgeschichte. Historische Beiträge und neuere Ansätze*. Frankfurt a.M.: Suhrkamp, 1980, pp. 390-419.

Böttger, H. *Das Programm der Handwerker*. Braunschweig: Limbach, 1893.

Bowman, M.J. From guilds to infant training industries. In: Anderson, C.; Bowman, M.J. (eds.) *Education and economic development.* Chicago: Adline, 1966, pp. 98-129.

Bruchhäuser, H.-P.; Lipsmeier, A. (eds.) *Quellen und Dokumente zur schulischen Berufsbildung 1869-1918*. Cologne: Böhlau, 1985.

Brunner, O. Das 'ganze Haus' und die alteuropäische 'Ökonomik'. In: Brunner, O. *Neue Wege der Verfassungs- und Sozialgeschichte*, 2nd ed. Göttingen: Vandenhoeck & Ruprecht, 1968, pp. 103-127.

Bücher, K. *Die gewerbliche Bildungsfrage und der industrielle Rückgang.* Eisenach: Bacmeister, 1877.

Bücher, K. *Lehrlingsfrage und gewerbliche Bildung in Frankreich.* Eisenach: Bacmeister, 1878.

Bullock, A.; Shock, M. Englands liberale Tradition. In: Gall, L. (eds.) *Liberalismus*, 3rd ed. Königstein/Ts.: Athenäum, 1985, pp. 254-282.

Bunk, G.P. *Erziehung und Industriearbeit. Modelle betrieblichen Lernens und Arbeitens Erwachsener.* Weinheim: Beltz, 1972.

Butts, R.F. *Public education in the United States. From revolution to reform.* New York: McGraw-Hill, 1978.

Cedefop. *A history of vocational education and training in Europe: from divergence to convergence. A Cedefop exhibition in association with DASA*. Thessaloniki: Cedefop, n.d. Available from the Internet: http://www2.trainingvillage.gr/etv/gallery/history_of_vet/ [26.1.05].

Cedefop. *Towards a history of vocational education and training (VET) in Europe in a comparative perspective*. Proceedings of the first international conference October 2002, Florence. Vols. I and II. Luxembourg: EUR-OP, 2004 (Cedefop Panorama series, 101 und 103).

Charlot, B.; Figeat, M. *Histoire de la formation des ouvriers 1789-1984*. Paris: Minerve, 1985.

Coelsch, H. *Deutsche Lehrlingspolitik im Handwerk*. Berlin: J. Guttentag Verlagsbuchhandlung, 1910.

Commager, A.S. *The American Mind.* New York: Yale, 1950.

Council of the EU. Council Directive 92/51/EEC of 18 June 1992 on a second general system for the recognition of professional qualifications supplementing Directive 89/48/EEC. In: *Official Journal of the European Communities L*, 24. July 1992, Vol. 35, No. 209, pp. 25-45.

Council of the EU/European Commission. *Treaty on European Union of 7 February 1992.* Luxembourg: EUR-OP, 1992.

Cousinet, R. *La culture intellectuelle*. Paris: Presses d'Île de France, 1954.

Dahrendorf, R. *Gesellschaft und Demokratie in Deutschland*. Munich: Piper, 1965.

Deal, T.E.; Kennedy, A. *Corporate cultures. The rites and rituals of corporate life.* New York: Addison-Wesley, 1982.

Deißinger, Th. *Die englische Berufserziehung im Zeitalter der Industriellen Revolution. Ein Beitrag zur Vergleichenden Erziehungswissenschaft.* Würzburg: Unipress, 1992 (Reihe Pädagogik, 7).

Deißinger, Th. Das Konzept der 'Qualifizierungsstile' als kategoriale Basis ideal-typischer Ordnungsschemata zur Charakterisierung und Unterscheidung von 'Berufsbildungssystemen'. *Zeitschrift für Berufs- und Wirtschaftspädagogik*, 1995, Vol. 91, pp. 367-387.

Deißinger, Th. *Beruflichkeit als 'organisierendes Prinzip' der deutschen Berufsausbildung.* Markt Schwaben: Eusl, 1998.

Deißinger, Th. Apprenticeship systems in England and Germany: decline and survival. In: Cedefop (ed.) *Towards a history of vocational education and training (VET) in Europe in a comparative perspective. Volume I. The rise of national VET systems in a comparative perspective.* Luxembourg: EUR-OP, 2004, pp. 28-45.

Deißinger, Th.; Greuling, O. Die englische Berufsbildungspolitik der 80er Jahre im Zeichen der Krise eines 'Ausbildungssystems': Historische Hintergründe und aktuelle Problemlagen. *Zeitschrift für Berufs- und Wirtschaftspädagogik*, 90. Jahrgang, 1994.

Deutschmann, C. Lässt sich der Berufsbegriff interkulturell übertragen? In: Striegnitz, M.; Pluskwa, M. (eds.) *Berufsausbildung und berufliche Weiterbildung in Japan und in der Bundesrepublik Deutschland*. Rehburg: Loccum Evangelische Akademie, 1989, pp. 417-424.

Dewey, J. Some dangers in the present movement for industrial education. In: Dewey, J. *The Middle Works, 1899-1924. Volume 7: 1912-1914.* Carbondale: Southern Illinois UP, 1985, p. 100ff.

Dumreicher, A.F.v. *Über den französischen National-Wohlstand als Werk der Erziehung. Studien über Geschichte und Organisation des künstlerischen und technischen Bildungswesens in Frankreich*. Wien: Hölder, 1879.

Dumreicher, A.F.v. Über die Aufgaben der Unterrichtspolitik im Industriestaate Österreich. Vienna: Hölder, 1881.

Ebert, R. *Zur Entstehung der Kategorie Facharbeiter als Problem der Erziehungswissenschaft.* Bielefeld: Kleine, 1984.

Eichberg, E. *Die Lehrwerkstatt im Industriebetrieb.* Weinheim: Beltz, 1965.

Engelhardt, U. (ed.) *Handwerker in der Industrialisierung. Lage, Kultur und Politik vom späten 18. bis ins frühe 20. Jahrhundert.* Stuttgart: Klett-Cotta, 1984.

Etzioni, A. *Modern Organisations.* Englewood Cliffs: Prentice-Hall, 1964.

Euler, D. Berufsbildung in England im Spannungsfeld ökonomischer und sozialer Entwicklungen. *Kölner Zeitschrift für Wirtschaft und Pädagogik*, 1988, No. 5, pp. 117-137.

European Commission, DG XXII. *Teaching and Learning: towards the learning society. White paper on education and training.* Luxembourg: EUR-OP, 1995.

European Commission, DG XXII. *Lehren und Lernen: auf dem Weg gur kognitiven Gesellschaft. Weissbuch zur allgemeinen und beruflichen Bildung.* Luxembourg: EUR-OP, 1996.

Fenger, H. *Die betriebseigenen Berufsschulen industrieller Betriebe in der Bundesrepublik*, Cologne: Universität, 1968 (Wirtsch.- u. sozialwiss. F., Diss. v. 19).

Feuchthofen, J.E. EG-Bildungspolitik: Durchbruch in Maastricht. *Grundlagen der Weiterbildung 3.* Neuwied: Luchterhand, 1992, 1, pp. 1-4.

Fisher, B.M. *Industrial Education. American Ideals and Institutions.* Madison: Wisconsin UP, 1967.

Fremdling, R. Vergleich der Schutzzollpolitik Frankreichs und des Deutschen Zollvereins in ihren Auswirkungen auf die Modernisierung der Eisenindustrie 1815-1870. In: Blaich, F.; Gerold, A. (eds.) *Die Rolle des Staates für die wirtschaftliche Entwicklung*. Berlin: Duncker und Humblot, 1982.

Friedmann, G. *Der Mensch in der mechanisierten Produktion*. Cologne: Bund-Verlag, 1952.

Geißler, K. et al. (eds.) *Von der staatsbürgerlichen Erziehung zur politischen Bildung*. Berlin: BIBB, 1992.

Genauck, C. *Die gewerbliche Erziehung durch Schulen, Lehrwerkstätten, Museen und Vereine im Königreich Württemberg*. Reichenberg: Schöpfer, 1882a.

Genauck, C. *Die gewerbliche Erziehung durch Schulen, Lehrwerkstätten, Museen und Vereine im Großherzogtume Baden*. Reichenberg: Schöpfer, 1882b.

Genauck, C. *Die gewerbliche Erziehung durch Schulen, Lehrwerkstätten, Museen und Vereine im Königreiche Belgien*. Reichenberg: Schöpfer, 1887.

Georg, W. *Berufliche Bildung des Auslands: Japan. Zum Zusammenhang von Qualifizierung und Beschäftigung in Japan im Vergleich zur Bundesrepublik Deutschland*. Baden-Baden: Nomos, 1993.

Georg, W. Zwischen Tradition und Moderne: Berufsbildung im internationalen Vergleich. In: Arnold, R.; Dobischat, R.; Bernd, O. (eds.) *Weiterungen der Berufspädagogik*. Stuttgart: Steiner, 1997, pp. 153-166.

Georg, W. Die Modernität des Unmodernen. Anmerkungen zur Diskussion um die Erosion der Beruflichkeit und die Zukunft des dualen Systems. In: Schütte, F.; Uhe, E. (eds.) *Die Modernität des Unmodernen. Das 'deutsche System' der Berufsausbildung zwischen Krise und Akzeptanz*. Berlin: BIBB, 1998, pp. 177-198.

Georg, W.; Kunze, A. *Sozialgeschichte der Berufserziehung. Eine Einführung*. Munich: Juventa, 1981.

Georg, W.; Sattel, U. (eds.) *Von Japan lernen? Aspekte von Bildung und Beschäftigung in Japan*. Weinheim: Deutscher Studien-Verlag, 1992.

Georg, W.; Sattel, U. Arbeitsmarkt, Beschäftigungssystem und Berufsbildung. In: Arnold, R.; Lipsmeier, A. (eds.) *Handbuch der Berufsbildung.* Opladen: Leske & Budrich, 1995, pp. 123-141.

Gleitze, B. *Wirtschafts- und sozialpolitisches Handbuch.* Wirtschaftswissenschaftlichen Instituts der Gewerkschaften. Cologne: Bund, 1960.

Göck, K. *Die Gewerblichen Fortbildungsschulen und verwandten Anstalten in Deutschland, Belgien und der Schweiz*. Vienna: Hölder, 1882.

Gonon, Ph.; Müller, A. *Öffentliche Lehrwerkstätten im Berufsbildungssystem der Schweiz.* Lucerne: A. Müller, 1982.

Gonon, Ph. *Das internationale Argument in der Bildungsreform*. Berlin: Peter Lang, 1998.

Gréard, O. La question de l'apprentissage. In: Gréard, O. *Éducation et instruction. Enseignement primaire*. Paris: Hachette, 1887, pp. 173-266.

Greinert, W.-D. *Schule als Instrument sozialer Kontrolle und Objekt privater Interessen. Der Beitrag der Berufsschule zur politischen Erziehung der Unterschichten.* Hanover: Schroedel, 1975.

Greinert, W.-D. Marktmodell – Schulmodell – duales System. Grundtypen formalisierter Berufsbildung. *Die berufsbildende Schule*, 1988, Vol. 40, pp. 145-156.

Greinert, W.-D. Regelungsmuster der beruflichen Bildung: Tradition – Markt – Bürokratie. *BWP–Berufsbildung in Wissenschaft und Praxis*, 1995, Vol. 24, No. 5, pp. 31-35.

Greinert, W.-D. Die Berufsschule am Ende ihrer Entwicklung. Überlegungen zur Krise und notwendigen Reform einer pädagogischen Institution. *Berufsbildung,* 1996, Vol. 41, No. 50, pp. 38-41.

Greinert, W.-D. *Das duale System der Berufsausbildung in der Bundesrepublik Deutschland. Struktur und Funktion,* 3rd ed. Stuttgart: Holland und Josenhans, 1997a.

Greinert, W.-D. *Konzepte beruflichen Lernens unter systematischer, historischer und kritischer Perspektive*. Stuttgart: Holland und Josenhans*,* 1997b.

Greinert, W.-D. *Das 'deutsche System' der Berufsausbildung. Tradition, Organisation, Funktion*, 3rd ed. Baden-Baden: Nomos*,* 1998.

Greinert, W.-D. *Berufsqualifizierung und dritte industrielle Revolution. Eine historischvergleichende Studie zur Entwicklung der klassischen Ausbildungssysteme*. Baden-Baden: Nomos, 1999.

Greinert, W.-D. *Realistische Bildung in Deutschland. Ihre Geschichte und ihre aktuelle Bedeutung*. Baltmannsweiler: Schneider Verlag Hohengehren*,* 2003.

Greinert, W.-D.; Meyser, J. Lernchancen in Produktionsschulen. In: Bonz, B. (ed.) *Didaktik der Berufsbildung.* Stuttgart: Holland und Josenhans, 1996, pp. 132-143.

Greinert, W.-D.; Wiemann, G. *Produktionsschulprinzip und Entwicklungshilfe. Analyse und Beschreibungen*, 3rd ed. Baden-Baden: Nomos, 1997.

Griewank, K. *Die französische Revolution 1789-1799.* Cologne: Böhlau, 1958.

Gross, N.T. Die Industrielle Revolution im Habsburgerreich 1750-1914. In: Cipolla, C.M.; Borchardt, K. (eds.) *Europäische Wirtschaftsgeschichte. Bd. 4: Die Entstehung der industriellen Gesellschaften*. Stuttgart: Fischer*,* 1977, pp. 203-235.

Grossmann, G. Die Industrialisierung Russlands und der Sowjetunion. In: Cipolla, C.M.; Borchardt, K. (eds.) *Europäische Wirtschaftsgeschichte. Bd. 4: Die Entstehung der industriellen Gesellschaften*. Stuttgart: Fischer*,* 1977, pp. 403-433.

Grothe, H. Die technischen Fachschulen in Europa und Amerika. *Verhandlungen des Vereins zur Förderung des Gewerbfleißes*, 1882, Vol. 61, supplementary issue.

Grüner, G. *Die Entwicklung der höheren technischen Fachschulen im deutschen Sprachgebiet: ein Beitrag zur historischen und zur angewandten Berufspädagogik.* Braunschweig: Westermann, 1967.

Grüner, G. Modell Iserlohn. Zur Entwicklung und Bedeutung beruflicher Vollzeit-schulen *Die berufsbildende Schule*, 1977, Vol. 29, pp. 724-734.

Grüner, G. (ed.) *Quellen und Dokumente zur schulischen Berufsbildung 1945-1982*. 2 Vols. Cologne: Böhlau, 1983.

Grüner, G. (ed.) *Quellen und Dokumente zur Entwicklung der österreichischen Staats-Gewerbeschulen*. Cologne: Böhlau, 1987.

Habermas, J. *Legitimationsprobleme im Spätkapitalismus.* Frankfurt a.M.: Suhrkamp, 1973.

Hahn, M. Bürgerlicher Optimismus im Niedergang. Lorenz von Stein und Hegel. Munich: Fink, 1969.

Hanausek, E. *Kritische Bemerkungen über die organisatorischen Verhältnisse von Unterrichtsanstalten gewerblicher Richtung des deutschen Reiches, der Schweiz und Österreichs.* Vienna: Mechitharisten-Buchdruckerei, 1876.

Hanf, G. Berufsausbildung in Berliner Großbetrieben (1900-1920). Von der ökonomischen Rationalisierung zur wissenschaftlichen Rationalität In: Greinert, W.-D. et al. (eds.) *Berufsausbildung und Industrie*. Berlin: BIBB, 1987, pp. 157-187.

Harney, K. *Die preußische Fortbildungsschule. Eine Studie zum Problem der Hierarchisierung beruflicher Schultypen im 19. Jahrhundert*. Weinheim: Beltz, 1980.

Harney, K.; Storz, P. Strukturwandel beruflicher Bildung. In: Müller, D.K. (ed.) *Pädagogik – Erziehungswissenschaft – Bildung. Eine Einführung in das Studium*. Cologne: Böhlau, 1994, pp. 353-381.

Hasfeld, R. *Berufsausbildung im Großherzogtum Baden. Zur Geschichte des 'dualen Systems' im Handwerk.* Cologne: Böhlau, 1996.

Heilandt, A. Berufsabgrenzung in Metallindustrie, Schiffbau und Chemischer Industrie. *Technische Erziehung*, 1926, 1, pp. 4-12.

Henning, F.-W. *Die Industrialisierung in Deutschland 1800 bis 1914,* 5th ed. Paderborn: Schöningh, 1979.

Herkner, V. *Deutscher Ausschuss für Technisches Schulwesen. Untersuchungen unter besonderer Berücksichtigung metalltechnischer Berufe*, Hamburg: Kovak, 2003.

Hesse, H.A. *Berufe im Wandel: ein Beitrag zur Soziologie des Berufs, der Berufspolitik und des Berufsrechts*, 2nd ed. Stuttgart: Enke, 1972.

Higginson, J.H. Michael Sadler and the German Connection. *Oxford Review of Education*, 1990, Vol. 16, pp. 245-253.

Hildebrandt, S. *Berufsausbildung in Frankreich zwischen Staat, Region und Unternehmen.* Berlin: WZB – Forschungsschwerpunkt Arbeitsmarkt und Beschäftigung, 1996 (Wissenschaftszentrum FS I 96-101).

Hölzle, C. *Bildungspolitik in der Europäischen Gemeinschaft. Die Angleichungsproblematik von Bildungssystemen in der Europäischen Gemeinschaft am Beispiel Spaniens*. Cologne: Böhlau, 1994.

Hörner, W. Auf dem Weg zur 'lernenden Gesellschaft'? Zur Logik der Berufsbildung in Frankreich. *Bildung und Erziehung*, 1994, No. 47, pp. 283-303.

Hörner, W. Frankreich. In: Anweiler, O.; U. Boos-Nünning et al.: Bildungssysteme in Europa, 4th ed. Weinheim: Beltz, 1996, pp. 83-107.

Hoffmann, E. *Zur Geschichte der Berufsausbildung in Deutschland.* Bielefeld: Bertelsmann, 1962.

Hoffmann, F. *Die Organisation des Handwerks und die Regelung des Lehrlingswesens auf Grund des Reichsgesetzes vom 26. Juli 1897*, 3rd ed. Berlin: C. Heymann, 1902.

Hofstede, G. Organisationsentwicklung in verschiedenen Kulturen. In: Fatzer, G. (ed.) *Organisationsentwicklung für die Zukunft. Ein Handbuch*. Cologne: Humanistische Psychologie, 1993, pp. 327-348.

Holzmüller, G. Das technische Schulwesen. In: Schmid, K.A. (ed.) *Geschichte der Erziehung vom Anfang bis auf unsere Zeit.* Stuttgart: Cotta, 1902, pp. 293-389.

Homburg, H. Anfänge des Taylorsystems in Deutschland vor dem Ersten Weltkrieg. *Geschichte und Gesellschaft*, 1978, No. 4, p. 171ff.

Horlebein, M. *Die berufsbegleitenden kaufmännischen Schulen in Deutschland (1800-1945).* Frankfurt a.M: Peter Lang, 1976.

Horlebein, M. *Quellen und Dokumente zur Geschichte der kaufmännischen Berufsbildung 1818-1984*. Cologne: Böhlau, 1989.

Hoselitz, B. Unternehmertum und Kapitalbildung in Frankreich und England seit 1700. In: Fischer, W. (ed.) *Wirtschafts- und sozialgeschichtliche Probleme der frühen Industrialisierung*. Berlin: Colloquium Verlag, 1968, pp. 285-338.

Hutchins, B.L.; Harrison, A. *A History of Factory Legislation*, 3rd ed. London: Frank Cass, 1966.

John, P. *Handwerk im Spannungsfeld zwischen Zunftordnung und Gewerbefreiheit*. Cologne: Bund, 1987.

Jost, W. *Gewerbliche Schulen und politische Macht. Zur Entwicklung des gewerblichen Schulwesens in Preußen in der Zeit von 1850-1880*. Weinheim: Beltz, 1982.

Jost, W. (ed.) *Quellen und Dokumente zur Geschichte der technischen Bildung in Deutschland. Teil 1: Das gewerbliche Fachschulwesen 1821-1890*. Cologne: Böhlau, 2003.

Kantor, H.A. *Learning to Earn. School, Work, and Vocational Reform in California 1880-1930.* Madison: Wisconsin UP, 1988.

Karow, W. et al . *Berliner Berufsschulgeschichte. Von den Ursprüngen im 18. Jahrhundert bis zur Gegenwart*. Berlin: Hentrich, 1993.

Kennedy, P. *Aufstieg und Fall der großen Mächte. Ökonomischer Wandel und militärischer Konflikt von 1500 bis 2000*. Frankfurt a.M.: Fischer-Taschenbuch, 1991.

Kern, H.; Sabel, C.F. Verblaßte Tugenden – die Krise des deutschen Produktions-modells. In: Beckenbach, N.; Treek, W.v. (eds.) *Umbrüche gesellschaftlicher Arbeit*. Göttingen: Schwartz, 1994, pp. 605-624 (Soziale Welt, Sonderband 9).

Kerschensteiner, G. *Staatsbürgerliche Erziehung der deutschen Jugend: gekrönte Preisarbeit*. Erfurt: Villaret, 1901a.

Kerschensteiner, G. *Beobachtungen und Vergleiche über Einrichtungen für gewerbliche Erziehung außerhalb Bayern*. Munich: Gerber, 1901b.

Kielhauser, E.A. *Geschichte des gewerblichen Bildungswesens im Alten und Neuen Österreich.* Klagenfurt: Kollitsch, 1931.

Kieslinger, A. Fach- und Berufsbildung. In: Beckerath, E.v. (ed.) *Handwörterbuch der Sozialwissenschaften III*. Stuttgart: Fischer, 1961, p. 425ff.

Kipp, M. *Arbeitspädagogik in Deutschland: Johannes Riedel. Ein Beitrag zur Geschichte und Theorie der beruflichen Ausbildung; mit einer Riedel-Bibliographie.* Hanover: Schroedel, 1978.

Kipp, M. 'Perfektionierung' der industriellen Berufsausbildung im Dritten Reich. In: Greinert, W.-D. et al. (eds.) *Berufsausbildung und Industrie*. Berlin: BIBB, 1987, pp. 213-266.

Kipp; M.; Miller-Kipp, G. *Erkundungen Im Halbdunkel. Einundzwanzig Studien zur Berufserziehung und Pädagogik im Nationalsozialismus.* Frankfurt a.M.: GAFB, 1995.

Knoll, M. Dewey versus Kerschensteiner. Der Streit um die Einführung der Fortbildungsschule in den USA, 1910-1917. In: *Pädagogische Rundschau*, 1993, No. 47, pp. 131-145.

Koch, R. *Duale und schulische Berufsausbildung zwischen Bildungsnachfrage und Qualifikationsbedarf. Ein deutsch-französischer Vergleich.* Bielefeld: Bertelsmann, 1998.

Kocka, J. *Unternehmensverwaltung und Angestelltenschaft am Beispiel Siemens: 1847-1914. Zum Verhältnis von Kapitalismus und Bürokratie in der deutschen Industrialisierung*. Stuttgart: Klett, 1969.

Körzel, R. *Berufsbildung zwischen Gesellschafts- und Wirtschaftspolitik.* Frankfurt a.M.: GAFB, 1996.

Konietzka, D. *Ausbildung und Beruf. Die Geburtsjahrgänge 1919-1961 auf dem Weg von der Schule in das Erwerbsleben*. Opladen: Westdeutscher Verlag, 1999.

Kosellek, R. Staat und Gesellschaft in Preußen 1815-1845. In: Wehler, H.-U. (ed.) *Moderne deutsche Sozialgeschichte*. Cologne: Kiepenheuer & Witsch, 1968, pp. 55-84.

Kosellek, R. *Preußen zwischen Reform und Revolution. Allgemeines Landrecht, Verwaltung und soziale Bewegung von 1791 bis 1848*, 2nd ed. Stuttgart: Klett, 1975.

Krause, E. *Grundlagen einer Industriepädagogik*. Berlin: Beuth, 1961.

Kümmel, K. (ed.) *Quellen und Dokumente zur schulischen Berufsbildung 1918-1945.* Cologne: Böhlau, 1981.

Lane, C. *Management and Labour in Europe. The industrial enterprise in Germany, Britain and France.* Aldershot: Edward Elgar, 1989.

Lane, C. Vocational training and new production concepts in Germany. Some lessons for Britain. In: Edwards, R. u.a. (eds.) *Adult Learners. Education and Training.* London: Routledge, 1993, pp. 113-128.

Lauterbach et al. (ed.) *Strukturen, Vergleich, Ergebnisse, Internationales Handbuch der Berufsbildung*, Vol. I. Baden-Baden: Nomos, 1995.

Lazerson, M.; Grubb, W.N. (eds.) *American Education and Vocationalism. A Documentary History*. New York: Teachers College Press, 1974.

Lempert, W. *Leistungsprinzip und Emanzipation. Studien zur Realität, Reform und Erforschung des beruflichen Bildungswesens.* Frankfurt a.M.: Suhrkamp, 1971.

Lempert, W. Beruf als Politikum. In: *Zeitschrift für Berufs- und Wirtschaftspädagogik*, 1981, Vol. 77, pp. 519-531.

Lempert, W. Beruf und Herrschaft. Zur Kritik und Reform beruflich organisierter Arbeit. In: *Zeitschrift für Berufs- und Wirtschaftspädagogik*, 1982, Vol. 78, pp. 403-416.

Lenz, C.O. Die Rechtsordnung der Europäischen Gemeinschaft. In: Zempelin, H.G. et al. (eds.) *Die soziale Ordnung des Europäischen Binnenmarktes: Einheit oder Vielfalt?* Cologne: Wirtschaftsverlag Bachem, 1991, pp. 67-93.

Levy, H. *Die Grundlagen des ökonomischen Liberalismus in der Geschichte der englischen Volkswirtschaft.* Jena: Fischer, 1912.

Linke, W.-D. *Die Rolle des Reichstages bei der Einschränkung der Gewerbefreiheit. Ein Beitrag zum Problem 'Handwerk und Parlament'.* Berlin: Freie Universität, 1955 (Wirtsch.- u. sozialwiss. F., Diss. v. 3).

Lipsmeier, A. *Technik und Schule. Die Ausformung des Berufsschulcurriculums unter dem Einfluss der Technik als Geschichte des Unterrichts im technischen Zeichnen.* Wiesbaden: Steiner, 1971.

Littek, W. *Industriearbeit und Gesellschaftsstruktur: zur Kritik der Industrie- und Betriebssoziologie.* Frankfurt a.M.: Europäischer Verlag, 1973.

Loose, G. *Berufsvorbereitung in der amerikanischen* high school. *Strukturen, Probleme, Entwicklungsansätze*. Cologne: Böhlau, 1987.

Lundgreen, P. *Techniker in Preußen während der frühen Industrialisierung. Ausbildung und Berufsfeld einer entstehenden sozialen Gruppe*. Einzelveröffentlichungen der Historischen Kommission zu Berlin, Vol. 16, Berlin: 1975.

Lutz, B. Bildungssystem und Beschäftigungsstruktur in Deutschland und Frankreich. Zum Einfluss des Bildungssystems auf die Gestaltung betrieblicher Arbeitskräftestrukturen. In: Mendius, H.G. et al. *Betrieb – Arbeitsmarkt – Qualifikation I.* Frankfurt a.M.: Aspekte, 1976, pp. 83-151.

Lutz, B. *Der kurze Traum immerwährender Prosperität.* Frankfurt a.M.: Campus, 1984.

Lutz, B. Die Grenzen des *effet sociétal* und die Notwendigkeit einer historischen Perspektive. Einige Bemerkungen zum vernünftigen Gebrauch internationaler Vergleiche. In: Heidenreich, M.; Schmidt, G. (eds.) *International vergleichende Organisationsforschung.* Opladen: Westdeutscher Verlag, 1991, pp. 91-105.

Lutz, B. Es geht um die Zukunft qualifizierter Industriearbeit. In: Müntefering, F. (ed.) *Jugend – Beruf – Zukunft: Moderinisierung der Wirtschaft – Modernisierung der beruflichen Bildung.* Marburg: Schüren, 1995, pp. 8-22.

Maier, C. Zwischen Taylorismus und Technokratie: Gesellschaftspolitik im Zeichen industrieller Rationalität in den zwanziger Jahren in Europa. In: Stürmer, M. (ed.) *Die Weimarer Republik. Belagerte Civitas*. Königstein/Ts: Athenäum, 1980, pp. 188-213.

Mantoux, P. *La révolution industrielle au XVIIIème siècle*. Paris: Génin, 1905.

Manz, W. Systemprobleme der Berufsausbildung? In: Schütte, F.; Uhe, E. (eds.) *Die Modernität des Unmodernen*. Berlin: BIBB, 1998, pp. 221-236.

Maurice, M.; Sellier, F.; Silvestre, J.-J. Die Entwicklung der Hierarchie: Untersuchung eines gesellschaftlichen Effektes. In: *Soziale Welt,* 1979, Vol. 30, pp. 295-327.

Maurice, M.; Sorge, A.; Warner, M. Societal differences in organizing manufacturing units: a comparison of France, West Germany and Great Britain. In: *Organisation Studies*, 1980, Vol. 1, No. 1, pp. 59-86.

Maurice, M.; Sorge, A.; Silvestre, J.-J. *Politique d'éducation et organisation industrielle en France et en Allemagne: essai d'analyse sociétale*. Paris: PUF, 1982.

Metz, W. *Der Einfluss von Kerschensteiners Fortbildungsschulpädagogik auf den angelsächsischen Bereich*. Munich: Universität, 1971 (Univ., Philos. Fak., Diss.)

Meyser, J. *Die berufspädagogische Genese des Produktionsschulprinzips. Von den Ursprüngen im 18. Jahrhundert zur aktuellen Situation.* Frankfurt a.M.: Peter Lang, 1996.

Mohl, M. *Aus den gewerbswissenschaftlichen Ergebnissen einer Reise in Frankreich.* Stuttgart: Cotta, 1845.

Monsheimer, O. *Drei Generationen Berufsschularbeit,* 2nd ed. Weinheim: Beltz, 1970.

Mückenberger, U. Nationale Arbeitsrechte und soziales Europa. In: Gattero, B. (ed.) *Modell Deutschland, Modell Europa. Probleme, Perspektiven.* Opladen: Leske und Budrich, 1998, pp. 33-54.

Müller, W.; Shavit, Y. Bildung und Beruf im institutionellen Kontext. In: *Zeischrift für Erziehungswissenschaft*, 1998, Vol. 1, pp. 501-533.

Münch, J. *Berufsbildung und Bildung in den USA. Bedingungen, Strukturen, Entwicklungen und Probleme.* Berlin: Erich Schmidt, 1989.

Münk, D. Deutsche Berufsausbildung im europäischen Kontext: Nationalstaatliche Steuerungskompetenzen in der Berufsbildungspolitik und die Sogwirkung des europäischen Integrationsprozesses. In: Krüger, H.-H.; Olbertz, J.H. (eds.) *Bildung zwischen Staat und Markt.* Opladen: Leske und Budrich, 1997, pp. 91-108.

Muth, W. *Berufsausbildung in der Weimarer Republik*. Stuttgart: Steiner-Verlag-Wiesbaden, 1985.

Nagel, R. *Die Gewerblichen Fortbildungsschulen Deutschlands. Reisestudien und Reformvorschläge aufgrund eines den königl.Preussischen Ministerien des Kultus und Handels eingereichten Reiseberichts.* Eisenach: Bacmeister, 1877.

Nolte, H.; Röhrs, H.-J. (eds.) *Das Berufsbildungsgesetz. Text und Diskussion 1969-1976.* Bad Heilbrunn: Klinkhardt, 1979.

Offe, C. *Berufsbildungsreform. Eine Fallstudie über Reformpolitik.* Frankfurt a.M.: Suhrkamp, 1975.

Pätzold, G. *Die betriebliche Berufsbildung 1918-1945*. Cologne: Böhlau, 1980.

Pätzold, G. (ed.) *Quellen und Dokumente zur Geschichte des Berufsbildungsgesetzes 1875-1981*. Cologne: Böhlau, 1982.

Pätzold, G. (ed.) *Quellen und Dokumente zur betrieblichen Berufsausbildung 1945-1990, Bd. 2.* Cologne: Böhlau, 1991.

Paulinyi, A. Die Umwälzung der Technik in der industriellen Revolution zwischen 1750-1840. In: Paulinyi, A. Troitsch, U. *Mechanisierung und Maschinisierung: 1600-1840.* Berlin: Propyläen, 1991, pp. 268-495.

Pelpel, P.; Troger, V. *Histoire de l'enseignement technique*. Paris: Hachette Éducation, 1993.

Perry, P.J.C. *The Evolution of British Manpower Policy from the Statute of Artificers 1563 to the Industrial Training Act 1964.* London: Perry (self-pub.), 1976.

Pinder, J. Europa in der Weltwirtschaft 1920-1970. In: Cipolla, C.M.; Borchardt, K. (eds.) *Europäische Wirtschaftsgeschichte. Bd. 5: Die europäischen Volkswirtschaften im 20. Jahrhundert*. Stuttgart: Fischer, 1980, pp. 377-411.

Plessner, H. *Die verspätete Nation: über die politische Verführbarkeit bürgerlichen Geistes.* Stuttgart: Kohlhammer, 1959.

Ploghaus, G. Viktor Della-Vos, sein 'Russisches System' und sein internationaler Einfluss auf die Werkstattpädagogik. In: *Zeitschrift für Berufs- und Wirtschaftspädagogik*, 1991, Vol. 87, pp. 5-18.

Ploghaus, G. *Die Lehrgangsmethode in der berufspraktischen Ausbildung. Genese, internationale Verbreitung und Weiterentwicklung*. Bonn: BIBB, 2003.

Pohl, H. (ed.) *Sozialgeschichtliche Probleme in der Zeit der Hochindustrialisierung (1870-1914).* Paderborn: Schöningh, 1979.

Pukas, D. *Die gewerbliche Berufsschule der Fachrichtung Metalltechnik: Ihre Entstehung um die Jahrhundertwende und ihre Entwicklung bis zur Gegenwart.* Alsbach: Leuchtturm-Verlag, 1988.

Reuleaux, F. *Briefe aus Philadelpha.* Braunschweig: Vieweg, 1877.

Reuter, Th. *Schüler-Arbeiten der Königlichen Kunstgewerblichen Fachschule für Metall-Industrie zu Iserlohn.* Iserlohn: 1891.

Rifkin, J. *Das Ende der Arbeit und ihre Zukunft.* Frankfurt a.M.: Campus, 1995.

Rinneberg, K.J. *Das betriebliche Ausbildungswesen in der Zeit der industriellen Umgestaltung Deutschlands*. Cologne: Böhlau, 1985.

Riniker, E. et al. *Das gewerbliche Bildungswesen in Österreich, Württemberg, Frankreich und der Schweiz.* Aarau: Eidg. Handels- und Landwirtschafts Departement, 1884.

Rist, R.C.; Joyce, K. Neue Trends in der US-amerikanischen Berufsbildung. In: *Bildung und Erziehung*, 1994, Vol. 47, pp. 329-342.

Roberts, K. Grossbritannien. In: Richter, I.; Sardei-Biermann, S. (eds.) *Jugendarbeitslosigkeit: Ausbildungs- und Beschäftigungsprogramme in Europa*. Opladen: Leske und Budrich 2000, pp. 57-77.

Rothe, G. *Die Systeme beruflicher Qualifizierung Frankreichs und Deutschlands im Vergleich.* Nuremberg: Institut für Arbeitsmarkt- und Berufsforschung der Bundesanstalt für Arbeit, 1995.

Sadler, M.E. (ed.) *Continuation Schools in England and Elsewhere. Their place in the educational system of an industrial and commercial State*, 2nd ed. Manchester: Manchester University, 1908 (Educational Series; 1).

Schermaier, J. *Die Formen der gewerblichen Berufserziehung bis zum Facharbeiterniveau in Österreich. Unter besonderer Berücksichtigung des Duo-Systems*. Vienna: Notring, 1970.

Scheven, P. *Die Lehrwerkstatt. Technik und qualifizierte Handarbeit in ihren Wechselwirkungen durch die Reform der Lehre.* Tübingen: Laupp, 1894.

Schiersmann, C. *Zur Sozialgeschichte der preußischen Provinzialgewerbeschulen im 19. Jahrhundert*. Weinheim: Beltz, 1979.

Schmidt, G. *Gesellschaftliche Entwicklung und Industriesoziologie in den USA. Eine historische Analyse.* Frankfurt a.M.: Europ. Verlagsanst., 1974.

Schöfer, R. *Berufsausbildung und Gewerbepolitik. Geschichte der Ausbildung in Deutschland*. Frankfurt a.M.: Campus, 1981.

Schlüter, A.; Stratmann, K. (eds.) *Quellen und Dokumente zur betrieblichen Berufsbildung 1869-1918*. Cologne: Böhlau, 1985.

Schriewer, J. Alternativen in Europa: Frankreich. Lehrlingsausbildung unter dem Anspruch von Theorie und Systematik. In: Blankertz, H. et al. (eds.) *Enzyklopädie Erziehungswissenschaft, Bd. 9: Sekundarstufe II, Teil 1: Handbuch.* Stuttgart: Klett-Cotta, 1982, pp. 250-285.

Schriewer, J. Intermediäre Instanzen, Selbstverwaltung und berufliche Ausbildungsstrukturen im historischen Vergleich. In: *Zeitschrift für Pädagogik*, 1986, Vol. 32, pp. 69-90.

Schütte, F. *Berufserziehung zwischen Revolution und Nationalsozialismus. Ein Beitrag zur Bildungs- und Sozialgeschichte der Weimarer Republik*. Weinheim: Deutscher Studien-Verlag, 1992.

Schütte, F. *Technisches Bildungswesen in Deutschland. Aufstieg und Wandel der Technischen Fachschule 1890-1938*. Cologne: Böhlau, 2003a.

Schütte, F. (ed.) *Quellen und Dokumente zur Geschichte der technischen Bildung in Deutschland, Teil 2: Das technische Fachschulwesen 1890-1945*. Cologne: Böhlau, 2003b.

Schule und Wirtschaft: Denkschrift des Deutschen Industrie- und Handelstages (1932). In: *Deutsche Wirtschaftszeitung*, 1932, Vol. 29, pp. 1045-1050.

Schulte, D. (ed.) *Arbeit der Zukunft. Beiträge zur Reformdiskussion im Deutschen Gewerkschaftsbund und seinen Gewerkschaften*, 5 Vols. Cologne: Bund, 1996.

Schwarze, B. *Das Lehrlingswesen der preußisch-hessischen Staatseisenbahn-verwaltung unter Berücksichtigung der Lehrlingsverhältnisse in Handwerks- und Fabrikbetrieben.* Berlin: Springer, 1918.

Seubert, R. *Berufserziehung und Nationalsozialismus: das berufspädagogische Erbe und seine Betreuer*. Weinheim: Beltz, 1977.

Seubert, R. 'Eisen erzieht'. Erinnerungen eines am 'deutschesten Werkstoffe' Gestählten. In: Lisop, I. (ed.) *Die andere Seite: Profile und Liebhabereien gelehrter Männer.* Frankfurt a.M.: GAFB, 1993, pp. 51-82.

Simon, M. *Handwerk in Krise und Umbruch. Wirtschaftliche Forderungen und sozialpolitische Vorstellungen der Handwerksmeister im Revolutionsjahr 1848/49*. Cologne: Böhlau, 1983.

Shadwell, A. *Industrial Efficiency. A Comparative Study of Industrial Life in England, Germany and America*. London: Longmans Green, 1906.

Snell, K.D.M. The apprenticeship system in British history: the fragmentation of a cultural institution. In: *History of Education*, 1996, Vol. 25, pp. 303-321.

Solaux, G. *Les lycées professionnels: le CAP, le BEP, le baccalauréat professionnel*. Paris: CNPD, 1994.

Sombart, W. *Der moderne Kapitalismus. Historisch-systematische Darstellung des gesamteuropäischen Wirtschaftslebens von seinen Anfängen bis zur Gegenwart*. Munich: Dt. Taschenbuch, 1987.

Specht, A. *100 Jahre MSW: Lehrwerkstätten und Berufsschule für Mechanik, Feinmechanik und Elektronik Winterthur, 1889-1989*. Winterthur: MSW, 1989.

Steinbeis, F.v. *Die Elemente der Gewerbeförderung nachgewiesen an den Grundlagen der belgischen Industrie*. Stuttgart: Ebner und Seubert, 1853.

Stratmann, K. Berufsorientierung als pädagogisches Problem. *Zeitschrift für Pädagogik* 1966, 12, p. 570-584.

Stratmann, K. *Die Krise der Berufserziehung im 18. Jahrhundert als Ursprungsfeld pädagogischen Denkens*. Ratingen: Henn, 1967.

Stratmann, K. Kernprobleme der Berufsgrundbildung. *Die Deutsche Berufs- und Fachschule* 1971, 67, pp. 652-677.

Stratmann, K. *'Zeit der Gärung und Zersetzung'. Arbeiterjugend im Kaiserreich zwischen Schule und Beruf*. Weinheim: Deutscher Studien-Verlag, 1992.

Stratmann, K. *Die gewerbliche Lehrlingserziehung in Deutschland. Modernisierungsgeschichte der betrieblichen Berufsbildung. Bd. I: Berufserziehung in der ständischen Gesellschaft (1648-1806).* Frankfurt a.M.: GAFB, 1993.

Stratmann, K. *Berufserziehung und sozialer Wandel.* Frankfurt a.M.: GAFB*,* 1999.

Stratmann, K.; Schlösser, M. *Das duale System der Berufsausbildung. Eine historische Analyse seiner Reformdebatten.* Frankfurt a.M.: GAFB, 1990.

Stratmann, K.; Pätzold, G.; Wahle, M. *Die gewerbliche Lehrlingserziehung in Deutschland. Bd. II: Vom Ende der ständischen Epoche bis zum Beginn der Hochindustrialisierung (1806-1878)*, Frankfurt a.M.: GAFB, 2003.

Stütz, G. (ed.) *Das Handwerk als Leitbild der deutschen Berufserziehung.* Göttingen: Vandenhoeck & Ruprecht, 1969.

Stütz, G. *Berufspädagogik unter ideologiekritischem Aspekt.* Frankfurt a.M.: Suhrkamp, 1970.

Tawny, R.H. The economics of boy labour. *Economic Journal*, 1909, Vol. 19, pp. 517-537.

Thyssen, S. *Die Berufsschule in Idee und Gestaltung.* Essen: Girardet, 1954.

Titze, H. *Die Politisierung der Erziehung. Untersuchungen über die soziale und politische Funktion der Erziehung von der Aufklärung bis zum Hochkapitalismus.* Frankfurt a.M.: Athenäum-Fischer-Taschenbuch-Verlag, 1973.

Tollkühn, G. Zur Statistik der industriellen deutschen Werkschulen. *Technische Erziehung*, 1927, Vol. 2, pp. 119-122.

Toynbee, A. *Lectures on the Industrial Revolution in England: popular addresses, notes and other fragments.* New York: Kelley, 1969.

Troger, V. Du modèle allemand à la scolarisation à plein temps des apprentissages: Le tournant des années 1940-1950. *Revue d'histoire moderne et contemporaine*, 1993, Vol. 40, pp. 490-502.

Verein für Sozialpolitik (ed.) *Verhandlungen der fünften General-versammlung des Vereins für Sozialpolitik am 8., 9. und 10. Oktober 1877*. Leipzig: Verein für Sozialpolitik, 1878 (Schriften des Vereins für Sozialpolitik, 14).

Verein für Sozialpolitik (ed.) *Das gewerbliche Fortbildungswesen. Sieben Gutachten und Berichte.* Leipzig: Verein für Sozialpolitik, 1879 (Schriften des Vereins für Sozialpolitik, 15).

von Stein, L. *Die Verwaltungslehre. Fünfter Teil: Die innere Verwaltung – Zweites Hauptgebiet*. Stuttgart: Cotta, 1868.

von Stein, L. *Handbuch der Verwaltungslehre mit Vergleichung der Literatur und Gesetzgebung von Frankreich, England, Deutschland und Österreich.* Stuttgart: Cotta, 1876.

Waentig, H. *Gewerbliche Mittelstandspolitik: eine rechtshistorisch-wirtschaftspolitische Studie auf Grund österreichischer Quellen.* Leipzig: Duncker und Humblot, 1898.

Weber, M. *Gesammelte Aufsätze zur Religionssoziologie.* Tübingen: Mohr, 1920.

Wernet, W. *Kurzgefasste Geschichte des Handwerks in Deutschland,* 3rd ed. Dortmund: Westdt. Handwerks, 1959.

Wettstein, E. *Die Berufsbildung in der Schweiz. Eine Einführung.* Lucerne: DBK – Deutsch-schweizerische Berufsbildungsämter-Konferenz, 1985.

Wettstein, E. *Die Entwicklung der Berufsbildung in der Schweiz*. Aarau: Sauerländer, 1987.

Wiemann, G. Der 'Grundlehrgang Metall' als systemstiftendes didaktisches Modell einer industrieorientierten Berufsausbildung – eine berufspädagogische Bewertung. In: Arnold, R.; Lipsmeier, A. (eds.) *Betriebspädagogik in nationaler und internationaler Perspektive*. Baden-Baden: Nomos, 1989, pp. 179-196.

Wiemann, G. *Didaktische Modelle beruflichen Lernens im Wandel. Vom Lehrgang zur kunden- und produktionsorientierten Lernorganisation.* Bielefeld: Bertelsmann, 2002.

Wilda, E. *Wahrnehmungen und Gedanken über technisch-gewerbliches Schulwesen.* Leipzig: Knapp, 1879.

Winkler, H. A. Der rückversicherte Mittelstand: Die Interessenverbände von Handwerk und Kleinhandel im deutschen Kaiserreich. In: Rüegg, W.; Neuloh, O. (eds.) *Zur soziologischen*

Theorie und Analyse des 19. Jahrhunderts. Göttingen: Vandenhoeck und Ruprecht, 1971, pp. 163-179.

Winkler, H.A. *Mittelstand, Demokratie und Nationalsozialismus.* Cologne: Kiepenheuer und Witsch, 1972.

Wissell, R. *Des alten Handwerks Recht und Gewohnheit*, 2nd ed. Berlin: Colloquium, 1985.

Wolsing, T. *Untersuchungen zur Berufsausbildung im Dritten Reich.* Kastellaun: Henn, 1977.

Zernack, K. *Polen und Russland. Zwei Wege der europäischen Geschichte*. Berlin: Propyläen, 1994.

Cedefop (European Centre for the Development of Vocational Training)

Mass vocational education and training in Europe
Classical models of the 19th century and training in
England, France and Germany during the first half of the 20th

Wolf-Dietrich Greinert

Luxembourg: Office for Official Publications of the European Communities

2005 – VI, 132 pp. – 21 x 29.7 cm

(Cedefop Panorama series; 118 – ISSN 1562-6180)

ISBN 92-896-0417-4

Cat. No: TI-68-05-769-EN-C

Free of charge – 5157 EN –

04 05 16 TI-68-05-769-EN-C

This investigation forms part of the project entitled 'A European History of Vocational Education and Training' launched by the European Centre for the Development of Vocational Training, which has so far consisted of a conference held in 2002 and an exhibition.

The book contains an overview of the historical development of mass vocational training in Europe during the 19th century — as distinct from academic education. The second half comprises a historical analysis of the three 'classic' training systems in England, France and Germany in the first half of the 20th century.

PANORAMA

Mass vocational education and training in Europe

Classical models of the 19th century and training in England, France and Germany during the first half of the 20th

CEDEFOP
European Centre for the
Development of Vocational Training

Europe 123, GR-570 01 Thessaloniki (Pylea)
Postal address: PO Box 22427, GR-551 02 Thessaloniki
Tel. (30) 23 10 49 01 11, Fax (30) 23 10 49 00 20
E-mail: info@cedefop.eu.int
Homepage: www.cedefop.eu.int
Interactive website: www.trainingvillage.gr

Free of charge – On request from Cedefop

5157 EN

Publications Office
Publications.eu.int

ISBN 92-896-0417-4

9 789289 604178